



الجمهورية العربية السورية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية العلوم الطبية  
قسم الصيدلة

# Program and Course`s Specifications of

## Bachelor of Pharmacy (B. Pharm)

مواصفات البرنامج الأكاديمي  
والمقررات الدراسية

لبرنامج (بكالوريوس الصيدلة)

**2022**

Preparation Committee

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2. Dr. Ali Alyahawi
3. Dr. Nabil Albaser
4. Dr. Abdullah Al-Bajali
5. Dr. Ameen Alwosabi
6. Dr. Anis Thabit



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## 1.BASIC INFORMATION ON THE PROGRAM

<b>Program name &amp; scientific degree awarded</b>	Pharmacy
<b>The entity awarding the degree</b>	Faculty of Medicine and Health Sciences - Pharmacy Department
<b>The academic department responsible for the program</b>	Pharmacy department
<b>Total credit hours /No. of courses</b>	186 Credit hours (182 credit hours as theoretical and practical and 4 credit hours training equivalent to 640 contact hours) / 77 courses/10 semester
<b>Field Training</b>	640 contact hours.
<b>Other departments participating in the program</b>	Faculty of Medicine and Health Sciences (Medical Laboratory dept., applied medical sciences dept.), Computer sciences & IT College (Computer sciences dept.,)
<b>Language of the study</b>	English
<b>Study order</b>	Compulsory attendance (minimum 75 %)
<b>Facility of program execution</b>	The university
<b>Study system</b>	Semester type
<b>Study duration</b>	5 academic levels (Years) consisting of 10 academic semesters, 16weeks/semester
<b>The profession for which the program prepares the students</b>	Pharmacy
<b>Conditions for admission</b>	High-School certificate (Scientific department) with score not less than 75 % or as determined by the ministry of Higher education and scientific research-Yemen. The date of the high-school certificate should not exceed 5 years.
<b>Prepared by</b>	<ol style="list-style-type: none"> <li>1. Dr. Ahmed Al-Ghani</li> <li>2. Dr. Nabil Albaser</li> <li>3. Dr. Abdullah Al-Bajali</li> <li>4. Dr. Anis Thabit</li> <li>5. Dr. Ameen Alwosabi</li> </ol>

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Study plan								
FIRST level ( 1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Arabic language I	لغة عربية 1	RAZ111	University	2	-	2	---
2.	English language	لغة انجليزية	RAZ112	University	2	-	2	---
3.	Computer skills	مهارات حاسوب	RAZ113	University	1	2	2	---
4.	Islamic culture	ثقافة إسلامية	RAZ114	University	2	-	2	---
5.	Introduction to pharmacy	مقدمة في الصيدلة	PHP115	Department	2	-	2	---
6.	General Biology	أحياء عامة	MSC116	College	2	2	3	Co: MSC117
7.	General Chemistry	كيمياء عامة	MSC117	College	2	2	3	Co: MSC116
8.	National culture I	ثقافة وطنية I	RAZ118	University	2	-	2	---
Total					15	6	18	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; : Pr: Prerequisite ; Co: Corequisite

FIRST level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Arabic language II	لغة عربية 2	RAZ121	University	2	-	2	Pr: RAZ111
2.	Communication skills	مهارات اتصال	RAZ122	University	2	-	2	-----
3.	Physics	فيزياء	MSC123	College	2	2	3	Co: PHT124
4.	Mathematics	رياضيات	PHT124	Department	2	-	2	Co: PHT123
5.	English for medical purposes	الانجليزية للأغراض الطبية	MSC125	College	2	-	2	Pr: RAZ112
6.	Organic chemistry	الكيمياء العضوية	PHM126	Department	3	2	4	Pr:MSC117
7.	Anatomy	تشريح	MSC127	College	2	2	3	Pr: MSC116
8.	Drug Discovery & Development	إكتشاف وتطوير الدواء	PHM128	Department	2	-	2	-----
Total					17	6	20	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; : Pr: Prerequisite ; Co: Corequisite

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ECOND level ( 1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Physical Pharmacy	فيزياء صيدلانية	PHT211	Department	2	2	3	Pre: PHT123
2.	Psychology	علم نفس	MSC212	College	2	-	2	-----
3.	Human Physiology I	علم وظائف الأعضاء 1	MSC213	College	2	-	2	Pre: PHC127
4.	Pharmaceutical Organic chemistry	كيمياء عضوية صيدلانية	PHM214	Department	3	2	4	Pre: PHM126
5.	Medical Biochemistry	كيمياء حيوية طبية	MSC215	College	2	2	3	Pre: PHM126
6.	Botany	علم النبات	PHG216	Department	2	2	3	Pre: MSC116
7.	Pharmaceutical Calculations	مهارات الحسابات الصيدلانية	PHT217	Department	2	-	2	Pre: PHT124
8.	National culture2	ثقافة وطنية2	RAZ218	University	2	-	2	-----
Total					17	8	21	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

SECOND level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Human Physiology II	علم وظائف الأعضاء 2	MSC221	College	2	-	2	Pre: MSC213
2.	Pharmaceutics I	صيدلانيات 1	PHT222	Department	2	2	3	Pre: PHT211
3.	Pharmaceutical analytical chemistry I	كيمياء تحليلية صيدلانية 1	PHM223	Department	2	2	3	Pre: PHM214
4.	Pharmacognosy I	علم العقاقير 1	PHG224	Department	2	2	3	Pre: PHG216
5.	Pharmaceutical Microbiology	أحياء دقيقة صيدلانية	PHT225	Department	2	2	3	
6.	Pathology	علم الأمراض	MSC226	College	2	-	2	Co: PHC221
7.	Medicinal Chemistry I	كيمياء دوائية 1	PHM227	Department	3	2	4	Co: PHC228
8.	Pharmacology I	علم أدوية 1	PHP228	Department	2	-	2	Co: PHM227

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Total	17	10	22
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Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

THIRD level (1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Medicinal Chemistry II	كيمياء دوائية 2	PHM311	Department	3	2	4	Pre: PHM225; Co: PHP315
2.	Pharmaceutics I	صيدلانيات 2	PHT312	Department	2	2	3	Pre: PHT222
3.	Medical parasitology	طفيليات طبية	MSC313	College	2	2	3	Pre: PHT225
4.	Pathophysiology	علم الأعضاء المرضي	PHC314	Department	2	-	2	
5.	Pharmacognosy II	علم العقاقير 2	PHG315	Department	2	2	3	Pre: PHG224
6.	Pharmacology II	علم الأدوية 2	PHP316	Department	2	-	2	Pre: PHP228
7.	Pharmaceutical analytical chemistry II	كيمياء تحليلية صيدلانية 2	PHM317	Department	2	2	3	Pre: PHM223
8.	First aid	اسعافات أولية	MSC318	College	2	-	2	
Total					17	10	22	

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

THIRD level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Phytochemistry I	كيمياء عقاقير 1	PHG321	Department	2	2	3	Pre: PHG314
2.	Pharmacology III	علم الأدوية 3	PHP322	Department	2	-	2	Pre: PHP316; Co: PHM326
3.	Pharmaceutics III	صيدلانيات 3	PHT323	Department	2	2	3	Pre: PHT312
4.	Therapeutics I	معالجة دوائية 1	PHP324	Department	2	-	2	Co: PHP327
5.	Pharmaceutical instrumental analysis I	تحليل الي صيدلاني 1	PHM325	Department	2	2	3	Pre: PHM316
6.	Medicinal Chemistry III	كيمياء دوائية 3	PHM326	Department	3	2	4	Pre: PHM311; Co: PHP322
7.	Clinical Pharmacy I	صيدلة سريرية 1	PHC327	Department	2	-	2	Co: PHC328

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8.	Integrated-Case based Learning I	التعلم القائم على الحالات 1	PHC328	Department		2	1	Co: PHC327
Total					15	10	20	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

### OURTH level ( 1<sup>st</sup> semester)

	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
	Pharmaceutical instrumental analysis II	تحليل الي صيدلاني 2	PHM411	Department	2	2	3	Pre: PHM324
1.	Cosmetic preparations	مستحضرات تجميل	PHT412	Department	2	2	3	Pre: PHT323
2.	Phytochemistry II	كيمياء عقاقير 2	PHG413	Department	2	2	3	Pre: PHG321
3.	Clinical Pharmacy II	صيدلة سريرية 2	PHC414	Department	2	-	2	Pre: PHP326; Co:PHP418
4.	Therapeutics II	معالجة دوائية 2	PHP415	Department	2	-	2	Pre: PHP324
5.	Integrated-Case based Learning II	التعلم القائم على الحالات 2	PHC416	Department	-	2	1	Co: PHP414
6.	Experimental Pharmacology	علم الأدوية التجريبي	PHP417	Department	2	2	3	Pre: PHP322
7.	Pharmacology IV	علم الأدوية 4	PHP418	Department	2	-	2	Pre: PHP322;
Total					14	10	19	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

### FOURTH level (2<sup>nd</sup> semester)

	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Advanced Drug Delivery Systems	أنظمة إيصال دواء متقدمة	PHT421	Department	2	-	2	Pre: PHT412
2.	Industrial Pharmacy	صيدلة صناعية	PHT422	Department	3	-	3	Pre: PHT412
3.	Phytotherapy	المعالجة بالأعشاب	PHG423	Department	2	-	2	Pre: PHP417; PHG413
4.	Pharmacy training I	تدريب صيدلاني 1	PHF424	Department	-	-	*2	
5.	Pharmaceutical quality Control	ضبط جودة صيدلانية	PHM425	Department	2	2	3	Pre: PHM411
6.	Biopharmaceutics	صيدلة حيوية	PHT426	Department	2	-	2	Pre: PHC417
7.	Hospital Pharmacy	صيدلة مستشفيات	PHC427	Department	2	-	2	Pre: PHP424

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								Pr: PHP 228, 316, 322, 418.
8.	Toxicology	علم السموم	PHC428	Department	2	-	2	Pre: PHP418
Total					15	2	19	

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite ; \*: equivalent to 10 actual hours weekly at the field for 12 weeks

\*2 credit hour of pharmacy training 2 = 320 contact hours

### FIFTH level (1<sup>st</sup> semester)

	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Pharmaceutical Biotechnology	تقنية حيوية صيدلانية	PHT511	Department	2	-	2	Pr: PHT421
2.	Biostatistics	إحصاء حيوي	MSC512	College	2	-	2	Co: MSC513
3.	Research methodology	طرق بحث	MSC513	College	2	-	2	Co: MSC512
4.	Community Pharmacy	صيدلة مجتمع	PHC514	Department	2	-	2	Co:PHP516
5.	Pharmacogenomics and Gene therapy	جينوما دوائية و معالجة جينية	PHP515	Department	2	-	2	Pr:PHT511
6.	Pharmacy Training II	تدريب صيدلاني 2	PHF516	Department	-	-	*2	Co:PHP514
7.	Pharmacokinetics	حركية الدواء	PHT517	Department	2	-	2	Pr:PHT426
8.	Nuclear Pharmacy	صيدلة نووية	PHT518	Department	2	-	2	Co :PHC515
Total					14	-	16	

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite ; \*: equivalent to 10 actual hours weekly at the field for 12 weeks

\*2 credit hour of pharmacy training 2 = 320 contact hours

### FIFTH level (2<sup>nd</sup> semester)

	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	Pharmacoeconomics & Pharmacoepidemiology	اقتصاد صيدلاني ووبائية دوائية	PHP521	Department	2	-	2	Co: PHP524
2.	Public health	صحة عامة	MSC522	College	2	-	2	Co: MSC523
3.	Professional Ethics and Regulations	أخلاقيات و تشريعات مهنية	MSC523	College	2	-	2	Co:MSC522
4.	Pharmaceutical Marketing	تسويق دوائي	PHC524	Department	2	-	2	Co: PHP521
5.	Graduation Research project	مشروع بحث التخرج	MSC525	College	-	4	2	Pr: MSC512, 513

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Total

8

4

10

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

اجمالي عدد الساعات المعتمدة 186

## مبررات تحديث الخطة الدراسية 2022 في برنامج ( بكالوريوس الصيدلة )

- تطبق هذه الخطة الدراسية على دفعات الطلاب المتحقين بالبرنامج ابتداء من 2022 والمتوقع تخرجهم في 2026/2027 وعلى الدفع التي تليهم إلى حين إجراء التحديث الدوري للبرنامج في 2026

### مبررات التحديث 2022

- 1- تحديث توصيف البرنامج الأكاديمي والمقررات الدراسية بما يطابق القوالب والشروط المعتمدة من مجلس الاعتماد الأكاديمي -وزارة التعليم العالي - اليمن
- 2- التوافق مع التحديثات في محتوى ومراجع المقررات الدراسية تبعاً للمرجعيات الدولية المقررة في البرنامج
- 3- المتطلبات الحديثة في سوق العمل
- 4- المقررات الدراسية :

المبرر	التعديل
	<b>المستوى الأول - الفصل الأول</b>
إدخال الطلاب في دورات تقوية مكثفة في اللغة الانجليزية (برنامج تحضير التوفل) عبر مركز التدريب والتأهيل في الجامعة	تخفيض عدد الساعات المعتمدة لمقرر ( لغة انجليزية) من 4 الى 2
تنفيذ قرار وزارة التعليم العالي والبحث العلمي - اليمن	تقسيم مقرر اللغة العربية الى مقررين دراسيين ( لغة عربية 1 ) يدرس في الفصل الأول و ( لغة عربية 2 ) يدرس في الفصل الذي يليه
تنفيذ قرار وزارة التعليم العالي والبحث العلمي - اليمن	إضافة مقرر ( الثقافة الوطنية 1 )
	<b>المستوى الأول - الفصل الثاني</b>
تنفيذ قرار وزارة التعليم العالي والبحث العلمي - اليمن	أضافة مقرر ( اللغة العربية 2 )
<b>المبرر</b>	

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التعديل	المبرر
المستوى الثاني - الفصل الثالث	
إضافة مقرر ( الثقافة الوطنية 2 )	تنفيذ قرار وزارة التعليم العالي والبحث العلمي - اليمن
المستوى الثاني - الفصل الرابع	
تعديل مسمى مقرر ( الكيمياء التحليلية الصيدلانية ) الى ( الكيمياء التحليلية الصيدلانية 1 )	- التوافق مع المرجعيات الدولية الحديثة
المستوى الثالث - الفصل الخامس	
تعديل مسمى مقرر ( تحليل الي صيدلاني 1 ) الى ( الكيمياء التحليلية الصيدلانية 2 )	التوافق مع المرجعيات الدولية الحديثة
فصل مقرر ( صحة عامة واسعافات أولية ) الى مقرر يدرس الأول ( اسعافات أولية ) في هذا الفصل	التوافق مع المرجعيات الدولية الحديثة
المستوى الثالث - الفصل السادس	
تعديل مسمى مقرر ( تحليل الي صيدلاني 2 ) الى ( تحليل الي صيدلاني 1 )	التوافق مع المرجعيات الدولية الحديثة
تعديل مسمى مقرر ( Pharmacotherapy 1 ) الى ( Therapeutics 1 )	التوافق مع المرجعيات الدولية الحديثة
تعديل مسمى مقرر ( رعاية صيدلانية سريرية 1 ) الى ( صيدلة سريرية 1 )	التوافق مع المرجعيات الدولية الحديثة
المستوى الرابع - الفصل السابع	
إضافة مقرر جديد ( علم الأدوية 4 )	<ul style="list-style-type: none"> <li>التوافق مع المرجعيات الدولية الحديثة</li> <li>تقسيم هذا المقرر الى 4 أجزاء بدلا من 3 أجزاء في الخطة السابقة لعدم كفاية التقسيم السابق لاستيعاب جميع محتويات المقرر</li> </ul>
تعديل مسمى مقرر ( Pharmacotherapy 2 ) الى ( Therapeutics 2 )	<ul style="list-style-type: none"> <li>التوافق مع المرجعيات الدولية الحديثة</li> </ul>
تعديل مسمى مقرر ( رعاية صيدلانية سريرية 2 ) الى ( صيدلة سريرية 2 )	التوافق مع المرجعيات الدولية الحديثة
المستوى الرابع - الفصل الثامن	

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<ul style="list-style-type: none"> <li>•التوافق مع المرجعيات الدولية الحديثة</li> <li>•توجيه المقرر ليصبح أكثر تفصيلا في التأثير الفارماكولوجي و</li> <li>السريري للنباتات الطبية ذات المرجعية العلمية واستخدامها</li> <li>لمعالجة للأمراض الشائعة كجزء من متطلبات مهنة الصيدلة</li> </ul>	تعديل مسمى ومحتوى مقرر (الطب المكمل والبديل ) الى (المعالجة بالأعشاب)
المستوى الخامس – الفصل العاشر	
<ul style="list-style-type: none"> <li>• التوافق مع المرجعيات الدولية الحديثة</li> <li>• Pharmacoeconomics علم صيدلاني</li> <li>حديث يهتم بدراسة معدلات استخدام وتأثير الأدوية</li> <li>على المجموعات السكانية المختلفة</li> </ul>	تعديل مسمى مقرر (اقتصاد صيدلاني (Pharmacoeconomics الى (اقتصاد صيدلاني Pharmacoeconomics & Pharmacoeconomics ووبائية دوائية)
التوافق مع المرجعيات الدولية الحديثة	فصل مقرر ( صحة عامة واسعافات أولية ) الى مقررين يدرس الثاني ( صحة عامة) في هذا الفصل

## 2.Introduction

Al-Razi University and Faculty of Medicine and Health Sciences, in its broad vision, provide a comprehensive medical education services offer a unique & recent program in Pharmacy. Due to the increased need to develop the Pharmacy department to keep up with local, regional, and international challenges competition, with reference to the most important and famous similar programs accredited in international universities. Preparing a professional pharmacy staff with the knowledge and skills necessary to provide safe and standard pharmaceutical care for community people.

### Promising Jobs:

- 1- Community pharmacist in private community pharmacies.
- 2- Hospitals pharmacist: In public and private hospital pharmacies.
- 3- Industrial Pharmacist: In Drugs Industries.
- 4- Clinical Pharmacist: Participation within the medical care team for the purpose of designing treatment plans and carrying out the purpose of monitoring the effect of medication on hospitalized patients.
- 5-Scientific representative: In the field of pharmaceutical marketing in local, regional and international pharmaceutical companies.
- 6- Pharmaceutical Quality Control: A pharmacist for the purpose of monitoring and controlling the quality of manufacturing pharmaceutical products in the Supreme Authority for Medicines and drug control laboratories and pharmaceutical companies.
- 7- Research and development: contributing in the development of pharmaceutical products in research and development centers in pharmaceutical factories and in research centers.

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- 8- Pharmaceutical Management: In pharmacies, pharmaceutical companies and government and private pharmaceutical managements.  
9- The academic field (teaching) in institutes and universities.

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### 3. University Vision, Mission, Values, and Objectives:

#### University vision :

To be the One of the best five special national universities.

#### University mission:

Providing special educational and research service according to the standards of the academic accreditation and quality assurance to prepare graduates with scientific, professional and ethical competence enabling to compete in the labor market, and contribute in the sustainable development in community service.

#### University Core values:

Quality: Accuracy in the design and implementation of educational and research programs

Excellence and Quality: Proficiency in all areas offered by the university, and educational and research excellence in specific academic fields.

Creativity and innovation: Seeking to develop an educational, professional and research environment suitable for creativity and innovation.

Continuous development: continuous improvement of institutional capabilities, administrative practices, educational and research processes.

Social responsibility: Providing a variety of services that contribute to the development and development of society.

#### Special University Objectives (Educational):

1. Confirming religious, national and civilized concepts.
2. Developing and creating academic programs to provide special educational opportunities to match the rapid developments in the fields of medical, technological and administrative sciences.
3. Participating effectively in preparing a qualified human capital scientifically, professionally and ethically that meets the needs of the local and regional labor market.
4. Developing continuously curricula and study plans for all academic programs at the university to match rapid developments in various scientific fields.
5. Raising awareness of the scientific research importance in the progress and development of society, through holding conferences, seminars and various events.

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6. Encouraging translation, publication and authorization and producing qualitative scientific research that contributes to knowledge progress and meets the needs of national development.
7. Providing technical, training and advisory assistance to various community institutions.
8. Providing specialized training and advisory services that contribute to addressing community issues and developing its institutions.
9. Enhancing the university's social responsibility in a way that contributes to achieving sustainable development goals.
10. Providing students with critical creative and scientific thinking skills and positive attitude towards continuous self-learning.

**Strategic goals(Strategic):**

1. Enhancing the institutional abilities and the educational efficiency of the university.
2. Increasing the competitive ability of the university students.
3. Committing in the quality standards and the academic accreditation.
4. Developing the abilities and skills of the academic staff and improving the services offered to them.
5. Expanding and verifying in the qualitative academic programs and higher studies.
6. Sustainably improving the infrastructure and fulfilling attractive learning environment.
7. Building excellent partnership with analogous educational institutions locally, regionally and globally.
8. Focusing on scientific research, authorship, publication and translation.
9. Consolidating in social partnership and specializing in community service.
10. Developing and verifying in capital resources.

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<b>4.Faculty Vision, Mission and Goals:</b>	
<b>Vision:</b>	
Excellence and pioneering in quality of educational and scientific research in Medical sciences programs to contributing in serving the community	
<b>Mission</b>	
Provides special educational and research service according to the standards of the academic accreditation and quality assurance to prepare graduates with scientific, professional and ethical competence enabling to compete in the labor market, and contribute in the sustainable development in community service.	
<b>Values:</b>	
<ul style="list-style-type: none"> <li>- Quality.</li> <li>- Excellence and Quality.</li> <li>- Creativity and innovation.</li> <li>- Continuous development..</li> <li>- Social responsibility.</li> </ul>	
<b>Faculty Objectives (Educational):</b>	
<ol style="list-style-type: none"> <li>1. Providing unique academic health and medical programs to meet the community needs.</li> <li>2. Providing the local and regional community with health and medical specialists qualified scientifically professionally and ethically.</li> <li>3. Attracting distinguished teaching staff and developing their skills and capacities.</li> <li>4. Producing scientific research addressing prior health problems prior in Yemen community.</li> <li>5. Providing qualitative training programs to improve the skills of health sector workers in Yemen.</li> <li>6. Building scientific and research partnerships with educational and research institutions in the health field.</li> </ol>	

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## 5. Program (Department) Vision, Mission & Aims.

### VISION

Pioneering and leadership of pharmacy education in Yemen.

### MISSION

The Pharmacy department is committed to graduate competent pharmacists who are capable to perform the missions related to different aspects pharmacy profession and to enhance pharmaceutical services for the community through implementation of excellent pharmacy educational , training and research standards.

### AIMS

The Department of pharmacy aims to:

1. To provide excellent education and professional development of pharmacy students.
2. To equip of pharmacy graduate students with fundamental knowledge and skills to enhance career opportunities within the pharmaceutical or biotechnology industries, academic pharmaceutical research, or pharmaceutical regulatory organizations.
3. To develop intellectual and professional skills of use to graduates irrespective of their career choice after graduation.
4. To conduct and promote applied research and problem-oriented basic research as a vital element of pharmaceutical sciences.
5. To motivate scholar development in order to maintain high quality teaching and training skills for both undergraduates and postgraduates.
6. To encourage extracurricular activities that enhances faculty image and pride.
7. To encourage and support the development of appropriate pharmacist models for various practice setting.
8. To foster interdisciplinary aspects between faculty of pharmacy and community development needs.

## Program Mission & Aims.

### Mission

Providing outstanding educational and research service in the field of Pharmacy matching the academic accreditation requirements to prepare pharmacists qualified scientifically, practically, professionally and ethically able to compete in the labor market and contribute in improving the pharmacy services provided to the community.

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### **AIMS : The Program of pharmacy aims to**

1. Deliver competent pharmacists supplied with knowledge, skills and ethical values and are capable to compete in the work market.
2. Provide , develop & update pharmacy education , training and research to serve the community and meet its needs and advancement in pharmacy profession and meet the local and international standards.
3. Augment the relationship with the local, regional and international pharmaceutical academic and research institutes and other entities related to Pharmacy profession

### **6. PROGRAM REFERENCES(BENCHMARKS)**

1. Regulations adopted by the Council for Accreditation & Quality Assurance– Ministry of Higher education & scientific research, Yemen.
2. National Academic Reference Standard (NARS) For Pharmacy Bachelor program adopted by the Council for Accreditation & Quality Assurance– Ministry of Higher education & scientific research, 2018, Yemen.
3. Curriculum of similar programs of awarded by:
  1. Saud King University, Saudi Arabia Kingdom
  2. Cairo university, Egypt
  3. Beirut Arab University, Lebanon
  4. Jouf University, Saudi Arabia Kingdom
  5. Eastern- Mediterranean University, North Cyprus
  6. Al-Ain university, United Arab Emirates
  7. National University, Oman
  8. Zamzam University, Sudan

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7. GRADUATE ATTRIBUTES	
At the end of the program, the BPharm graduates will have the following criteria:	
1	<b>Knowledgeable:</b> Comprehensive knowledge associated with practice of pharmacy.
2	<b>Professional practice:</b> recalling knowledge for manufacturing and development of pharmaceutical products and pharmacy practice
3	<b>Care Provider:</b> providing patients with pharmaceutical are ethically and legally.
4	<b>Ethical:</b> acting responsibly in preparing and dispensing medications legally, ethically and with integrity within social and cultural contexts.
5	<b>Problem solver:</b> identifying and solving problems related to pharmacy practice.
6	<b>Communicator:</b> with pharmacists, patients and other health care providers.
7	<b>Leader:</b> performing necessary pharmacy administrative duties and pharmacy practice.
8	<b>Lifelong learning:</b> self-commitment to <b>independent</b> and lifelong learning using up to date technology.

6. Program Intended Learning Outcomes (PILOs):
<b>A. Knowledge and Understanding:</b>
Upon successful completion of undergraduates BPharm program, should be able to:
A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.
A2. Explain the essential knowledge about designing, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.
A3. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.

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## 6. Program Intended Learning Outcomes (PILOs):

**A4.** Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness. 9

**A5.** Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmaco-economic, pharmacoinformatic etc) to optimize the therapeutic outcomes.

### B. Cognitive/ Intellectual Skills:

**Upon successful completion of undergraduates BPharm program, should be able to:**

**B1.** Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.

**B2.** Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..

**B3.** Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.

**B4.** Determine possible strategies to support the national pharmaceutical industries (technologies/formulations) based on potential business opportunities in meeting medical needs of the patient and community.

**B5.** Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.

### C. Practical and Professional Skills:

**Upon successful completion of an undergraduates BPharm program, should be able to:**

**C1.** Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.

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## 6. Program Intended Learning Outcomes (PILOs):

**C2.** Practice extraction/synthesis and analysis of pharmaceutical potential agents.

**C3.** Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.

**C4.** Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.

**C5.** Advise/ educate them on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.

**C6.** Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.

### D. General and Transferable Skills:

**Upon successful completion of an undergraduate BPharm program, graduates should be able to:**

**D1.** Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills

**D2.** Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.

**D3.** Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.

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### 1. Intended Learning Outcomes Mapping:

No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills		
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
1	Arabic language I	RAZ111																√	√		
2	Introduction to pharmacy	PHP115				√			√								√	√			
3	English language	RAZ112			√				√						√					√	
4	General Biology	MSC116	√						√								√	√			
5	Computer skills	RAZ113																√	√		
6	Islamic culture	RAZ114	√						√									√			
7	General Chemistry	MSC117	√						√				√					√	√		
8	National culture1	RAZ118																√	√		
9	English for medical purposes	MSC125	√						√						√				√		

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No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills			
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3	
10	Anatomy	MSC127	√						√											√		
11	Organic chemistry	PHM126	√					√						√	√				√			√
12	Mathematics	PHT124	√						√					√						√		
13	Physics	MSC123	√						√											√		
14	Drug Discovery & Development	PHM128		√	√	√			√									√	√	√	√	
15	Communication skills	RAZ122																	√	√		
16	Arabic language II	RAZ121																	√	√		
17	Pharmaceutical Organic chemistry	PHM214			√			√	√					√	√				√			√
18	Human Physiology I	MSC213	√		√			√	√							√			√	√		
19	Physical Pharmacy	PHT211		√					√					√					√			
20	Psychology	MSC212																	√	√		

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No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills		
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
21	Botany	PHG216			√				√				√	√				√	√		
22	Pharmaceutical Calculations	PHT217		√					√	√						√		√			
23	Medical Biochemistry	MSC215	√		√			√	√			√	√			√	√	√			
24	National culture2	RAZ218																			
25	Pharmaceutics I	PHT222	√	√	√	√			√				√					√			
26	Human Physiology II	MSC221	√		√			√	√								√	√			
27	Pharmaceutical analytical chemistry I	PHM223		√	√	√			√	√		√	√					√	√		
28	Pharmaceutical Microbiology	PHT225	√	√		√			√			√					√	√	√		
29	Pathology	MSC226	√							√						√			√		
30	Pharmacognosy I	PHG224		√	√	√		√				√	√			√		√	√		

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No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills		
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
31	Medicinal Chemistry I	PHM227		√	√	√		√	√	√			√	√		√		√		√	
32	Pharmacology I	PHP228			√	√			√							√		√			
33	Medical parasitology	MSC313	√		√						√	√	√					√			
34	Pharmaceutics II	PHT312	√	√	√	√			√			√						√			
35	Medicinal Chemistry II	PHM311		√	√	√		√	√	√		√	√		√			√		√	
36	Pharmacology II	PHP316			√	√			√							√		√			
37	Pharmacognosy II	PHG315		√	√	√		√			√	√	√		√			√	√		
38	Pathophysiology	PHC314	√					√			√						√	√			
39	Pharmaceutical analytical chemistry II	PHM317		√	√	√			√	√	√	√	√					√		√	
40	First aid	MSC318	√			√				√					√			√			
41	Phytochemistry I	PHG321		√	√	√		√	√			√	√		√			√	√		
42	Pharmacology III	PHP322			√	√			√						√			√			
43	Pharmaceutics III	PHT323	√	√	√	√			√			√						√			

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No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills		
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
44	Therapeutics I	PHP324	√			√			√					√				√		√	
45	Pharmaceutical instrumental analysis I	PHM325		√	√	√			√	√		√	√			√		√	√	√	
46	Medicinal Chemistry III	PHM326		√	√	√		√	√	√		√	√		√			√		√	
47	Clinical Pharmacy I	PHC327				√			√							√		√			
48	Integrated-Case based Learning I	PHC328	√		√				√	√				√		√			√	√	
49	Experimental Pharmacology	PHP417	√		√	√		√	√				√	√				√	√		
50	Integrated-Case based Learning II	PHC416	√		√				√	√				√		√			√	√	
51	Therapeutics II	PHP415	√			√				√				√				√		√	
52	Clinical Pharmacy II	PHC414				√			√							√		√			
53	Phytochemistry II	PHG413		√	√	√		√	√			√	√		√			√	√		

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No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills		
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
54	Cosmetic preparations	PHT412	√	√	√	√					√	√						√			
55	Pharmaceutical instrumental analysis II	PHM411		√	√	√			√	√		√	√		√			√	√	√	
56	Pharmacology IV	PHP418			√	√			√							√		√			
57	Phytotherapy	PHG423		√	√				√	√		√	√					√		√	
58	Advanced Drug Delivery Systems	PHT421	√	√	√	√			√		√	√	√					√			
59	Biopharmaceutics	PHT426	√	√	√	√		√	√			√						√			
60	Industrial Pharmacy	PHT422		√	√				√			√						√			
61	Hospital Pharmacy	PHC427	√			√					√			√				√	√		
62	Pharmaceutical quality Control	PHM425		√	√	√			√	√		√	√		√			√	√		
63	Toxicology	PHC428	√			√			√						√				√		
64	Pharmacy training I	PHF424	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	
65	Biostatistics	MSC512	√															√	√	√	
66	Research methodology	MSC513					√				√					√	√	√	√	√	

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No	Course name	Course Code	Knowledge and Understanding					Intellectual Skills					Professional & practical skills						General & Transferable Skills		
			A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	C6	D1	D2	D3
67	Community Pharmacy	PHC514	√		√	√	√			√		√				√	√	√	√	√	√
68	Pharmacogenomics and Gene therapy	PHP515	√		√	√		√	√	√						√		√	√	√	√
69	Pharmacy Training II	PHF516	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
70	Pharmacokinetics	PHT517	√	√	√	√		√				√						√			
71	Nuclear Pharmacy	PHT518	√	√	√	√			√			√		√				√			
72	Pharmaceutical Biotechnology	PHT511		√	√	√			√							√		√			
73	Pharmaceutical Marketing	PHC524				√	√			√					√			√			
74	Professional Ethics and Regulations	MSC523																√	√		
75	Graduation Research project	MSC525	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
76	Pharmacoeconomics & Epidemiology	PHP521				√	√					√				√		√			
77	Public health	MSC522	√			√				√					√			√			

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## 7. Teaching and Learning Strategies:

- Active Lectures,
- Group Discussion and Activities
- Problem-Based Learning,
- Journal Clubs and Workshops,
- Practical Sessions,
- Case Studies
- Brain Storming
- Field Training in Pharmaceutical Industries,
- Field Training in Community Pharmacies
- Field Training in Hospitals
- Simulated Software Program
- Computer and Web-Based Learning,
- Use of Communication and Information Technology,
- Seminars, Presentation, Project Work,
- Self-Learning.

Teaching Strategy	Description	When to be used ?
- Active Lectures,	It is the most frequently employed teaching method to convey knowledge and explain theories to students. The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b> : It depends on stimulation of the student`s brain through a group of questions &/or <b>Concepts map</b> : which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using <b>learning aids</b> such as Data show projector.	Used in most courses except the courses of pharmacy training 1, pharmacy training 2 and Graduation research project
- Group Discussion and Activities	students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills	Used in courses that require team work such as " <b>integrated-case based learning I</b> " &" <b>integrated-case based learning II</b> " courses, " <b>Graduation research project</b> " courses.

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Teaching Strategy	Description	When to be used ?
- Problem-Based Learning,	In the problem-based learning approach, the most important role falls to the student. The student examines the problem given by the educator and produces solutions for the problem by using both his previous knowledge and the knowledge obtained by researching.	
- Journal Clubs and Workshops,	Used in courses including practical parts e.g. pharmaceuticals, pharmacognosy etc.	
- Practical Sessions,	Students doing experiments in labs individually or in small groups	
- Case Studies	Case study is a research method to gain a better understanding of a subject or process. Case studies involve in-depth research into a given subject, in order to understand its functionality and successes.	
- Brain Storming	Brainstorming is a method of generating ideas and sharing knowledge to solve a particular commercial or technical problem, in which participants are encouraged to think without interruption. Brainstorming is a group activity where each participant shares their ideas as soon as they come to mind.	
- Field Training	The student is commissioned to do certain assignments in a real field including as drug plant, hospitals and community pharmacies under supervision of both the field principle and an academic supervisor	Used in " <b>pharmacy training I</b> " and in " <b>pharmacy training II</b> " courses in Pharmaceutical Industries, in Community Pharmacies, in Hospitals
Simulated Software Program	Design simulation can include a wide range of analyses that virtually test behavior of a product under various operating and environmental conditions. As opposed to trial-and-error, a smart simulation process allows targeted implementation of design choices in various stages of the development cycle.	
- Computer and Web-Based Learning,	Web based learning is often called online learning or e-learning because it includes online course content. Discussion forums via email, videoconferencing, and live lectures (videostreaming) are all possible through the web.	
- Use of Communication and Information Technology,	Information and communication technology contributes greatly to education because it provides a better educational environment. ICT facilitates the communication of information to students through the use of computers, tablets, data displays, interactive electronic boards, and other formats.	
- Seminars, Presentation, Project Work,	Project Seminar provides a systematic theoretical and practical knowledge of innovation' project management. Particularly this course focuses on skills of planning the development of innovative projects and business ideas in order to improve professional competencies.	
<b>Feed-back learning</b>	During teaching theoretical part of the course, the teacher presents problems, questions or issue related to the studied topics and make assignment to the students (individually or as a group) to do (homework to solve the problems, answer or search for answers of the questions or to present a written report or do seminar presentation about the issue in the next class. The strategy is also applied during laboratory practice where the teacher	

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Teaching Strategy	Description	When to be used ?
	assigns the students to perform practical activities. Whether theoretical or practical, the teacher must present the student with a feed-back as assessment or correction of the assignment. Used in almost all courses.	
Self-Learning.	Self-learning is any education or learning that you initiate yourself, away from the setting of formal education, curriculums or examinations. Independent learning is about being self-motivated, disciplined and dedicated to improving yourself and your skill set.	

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## 8. Assessment Methods:

- Short Essays,
- Written Exams
- Oral Exams
- Oral Presentation
- Multiple Choice Questions (MCQs),
- Assignments
- Report/Project Sessions
- Quiz
- Coursework Activities
- Case Presentation
- Faculty assessment by structured observation through checklists and rating scales,
- Seminar Assessment,
- Multi-source assessments, such as Student Self-Assessment,
- Simulations, such as Computer-Based Clinical Scenarios,
- Practical Lab Assessments,
- Practical Lab Reports,
- Problem Solving Exercise
- Graduate Project.
- Work samples, such as, Pharmacy Practice Manual, Logbooks and Portfolios.

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Assessment Strategy	Description
Short Essays,	Short essays usually involve answering a question related to course content and could be anywhere from 200 words to 750 words long, depending on the professor's guidelines.
- Written Exams	<ul style="list-style-type: none"> <li>• Will be used in most courses.</li> <li>• Closed-book pattern.</li> <li>• It is the form of the final exam of theoretical part.</li> <li>• It is the form of the mid-semester exam of theoretical part.</li> <li>• It can also be used for Exam of theory-practice.</li> </ul>
- Oral Exams	Used to assess " Pharmacy training " courses where a specialized committee will implement the exam.
- Oral Presentation	Oral presentations, also known as public speaking or simply presentations, consist of an individual or group verbally addressing an audience on a particular topic. The aim of this is to educate, inform, entertain or present an argument.
- Multiple Choice Questions (MCQs),	A multiple-choice question (MCQ) is composed of two parts: a stem that identifies the question or problem, and a set of alternatives or possible answers that contain a key that is the best answer to the question, and a number of distractors that are plausible but incorrect answers to the question.
- Assignments	The student is assigned to do homework activities (answer questions, solve problems make a report about an issue related to the studies topics) or at the library or by using net (search for an issue) or prepare seminar presentation. The assignment can be individual or as group.
- Report/Project Sessions	Will be used in courses including practical parts and also courses related to filed training
- Quiz	A predefined timed brief question will be asked to be answered by the students most likely in the form of written exam
- Coursework Activities	Coursework can encompass a wide range of activities, including practice, experimentation, research, and writing (e.g., dissertations, book reports, and essays).

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Assessment Strategy	Description
- Case Presentation	The purposes of the case presentations are as follows: 1) Encourage interns to maintain an evidence-based, scientist-practitioner model in everyday clinical work. 2) Practice presentation skills. 3) Improve clinical skills. 4) Respond professionally to questions and feedback.
- Faculty assessment by structured observation through checklists and rating scales,	Rating scales can be used to assess the individual once only or on repeated occasions to show developments over time. They can be completed using information derived from direct observations or from existing information contained in running records or anecdotal records.
- Seminar Assessment,	With seminar evaluation, you get first-hand personal impressions from your event attendees. There are several possibilities at which point you can collect feedback from your seminar participants. Basically, you always build your seminar survey according to the concept: "Introduction – main part – conclusion".
- Practical Lab Assessments,	- Will be used in courses including practical parts. - It is the form of the final exam of practice all part.  In this method, the student will be asked to perform an experiment and deliver the result to the teacher.
Practical Lab Reports,	-Will be used in courses including practical parts and also courses related to filed training and graduation project courses
- Problem Solving Exercise	
- Graduate Project.	A Graduation Project is a formal assignment chosen by a student or small group of students on a topic related to the curriculum and involves out-of-class research and development

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## 12. Alignment of Program Intended Learning Outcomes (PILOs) to Teaching Strategies and Assessment Methods:

### A. Knowledge and Understanding

PILOs	Teaching strategies	Assessment strategies
<p><b>A1.</b> Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.</p> <p><b>A2.</b> Explain the essential knowledge about designing, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.</p> <p><b>A3.</b> Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.</p> <p><b>A4.</b> Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness. 9</p> <p><b>A5.</b> Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmaco-economic, pharmaco-informatic etc) to optimize the therapeutic outcomes.</p>	<ul style="list-style-type: none"> <li>○ Active Lecture</li> <li>○ Tutorial</li> <li>○ Feed-back learning</li> <li>○ Case Studies</li> <li>○ - Self-Learning</li> <li>○ Brain Storming</li> <li>○ Presentation, Project Work,</li> </ul>	<ul style="list-style-type: none"> <li>○ Written exam</li> <li>○ Attendance</li> <li>○ Quiz</li> <li>○ Assignments</li> <li>○ Oral Exams</li> <li>○ Oral Presentation</li> <li>○ Coursework Activities</li> </ul>

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B. Intellectual Skills			
PILOs	Teaching strategies	Assessment strategies	
B1. Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.	<ul style="list-style-type: none"> <li>○ Active Lecture</li> <li>○ Tutorial</li> <li>○ Feed-back learning</li> <li>○ Laboratory practice</li> <li>○ Brain Storming</li> <li>○ Case Studies</li> <li>○ Group Discussion and Activities</li> <li>○ Problem-Based Learning</li> </ul>	<ul style="list-style-type: none"> <li>○ Written exam</li> <li>○ Attendance</li> <li>○ Assignments</li> <li>○ Quiz</li> <li>○ Lab. reporting</li> <li>○ Field-task accomplishment</li> <li>○ Oral Exam</li> <li>○ Practical Lab Assessments</li> <li>○ Report/Project Sessions</li> </ul>	
B2. Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..			
B3. Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.			
B4. Determine possible strategies to support the national pharmaceutical industries (technologies/formulations) based on potential business opportunities in meeting medical needs of the patient and community.			
B5. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.			
C. Professional and Practical Skills			
PILOs	Teaching strategies	Assessment strategies	
C1. Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.	<ul style="list-style-type: none"> <li>○ Laboratory practice</li> <li>○ Field-training</li> </ul>	<ul style="list-style-type: none"> <li>○ Lab. accomplishments</li> <li>○ Lab. attitude</li> <li>○ Field-task accomplishment</li> <li>○ Practical Exam</li> <li>○ Case Presentation</li> <li>○ Problem Solving Exercise</li> </ul>	

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<b>B. Intellectual Skills</b>			
<b>PILOs</b>	<b>Teaching strategies</b>	<b>Assessment strategies</b>	
<b>C2.</b> Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<ul style="list-style-type: none"> <li>○ Laboratory practice</li> <li>○ Field-training</li> <li>○ Feed-back learning</li> </ul>	<ul style="list-style-type: none"> <li>○ Lab. Accomplishment</li> <li>○ Practical Exam</li> <li>○ Assignment</li> <li>○ Graduation research project assessment (by internal &amp; external examiners)</li> <li>○ Field-task accomplishment</li> </ul>	
<b>C3.</b> Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	<ul style="list-style-type: none"> <li>○ Field- training</li> </ul>	<ul style="list-style-type: none"> <li>○ Filed-task accomplishments</li> </ul>	
<b>C4.</b> Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<ul style="list-style-type: none"> <li>○ Feed-back learning</li> <li>○ Group project</li> <li>○ Field-training</li> <li>○ Lab. practice</li> </ul>	<ul style="list-style-type: none"> <li>○ Field- training Reporting</li> <li>○ Graduation research project assessment ( by internal and external examiners)</li> <li>○ Assignments</li> </ul>	
<b>C5.</b> Advise/ educate them on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.			
<b>C6.</b> Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.			
<b>D. General &amp; Transferable Skills</b>			
<b>PILOS</b>	<b>Teaching strategies</b>	<b>Assessment strategies</b>	
<b>D1.</b> Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<ul style="list-style-type: none"> <li>○ Lab. practice</li> <li>○ Group project</li> <li>○ Filed-training</li> </ul>	<ul style="list-style-type: none"> <li>○ Practical assessment (Lab. attendance, attitude, practical exam), Assignments</li> </ul>	

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B. Intellectual Skills		
PILOs	Teaching strategies	Assessment strategies
<b>D2.</b> Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<ul style="list-style-type: none"> <li>○ Lab. practice</li> <li>○ Group project</li> <li>○ Filed-training</li> </ul>	<ul style="list-style-type: none"> <li>○ Practical assessment (Lab. attendance, attitude, practical exam), Assignments</li> </ul>
<b>D3.</b> Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<ul style="list-style-type: none"> <li>○ Lab. practice</li> <li>○ Group project</li> <li>○ Filed-training</li> </ul>	<ul style="list-style-type: none"> <li>○ Practical assessment (Lab. attendance, attitude, practical exam), Assignments</li> </ul>

### Assessment Rules

- (i) No students are allowed to enter the final exam unless he/she has attended at least 75 % of the total number of course lectures/practical sessions.
- (ii) For courses that involve practical parts, the student will not pass the course unless he/she passes both theoretical and practical course parties
- (iii) The student will not pass the course unless he/she gain theoretical and practical course parties
- (iv) The minimum pass degree in the final theoretical exam is 30 % of the estimation weight of the exam.
- (v) The minimum pass degree in the final practical exam is 30 % of the estimation weight of the exam.
- (vi) The student will pass the course if he/she gains at least 50 % of the total the estimation weight of the course.

### Assessment distribution

#### 1. For courses involving only theoretical part

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment %
1	Attendance	1 – 15	5	5
2	Assignments (1 + 2)	4-13, 14	10	10
3	Quiz 1 + Quiz 2	7, 12	5	5
4	Mid-semester exam of theoretical part (written exam)	7	20	20
5	Final exam of theoretical part (written exam)	16	60	60
TOTAL			100	100 %

#### 2. For courses involving both theoretical and practical parts

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1. Theoretical part assessment				
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment
1	Attendance	1 – 15	2	2.5
2	Assignments (1 + 2)	4-13, 14	5	5
3	Quiz 1 + Quiz 2	7, 12	3	2.5
4	Mid-semester exam of theoretical part (written exam)	7	10	10
5	Final exam of theoretical part (written exam)	16	40	40
TOTAL			60	60 %

2. Practical part assessment				
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment
1	Lab. Attendance	Weekly	5	5
2	Lab. Attitude	Weekly	2	2
3	Lab. Accomplishments	Weekly	5	5
4	Reporting	Weekly	3	3
5	Exam of practice theory (written exam or oral exam)	14	5	5
6	Practical exam (practical)	14	20	20
Total			40	40 %

### 3. Field- training assessment

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment
1	Attendance (by the supervisor)	Weekly	10	10 %
2	Attitude (by the supervisor)	Weekly	10	10 %
3	Reporting (by the supervisor)	12th week	10	10 %
4	Task accomplishment (by the supervisor)	13th week	20	20 %
5	Final Committee exam * : Oral exam	16th week	50	50 %

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<b>TOTAL</b>	100	100%
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\* : A committee of three of the teaching staff including the supervisor of the training.  
 The marks of the committee exam are divided as follows:

Item	Mark
Supervisor	10
Committee member 1	20
Committee member 1	20

#### 4. Graduation research project assessment

Each project will be assessed by a committee of three member as follows

Items	Weight
Project supervisor	70 %
Internal examiner: a member of the department teaching staff.	15 %
External examiner: a qualified external examiner (either from other departments of the college or from another university)	15 %
<b>Total</b>	<b>100</b>

Assessment of the project by the project supervisor	
Items	Mark
Attendance	35
Attitude and collaboration	35
<b>Total</b>	<b>70</b>

Assessment of the project by the internal examiner *	
Items	Mark <sup>1</sup>
Research methodology	5
Research writing	5
Presentation & Discussion	5
<b>Total</b>	<b>15</b>

\* The examiner will put the mark for the team as one unit.

Assessment of the project by the external examiner *	
Items	Mark <sup>1</sup>

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Research methodology	5
Research writing	5
Presentation & Discussion	5
<b>Total</b>	<b>15</b>

\* The examiner will put the mark for the team as one unit.

### Description of grades

Table of grades description	
Grade percentage %	Description
95 – 100 %	Excellent +
90 – 94 %	Excellent
85- 89 %	Very good +
80- 84 %	Very Good
75- 79 %	Good +
70- 74 %	Good
65 – 69 %	Pass

•Grade

percentage with fractions greater than or equal 0.5 will be raised directly to the higher grade

- The Table of grades description is used to describe course grade, semester grades , annual grades and overall grade

### **Semester Grades %**

Credit Course grade = courses grade percentage x credit hours of the course

- Semester grade % = cumulative credit courses degrees in the semester / total credit hours of the semester courses

### **Annual Grades%**

Annual grade % = cumulative credit courses grades in the two semesters of the year / total credit hours of courses in the two semesters of the year.

### **Overall Grade %**

Overall grade = cumulative credit courses grades in the five years /186

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Dr. Ameen Alwosabi	Dr. Anis Thabit			

Where, 186 is the total credit hours of courses in the five years of the study

## 9. Program Structure:

No	Requirements	No. of Courses	Credit Hours	Rational Weight %	
1	University Requirements	Compulsory	8	16	%8.9
		Rational Weight %			
2	Faculty Requirements	Compulsory	17	40	%21.5
		Rational Weight %			
4	Department Requirements	Compulsory			
		Rational Weight %			
5	Program Requirements	Compulsory	49	124	%66.7
		Rational Weight %			
6	Field Training	Compulsory	2	4	%2.2
		Rational Weight %			
7	Project Courses	Compulsory	1	2	%1.1
		Rational Weight %			
<b>Total:</b>			<b>77</b>	<b>186</b>	<b>100%</b>

توزيع الساعات الفعلية المنفذة للبرنامج حسب نوع المتطلبات

Total	Program Requirements	Faculty Requirements	University Requirements	contact Hours
3676	2752	664	260	العدد

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Dr. Ameen Alwosabi	Dr. Anis Thabit			

100%	75%	18%	7%	النسبة
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توزيع الساعات الفعلية المنفذة للبرنامج حسب نوع المتطلبات

Total	Field Training	practical at lab	Theoretical	contact Hours
3676	640	620	2416	العدد
100%	17%	17%	66%	النسبة

### a. University Requirements

No.	Level-Sem	Course Code	Course Name	اسم المقرر	Credit Hr.			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	1/1	RAZ111	Arabic language I	لغة عربية 1	2	-	2	
2.	1/1	RAZ112	English language	لغة إنجليزية	2	-	2	
3.	1/1	RAZ113	Computer skills	مهارات حاسوب	1	2	2	
4.	1/1	RAZ114	Islamic culture	ثقافة إسلامية	2	-	2	
5.	1/2	RAZ121	Arabic language II	لغة عربية 2	2	-	2	لغة عربية 1
6.	1/2	RAZ122	Communication skills	مهارات الاتصال	2	-	2	
7.	1/2	RAZ128	National culture1	ثقافة وطنية 1	2	-	2	
8.	2/1	RAZ218	National culture2	ثقافة وطنية 2	2	-	2	
Total				8	15	2	16	

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

### b. Courses required by the College

No.	Level-Sem	Course Code	Course Name	اسم المقرر	Credit Hr.			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
1.	1/1	MSC116	General Biology	احياء عامة	2	2	3	
2.	1/1	MSC117	General Chemistry	كيمياء عامة	2	2	3	
3.	1/2	MSC123	Physics	فيزياء	2	2	3	
4.	1/2	MSC125	English for medical purposes	انجليزي للأغراض الطبية	2	-	2	
5.	1/2	MSC127	Anatomy	تشريح	2	2	3	
6.	2/1	MSC212	Psychology	علم نفس	2	-	2	
7.	2/1	MSC213	Human Physiology I	علم وظائف الانسان 1	2	-	2	

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8.	2/1	MSC215	Medical biochemistry	كيمياء حيوية طبية	2	2	3	
9.	2/2	MSC221	Human Physiology II	علم وظائف الانسان 2	2	-	2	
10.	2/2	MSC226	Pathology	علم الامراض	2	-	2	
11.	3/1	MSC313	Medical parasitology	علم الطفيليات الطبي	2	2	3	
12.	5/1	MSC512	Biostatistics	إحصاء حيوي	2	-	2	
13.	5/1	MSC513	Research methodology	طرق ومناهج بحث	2	-	2	
14.	5/2	MSC522	Public Health	صحة عامة	2	-	2	
15.	3/1	MSC318	First Aid	اسعافات أولية	2	-	2	
16.	5/2	MSC523	Professional ethics and regulations	اخلاقيات ولوائح المهنة	2	-	2	
17.	5/2	MSC525	Graduation Research project	بحث التخرج	2	-	2	
Total					34	12	40	

### c. Courses required by the Department

No.	Level-Sem	Course Code	Course Name	اسم المقرر	Credit Hr.			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
<b>Pharmaceutical Related Courses</b>								
1.	1/1	PHT124	Mathematics	رياضيات	2	-	2	
2.	1/1	PHT211	Physical pharmacy	صيدلة فيزيائية	2	2	3	
3.	1/2	PHT217	Pharmaceutical calculation	حسابات صيدلانية	2	-	2	
4.	1/2	PHT222	Pharmaceutics I	صيدلانيات 1	2	2	3	
5.	1/2	PHT225	Pharmaceutical microbiology	علم الاحياء الدقيقة الصيدلاني	2	2	3	
6.	2/1	PHT312	Pharmaceutics II	صيدلانيات 2	2	2	3	
7.	2/1	PHT323	Pharmaceutics III	صيدلانيات 3	2	2	3	
8.	2/1	PHT412	Cosmetic preparations	مستحضرات تجميل	2	2	3	
9.	2/2	PHT421	Advanced drug delivery systems	أنظمة إيصال الدواء المتقدمة	2	-	2	
10.	2/2	PHT422	Industrial pharmacy	صيدلة صناعية	3	-	3	
11.	3/1	PHT426	Biopharmaceutics	صيدلة حيوية	2	-	2	
12.	5/1	PHT511	Pharmaceutical biotechnology	تكنولوجيا حيوية صيدلانية	2	-	2	
13.	5/1	PHT517	Pharmacokinetics	حركية الدواء	2	-	2	
14.	5/2	PHT518	Nuclear pharmacy	صيدلة نووية	2	-	2	
Total					29	12	35	
<b>II. Medicinal Chemistry and Related Courses</b>								
15.	5/2	PHM128	Drug Discovery & Development	اكتشاف وتطوير الدواء	2	-	2	
16.		PHM126	Organic Chemistry	كيمياء عضوية	3	2	4	
17.		PHM214	Pharmaceutical Organic Chemistry	كيمياء عضوية صيدلانية	3	2	4	

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18.		PHM223	Pharmaceutical analytical chemistry I	كيمياء تحليلية صيدلانية 1	2	2	3	
19.		PHM227	Medicinal chemistry I	كيمياء دوائية 1	3	2	4	
20.		PHM311	Medicinal chemistry II	كيمياء دوائية 2	3	2	4	
21.		PHM317	Pharmaceutical analytical chemistry II	كيمياء تحليلية صيدلانية 2	2	2	3	
22.		PHM325	Pharmaceutical instrumental analysis I	تحليل الي صيدلاني 1	2	2	3	
23.		PHM326	Medicinal chemistry III	كيمياء دوائية 3	3	2	4	
24.		PHM411	Pharmaceutical instrumental analysis II	تحليل الي صيدلاني 2	2	2	3	
25.		PHM425	Pharmaceutical quality control	ضبط جودة صيدلانية	2	2	3	
<b>Total</b>					<b>27</b>	<b>20</b>	<b>37</b>	
<b>II-Pharmacognosy Related Courses</b>								
26.		PHG216	Botany	علم النبات	2	2	3	
27.		PHG224	Pharmacognosy I	علم عقاقير 1	2	2	3	
28.		PHG315	Pharmacognosy II	علم عقاقير 2	2	2	3	
29.		PHG321	Phytochemistry I	كيمياء عقاقير 1	2	2	3	
30.		PHG413	Phytochemistry II	كيمياء عقاقير 2	2	2	3	
31.		PHG423	Phyto-therapy	علاج بالأعشاب	2	-	2	
<b>Total</b>					<b>12</b>	<b>10</b>	<b>17</b>	
<b>Pharmacology and Related Courses</b>								
32.		PHP228	Pharmacology I	علم الادوية 1	2	-	2	
33.		PHP314	Pathophysiology	علم وظائف الاعضاء المرضي	2	-	2	
34.		PHP316	Pharmacology II	علم الادوية 2	2	-	2	
35.		PHP322	Pharmacology III	علم الادوية 3	2	-	2	
36.		PHP324	Therapeutics I	علاجات 1	2	-	2	
37.		PHP415	Therapeutics II	علاجات 2	2	-	2	
38.		PHP417	Experimental pharmacology	علم الادوية التجريبي	2	2	3	
39.		PHP418	Pharmacology IV	علم الادوية 4	2	-	2	
40.		PHP515	Pharmacogenomics and Gene therapy	جينوما دوائية ومعالجة جينية	2	-	2	
41.		PHP521	Pharmacoeconomics & Epidemiology	اقتصاد صيدلاني وعلم الوبائيات	2	-	2	
<b>Total</b>					<b>20</b>	<b>2</b>	<b>21</b>	
<b>Pharmacy Practice and Related Courses:</b>								
42.		PHC115	Introduction to pharmacy	مقدمة الي الصيدلة	2	-	2	
43.		PHC327	Clinical pharmacy I	صيدلة سريرية 1	2	-	2	
44.		PHC328	Integrated-case based learning I	تعلم قائم على الحالات 1	-	2	1	

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45.		PHC414	Clinical pharmacy II	صيدلة سريرية 2	2	-	2	
46.		PHC416	Integrated-case based learning II	تعلم قائم على الحالات 2	-	2	1	
47.		PHC427	Hospital pharmacy	صيدلة مستشفيات	2	-	2	
48.		PHC428	Toxicology	علم السموم	2	-	2	
49.		PHC514	Community Pharmacy	صيدلة مجتمع	2	---	2	
50.		PHC524	Pharmaceutical marketing	تسويق صيدلاني	2	-	2	
Total					14	4	16	
Total					102	48	126	

**Field- Training Courses required by the Department (Graduation Requirements)**

No.	Code	Course		Credit hours
1	PHF424	Pharmacy training I	320hours	2
2	PHF516	Pharmacy training II	320hours	2
Total			640hours	4

**Study plan**

**FIRST level ( 1<sup>st</sup> semester)**

	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Arabic language I	لغة عربية 1	RAZ111	University	2	-	2	---
10.	English language	لغة انجليزية	RAZ112	University	2	-	2	---
11.	Computer skills	مهارات حاسوب	RAZ113	University	1	2	2	---
12.	Islamic culture	ثقافة إسلامية	RAZ114	University	2	-	2	---
13.	Introduction to pharmacy	مقدمة في الصيدلة	PHP115	Department	2	-	2	---
14.	General Biology	أحياء عامة	MSC116	College	2	2	3	Co: MSC117
15.	General Chemistry	كيمياء عامة	MSC117	College	2	2	3	Co: MSC116
16.	National culture I	ثقافة وطنية 1	RAZ118	University	2	-	2	---
Total					15	6	18	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; : Pr: Prerequisite ; Co: Corequisite

**FIRST level (2<sup>nd</sup> semester)**

	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	

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9.	Arabic language II	لغة عربية 2	RAZ121	University	2	-	2	Pr: RAZ111
10.	Communication skills	مهارات اتصال	RAZ122	University	2	-	2	-----
11.	Physics	فيزياء	MSC123	College	2	2	3	Co: PHT124
12.	Mathematics	رياضيات	PHT124	Department	2	-	2	Co: PHT123
13.	English for medical purposes	الانجليزية للأغراض الطبية	MSC125	College	2	-	2	Pr: RAZ112
14.	Organic chemistry	الكيمياء العضوية	PHM126	Department	3	2	4	Pr:MSC117
15.	Anatomy	تشريح	MSC127	College	2	2	3	Pr: MSC116
16.	Drug Discovery & Development	إكتشاف وتطوير الدواء	PHM128	Department	2	-	2	-----
<b>Total</b>					<b>17</b>	<b>6</b>	<b>20</b>	

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

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SECOND level ( 1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Physical Pharmacy	فيزياء صيدلانية	PHT211	Department	2	2	3	Pre: PHT123
10.	Psychology	علم نفس	MSC212	College	2	-	2	-----
11.	Human Physiology I	علم وظائف الأعضاء 1	MSC213	College	2	-	2	Pre: PHC127
12.	Pharmaceutical Organic chemistry	كيمياء عضوية صيدلانية	PHM214	Department	3	2	4	Pre: PHM126
13.	Medical Biochemistry	كيمياء حيوية طبية	MSC215	College	2	2	3	Pre: PHM126
14.	Botany	علم النبات	PHG216	Department	2	2	3	Pre: MSC116
15.	Pharmaceutical Calculations	مهارات الحسابات الصيدلانية	PHT217	Department	2	-	2	Pre: PHT124
16.	National culture2	ثقافة وطنية2	RAZ218	University	2	-	2	-----
Total					17	8	21	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

SECOND level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Human Physiology II	علم وظائف الأعضاء 2	MSC221	College	2	-	2	Pre: MSC213
10.	Pharmaceutics I	صيدلانيات 1	PHT222	Department	2	2	3	Pre: PHT211
11.	Pharmaceutical analytical chemistry I	كيمياء تحليلية صيدلانية 1	PHM223	Department	2	2	3	Pre: PHM214
12.	Pharmacognosy I	علم العقاقير 1	PHG224	Department	2	2	3	Pre: PHG216
13.	Pharmaceutical Microbiology	أحياء دقيقة صيدلانية	PHT225	Department	2	2	3	
14.	Pathology	علم الأمراض	MSC226	College	2	-	2	Co: PHC221
15.	Medicinal Chemistry I	كيمياء دوائية 1	PHM227	Department	3	2	4	Co: PHC228
16.	Pharmacology I	علم أدوية 1	PHP228	Department	2	-	2	Co: PHM227
Total					17	10	22	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisit

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THIRD level (1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Medicinal Chemistry II	كيمياء دوائية 2	PHM311	Department	3	2	4	Pre: PHM225; Co: PHP315
10.	Pharmaceutics I	صيدلانيات 2	PHT312	Department	2	2	3	Pre: PHT222
11.	Medical parasitology	طفيليات طبية	MSC313	College	2	2	3	Pre: PHT225
12.	Pathophysiology	علم الأعضاء المرضي	PHC314	Department	2	-	2	
13.	Pharmacognosy II	علم العقاقير 2	PHG315	Department	2	2	3	Pre: PHG224
14.	Pharmacology II	علم الأدوية 2	PHP316	Department	2	-	2	Pre: PHP228
15.	Pharmaceutical analytical chemistry II	كيمياء تحليلية صيدلانية 2	PHM317	Department	2	2	3	Pre: PHM223
16.	First aid	اسعافات أولية	MSC318	College	2	-	2	
Total					17	10	22	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

THIRD level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Phytochemistry I	كيمياء عقاقير 1	PHG321	Department	2	2	3	Pre: PHG314
10.	Pharmacology III	علم الأدوية 3	PHP322	Department	2	-	2	Pre: PHP316; Co: PHM326
11.	Pharmaceutics III	صيدلانيات 3	PHT323	Department	2	2	3	Pre: PHT312
12.	Therapeutics I	معالجة دوائية 1	PHP324	Department	2	-	2	Co: PHP327
13.	Pharmaceutical instrumental analysis I	تحليل الي صيدلاني 1	PHM325	Department	2	2	3	Pre: PHM316
14.	Medicinal Chemistry III	كيمياء دوائية 3	PHM326	Department	3	2	4	Pre: PHM311; Co: PHP322
15.	Clinical Pharmacy I	صيدلة سريرية 1	PHC327	Department	2	-	2	Co: PHC328
16.	Integrated-Case based Learning I	التعلم القائم على الحالات 1	PHC328	Department		2	1	Co: PHC327
Total					15	10	20	

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Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

FOURTH level ( 1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
	Pharmaceutical instrumental analysis II	تحليل الي صيدلاني 2	PHM411	Department	2	2	3	Pre: PHM324
8.	Cosmetic preparations	مستحضرات تجميل	PHT412	Department	2	2	3	Pre: PHT323
9.	Phytochemistry II	كيمياء عقاقير 2	PHG413	Department	2	2	3	Pre: PHG321
10.	Clinical Pharmacy II	صيدلة سريرية 2	PHC414	Department	2	-	2	Pre: PHP326; Co:PHP418
11.	Therapeutics II	معالجة دوائية 2	PHP415	Department	2	-	2	Pre: PHP324
12.	Integrated-Case based Learning II	التعلم القائم على الحالات 2	PHC416	Department	-	2	1	Co: PHP414
13.	Experimental Pharmacology	علم الأدوية التجريبي	PHP417	Department	2	2	3	Pre: PHP322
14.	Pharmacology IV	علم الأدوية 4	PHP418	Department	2	-	2	Pre: PHP322;
Total					14	10	19	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

FOURTH level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Advanced Drug Delivery Systems	أنظمة إيصال دواء متقدمة	PHT421	Department	2	-	2	Pre: PHT412
10.	Industrial Pharmacy	صيدلة صناعية	PHT422	Department	3	-	3	Pre: PHT412
11.	Phytotherapy	المعالجة بالأعشاب	PHG423	Department	2	-	2	Pre: PHP417; PHG413
12.	Pharmacy training I	تدريب صيدلاني 1	PHF424	Department	-	-	*2	
13.	Pharmaceutical quality Control	ضبط جودة صيدلانية	PHM425	Department	2	2	3	Pre: PHM411
14.	Biopharmaceutics	صيدلة حيوية	PHT426	Department	2	-	2	Pre: PHC417
15.	Hospital Pharmacy	صيدلة مستشفيات	PHC427	Department	2	-	2	Pre: PHP424 Pr: PHP 228, 316, 322, 418.

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16.	Toxicology	علم السموم	PHC428	Department	2	-	2	Pre: PHP418
Total					15	2	19	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite ; \*: equivalent to 10 actual hours weekly at the field for 12 weeks

\*2 credit hour of pharmacy training 2 = 320 contact hours

FIFTH level ( 1 <sup>st</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
9.	Pharmaceutical Biotechnology	تقنية حيوية صيدلانية	PHT511	Department	2	-	2	Pr: PHT421
10.	Biostatistics	إحصاء حيوي	MSC512	College	2	-	2	Co: MSC513
11.	Research methodology	طرق بحث	MSC513	College	2	-	2	Co: MSC512
12.	Community Pharmacy	صيدلة مجتمع	PHC514	Department	2	-	2	Co:PHP516
13.	Pharmacogenomics and Gene therapy	جينوما دوائية و معالجة جينية	PHP515	Department	2	-	2	Pr:PHT511
14.	Pharmacy Training II	تدريب صيدلاني 2	PHF516	Department	-	-	*2	Co:PHP514
15.	Pharmacokinetics	حركية الدواء	PHT517	Department	2	-	2	Pr:PHT426
16.	Nuclear Pharmacy	صيدلة نووية	PHT518	Department	2	-	2	Co :PHC515
Total					14	-	16	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite ; \*: equivalent to 10 actual hours weekly at the field for 12 weeks

\*2 credit hour of pharmacy training 2 = 320 contact hours

FIFTH level (2 <sup>nd</sup> semester)								
	Course Name	اسم المقرر	Code	Requirement Of	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
					Th	Pr.	Cr.hr	
6.	Pharmacoeconomics & Epidemiology	اقتصاد صيدلاني وعلم الوبائيات	PHP521	Department	2	-	2	Co: PHP524
7.	Public health	صحة عامة	MSC522	College	2	-	2	Co: MSC523
8.	Professional Ethics and Regulations	أخلاقيات و تشريعات مهنية	MSC523	College	2	-	2	Co:MSC522
9.	Pharmaceutical Marketing	تسويق دوائي	PHC524	Department	2	-	2	Co: PHP521
10.	Graduation Research project	مشروع بحث التخرج	MSC525	College	-	4	2	Pr: MSC512, 513

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Total	8	4	10
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Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ; Co: Corequisite

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## Study Regulations & requirements

### 1-Admission & Registration Rules

1. The original certificate of secondary school graduation – scientific department- with at least 75 % overall performance grade associated with an authorial stamped copy of the certificate.( or as determined by the ministry of Higher education and scientific research-Yemen).
2. The date of the high-school certificate should not exceed 5 years.
3. For certificates from outside Yemen, they must be translated (if not in Arabic language) and approved by authority entities in Yemen.
4. A photocopy of personal or family identity card.
5. 10 frontal personal photocopies with a white background
6. A copy of the first 8 pages of the passport (for non-Yemeni students)  
The passport should be valid for at least one year to come.
7. A copy for health fitness certificate (for non-Yemeni students).

#### Procedure for registration

Application for admission and registration should be done at the times specified by the university. The person who desires to admit this program should do the following:

1. Review the study system, regulations and the admission requirements (he/she can get a copy from the unit of admission and registration (UAR) in the university).
2. Review the admission application papers offered by the university and fill it by him/herself and deliver it to the (UAR) in the university.
3. Deliver all the required certificates and papers required for admission to the UAR.
4. The administration of the UAR will revise the applier delivered papers to ensure their validation.
5. The UAR inform of the applier that his/her application is accepted/rejected.
6. If the application is accepted. he/she must pay the registration fee and deliver him/her a receipt for that.

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## 2- Attendance and program accomplishment

The followings are ONLY basic terms that regulate the study in this program. Other important terms are delivered by the UAR to those who want to admit this program.

### General regulations

- The student who is regressed in this program will not be allowed to register in another program of the same College at the same time.

### Attendance

- Attendance of the student is Compulsory in this program.
- At least he/she must attend at least 75 % of the study in both parts (theoretical and practical , if any)
- The student who fails to attend 75 % of each part will not be allowed to enter the final exams and will be considered "Failed" in the course. He/she also will not be allowed to attend the complementary exam either.

### Proceeding to next levels

- The student will be processing to the next level (academic year) of the study if he/she passes all the level courses.
- After performing the final exams and the complementary exams:
  - The student who has failed in a total of two courses (in that level or in the previous levels) can proceed to the next level only if one of these courses is a university-required courses.
  - The student who has failed in a total of three courses (in that level or in the previous levels) can proceed to the next level only if one of these courses is a university-required courses.
  - If the student failed in a non-practical based course, he has no need to attend that course in the next year.
  - If the student failed in a -practical based course, he has to attend the whole course again (both theoretical and practical part of the course) in the next year.
  - The student who has passed a course will not be allowed to re-study that course again.

### Outage and suspension of the study

#### The study outage

- The study outage is a state when the student stopped attending the study and has not deliver a request to suspend it. The outage period allowed is maximum of three academic years.
- The new curriculum (if any) of the program is applied to the outage student when he/she re-joins the study.

#### Suspension of the study

- The maximum allowed period of suspension is a maximum of two academic years or four academic semesters either consecutive or not.

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## 2- Attendance and program accomplishment

- The new curriculum (if any) of the program is applied to the suspending student when he/she re-joins the study.
  - The student who wants to suspend the study must himself/herself (or a person authorized by him/her) deliver a written request to the dean of the College associated with a reasonable excuse for suspension.
  - If the first semester has started, it is not permitted to accept requests of suspension.
- Withdrawal from the study**
- The student who wants to withdraw from the study must himself/herself (or a person authorized by him/her) deliver a written request to the dean of the College.
  - He/she must pay all financial fees of the study and must be free from demands from all related units of the university.

## 3- Graduation requirement

Requirement	Details
Total number of courses and credit hours required for graduation	<ul style="list-style-type: none"> <li>• A total of 76 course + graduation project research course of a total of 186 credit hours</li> </ul>
<b>Total number of actual field training hours required for graduation.</b>	<ul style="list-style-type: none"> <li>• <b>640 actual hours</b></li> </ul>
Minimum grade for success in every course.	<ul style="list-style-type: none"> <li>• The minimum grade % is 65 %                      With conditions that the student must Attain at least 30 % of the degree of:                     <ul style="list-style-type: none"> <li>○ the final theoretical exam</li> <li>○ the final practical exam</li> <li>○ the committee degree for graduation pharmacy field training courses.</li> </ul> </li> <li>• The minimum grade % is 65 % and the minimal grade is (pass)</li> </ul>

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## Learning Resources

### I. Teaching aids

The program has the following learning sources

Teaching aid	Sections	Detail
White Boards		At least One at each classroom
Library	Office equipments :	Reading tables, Computer tables, chairs , Shelves for books and periodicals
	Books and Periodicals	suitable number of books and periodicals that comprehend all courses
	Electronic Books	the library computers will be supplied with a variety number of electronic books and CDs that comprehend a lot of courses
Information technology sources	Computer desktops	( 6 computers at the library and 50 at the computer lab.)
	Data show projectors	3
	Printer s	(1) at the library , (1) at the computer lab, (1) at the photocopy services center
	Photocopy machine	(1) at the library , (1) at the photocopy services center
	Scanner	(1) at the library , (1) at the computer lab, (1) at the photocopy services center
	Flash memory cards (6 G) and CDs	Suitable amounts at at the library (1) at the photocopy services center
	Internet links	(1) at the library , (1) at the computer lab
	Wireless networks	In the middle of the College

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## II. Laboratories

### 1. Number and names of lab.

No.	Lab. Name
i.	Pharmaceutics & Industrial pharmacy Lab.
ii.	Pharmaceutical Instrumental analysis Lab.
iii.	Physics & physiotherapy Lab
iv.	Pharmacognosy & Phytochemistry Lab.
v.	Chemistry Lab.
vi.	Basic medical Lab.
vii.	Biology & Microbiology Lab.
viii.	Lab. investigation Laboratory
ix.	Virtual Pharmacy
x.	Computer Lab.

### 2. Tools and Equipment in the Laboratory

#### a. Glassware , plastic ware and other wares

Appropriate quantities based on requirements of the lab

Tools
Filter papers; Test-tubes ; Burettes ; Glass rods ; Conical flasks ; Calibrated flasks ; Beakers Funnels ; Separating funnels ; Measuring volumetric cylinders ; Pipettes ; Package Bottles; Mortar and pestles,

#### b. Simple Essential instruments

Appropriate quantities based on requirements of the lab

Instrument
Electronic balances (2 digits )
Thermometers(electronic and mercuric)
Water bath (6 well)
Bunsen burners

#### c. Safety aid

Aid	Quantity
First- aid set	1 in every lab.

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Fire extinguisher <b>bottle</b>	1 in every lab.
Cabinet for evaporated Gases and vapor suction system : whenever necessary	1 in every lab. (whenever necessary)
Air ventilation system	1 in each lab window
Safety instruction chart	1 in every lab.

**d. Specialized equipment's in Laboratories**

**i. Pharmaceutics & Industrial pharmacy Lab.**

No.	equipment name	Quantity
1.	Manual capsule fillers	1
2.	Homogenizer	2
3.	Centrifuge.	1
4.	Sieves	10
5.	pH Meter	4
6.	Suppository Mould	2 (1g), 2 (2 g)
7.	Magnetic stirrer	2
8.	Melting point apparatus	1
9.	Hot plate	1

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10.	Desiccators	1
11.	Tablet Coating – pan	1
12.	UV/visible Spectrophotometer	1
13.	Refrigerator	1
14.	Tablet single press	1
15.	US Sonnicator	1
16.	Buchner filtration system	2
17.	Electric Shaker	1

## ii. Pharmaceutical instrumental analysis lab

No.	equipment name	Quantity
1.	High performance liquid chromatography (HPLC) with UV detector	1
2.	Gas chromatography with flame photometer	1
3.	Dissolution apparatus	1
4.	Disintegration apparatus	1
5.	Hardness tester	1
6.	Friability tester	1
7.	UV/visible Spectrophotometer	1

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8.	Magnetic stirrer	1
9.	Homogenizer	1
10.	Electric Shaker	1

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### iii. Physics Lab

1.	equipment name	Quantity
2.	Electromagnetic field inducer	1
3.	Hirsto Arch instrument	1
4.	Galvanometer	1
5.	Rheostat3600ohm	2
6.	Dry battery	1
7.	Micrometer	2
8.	Triple glass prism	2
9.	Triple plastic prism	3
10.	Lenses (different types)	2 boxes
11.	Spring for Hawk`s constant	1
12.	Electric wires for connection	1
13.	Voltammeter	1

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**(iv) Pharmacognosy & Phytochemistry Lab**

No.	equipment name	Quantity
1	Chromatography column	2
2	Hot plate	1
3	Soxhlet apparatus With heating mantle	2
4	Oven	1
5	Rotary evaporator	1
6	Electric Shaker	1
7	Simple distillation apparatus	2
8	Steam distillation apparatus	2
9	TLC chamber	2
10	Magnetic stirrer	2
11	Light Microscopes	18
12	Electric grinder	2
13	Manual cutter	1
14	U .V lamp	1
15	Micro pipettes	5
16	Desiccators	3
17	Buchner filtration system	10
18	Chromatography plates	30

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**(v) Chemistry lab**

No.	equipment name	Quantity
1.	UV/visible Spectrophotometer	1
2.	Hot plate	1
3.	Oven	1
4.	Buchner filtration system	3
5.	Autoclave	1
6.	Magnetic stirrer	2
7.	US Sonicator	1
8.	pH Meter	2
9.	Micro pipettes	5

**(vi) Basic Medical sciences Lab.**

Anatomy/physiology models : Hip , eye, cardiac, kidney, dental care, skull, skeleton, elbow, male/female urogenital system, joints, muscular system, Brain, nervous system, Alimentary system, bones,	One of each model
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**(vii) Biology & Microbiology Lab.**

No.	equipment name	Quantity
1.	Autoclave	1
2.	Light Microscopes	20
3.	Oven	1
4.	Hot plate	2

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No.	equipment name	Quantity
5.	Incubator	1
6.	pH Meter	2
7.	Cupboard Storage	1
8.	Refrigerator	1
9.	Light Microscopes	10
10.	Petri dishes	<b>100</b>

**(viii) Laboratory investigations lab**

No.	Equipments / tools	Quantity
1.	Histology teaching slides	1 box
2.	Light Microscopes	20

**(ix) Virtual pharmacy**

•Shelves of appropriate size 4 x 4 m
•Instructional charts for pharmaceutical calculations
•Empty out-packages of a lot of pharmaceutical products available in Yemeni drug market and comprehend all generic names and variety of dosage forms
•Table + computer desktop + electronic program of drug indexes e.g. Mosby
•+ electronic books of drug indexes such as " Clinician drug index, BNF"
•A group of books of drug indexes e.g. MEPPPO, MIMS

**(x) Computer lab**

Computer desktops and appendices : 30 on appropriate table Chairs
•Printer : 1
•Scanner : 1
•Internet link

2.

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### 3. Chemicals & Reagents in the laboratory

A variety types of chemicals and reagents including acids, alkalis, plain elements, salts, solvents, indicators and others are required.

14. Program Evaluation		
Evaluation Target	Evaluation period and tool	Samples
Final year students	Annual Questionnaire	50 % of the final-year students
Program Graduates	Every 2 years Questionnaire	50 % of the graduates
Employment entities	Every 3 years (Questionnaire & Meeting)	<ul style="list-style-type: none"> <li>Supervisors of med. Representatives in a marketing Drug company</li> <li>Manager of a local drug factory</li> <li>Head pharmacist in a private hospital</li> <li>Head pharmacist in a public hospital</li> <li>Manager of the Quality control lab. in the supreme board of drugs</li> </ul>

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# Annex

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**Annex 1: Survey of Visions of University, Faculty and Department.**

	Vision
<b>University</b>	To be one of the best five special national universities.
<b>Faculty</b>	Excellence and pioneering in quality of education and scientific research in Medical sciences programs to contribute in serving the community
<b>Department.</b>	Pioneering and leadership of pharmacy education in Yemen.
<b>Program</b>	Pioneering and leadership of pharmacy education in Yemen.

**Annex 2: Survey of Missions of University, Department and Program.**

	Mission
<b>University</b>	Providing distinct educational and research services that meet the standards of the academic accreditation and quality assurance with the aim to prepare graduates with scientific, professional and ethical competence that enable them to compete in the work market, and to contribute in the sustainable development in community service.
<b>Faculty</b>	Provides distinct educational and research services that meet the standards of the academic accreditation and quality assurance with the aim to graduate medical professionals supported with scientific, professional and ethical competences that enable them to compete in the work market, and to contribute in the sustainable development in community service.
<b>Department.</b>	The Pharmacy department is committed to graduate competent pharmacists who are capable to perform the missions related to different aspects pharmacy profession and to enhance pharmaceutical services for the community through implementation of excellent pharmacy educational, training and research standards.
<b>Program</b>	Providing outstanding educational and research service in the field of Pharmacy matching the academic accreditation requirements to prepare pharmacists qualified scientifically, practically, professionally and ethically able to compete in the labor market and contribute in improving the pharmacy services provided to the community.

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**Annex 3: Survey of Objectives of University, Faculty, Department and Program.**

	Objectives
<b>University</b>	<ol style="list-style-type: none"> <li>1. Confirming religious, national and civilized concepts.</li> <li>2. Developing and creating academic programs to provide special educational opportunities to match the rapid developments in the fields of medical, technological and administrative sciences.</li> <li>3. Participating effectively in preparing a qualified human capital scientifically, professionally and ethically that meets the needs of the local and regional labor market.</li> <li>4. Developing continuously curricula and study plans for all academic programs at the university to match rapid developments in various scientific fields.</li> <li>5. Raising awareness of the scientific research importance in the progress and development of society, through holding conferences, seminars and various events.</li> <li>6. Encouraging translation, publication and authorization and producing qualitative scientific research that contributes to knowledge progress and meets the needs of national development.</li> <li>7. Providing technical, training and advisory assistance to various community institutions.</li> <li>8. Providing specialized training and advisory services that contribute to addressing community issues and developing its institutions.</li> <li>9. Enhancing the university's social responsibility in a way that contributes to achieving sustainable development goals.</li> <li>10. Providing students with critical creative and scientific thinking skills and positive attitude towards continuous self-learning.</li> </ol>
<b>Faculty</b>	<ol style="list-style-type: none"> <li>1. Providing unique academic health and medical programs to meet the community needs.</li> <li>2. Providing the local and regional community with health and medical specialists qualified scientifically professionally and ethically.</li> <li>3. Attracting distinguished teaching staff and developing their skills and capacities.</li> <li>4. Producing scientific research addressing prior health problems prior in Yemen community.</li> <li>5. Providing qualitative training programs to improve the skills of health sector workers in Yemen.</li> <li>6. Building scientific and research partnerships with educational and research institutions in the health field.</li> </ol>
<b>Department.</b>	<ol style="list-style-type: none"> <li>1. To provide excellent education and professional development of pharmacy students.</li> </ol>

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	<ol style="list-style-type: none"> <li>2. To equip of pharmacy graduate students with fundamental knowledge and skills to enhance career opportunities within the pharmaceutical or biotechnology industries, academic pharmaceutical research, or pharmaceutical regulatory organizations.</li> <li>3. To develop intellectual and professional skills of use to graduates irrespective of their career choice after graduation.</li> <li>4. To conduct and promote applied research and problem-oriented basic research as a vital element of pharmaceutical sciences.</li> <li>5. To motivate scholar development in order to maintain high quality teaching and training skills for both undergraduates and postgraduates.</li> <li>6. To encourage extracurricular activities that enhances faculty image and pride.</li> <li>7. To encourage and support the development of appropriate pharmacist models for various practice setting.</li> <li>8. To foster interdisciplinary aspects between faculty of pharmacy and community development needs.</li> </ol>
<p><b>*Program</b></p>	<ol style="list-style-type: none"> <li>1. Deliver competent pharmacists supplied with knowledge, skills and ethical values and are capable to compete in the work market.</li> <li>2. Provide , develop &amp; update pharmacy education , training and research to serve the community and meet its needs and advancement in pharmacy profession and meet the local and international standards.</li> <li>3. Augment the relationship with the local, regional and international pharmaceutical academic and research institutes and other entities related to Pharmacy profession.</li> </ol>

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**Annex 4: Survey of Similar Visions of Accredited Programs at Reference Universities**

University	Faculty	Program	Vision
Cairo-Egypt	Pharmacy	Bachelor in Pharmacy Sciences	Maintains its national leadership and continues its distinction in the field of pharmacy
Beirut-Arab-Lebanon	Pharmacy	Bachelor in Pharmacy	To be among the top universities in the region, with a global perspective that generates multi-cultural leaders equipped with competence and insightfulness for the development and progress of the society.
Jouf-University-KSA	Pharmacy	Bachelor in Pharmacy	To be a leading program in Pharmacy education, research and community services according to the national and international standards
Al-Ain-UAE	Pharmacy	Bachelor in Pharmacy	To emerge as a leading pharmacy program by offering excellence and value-based quality in pharmaceutical education, pharmacy practice to serve the society and the profession, and thus improve the healthcare of the community and the country
Eastern Mediterranean - Northern Cyprus	Pharmacy	Bachelor in Pharmacy	Our vision is to grow qualified and conscientious professionals who work in line with universal criteria of pharmacy profession, show respect towards their profession, work towards the benefit of the society, possess analytical thinking and work effectively in a team in the scope of pharmaceutical sciences and community health
National-Oman	Pharmacy	Bachelor in Pharmacy	Our vision is to be recognized nationally and internationally for quality education in pharmacy and research in pharmaceutical and health-related topics. The curriculum is integrated throughout.
Zamzam-Sudan	Pharmacy	Bachelor in Pharmacy	Leadership and excellence in building knowledge and research society
King Saud-KSA	Pharmacy	Bachelor in Pharmacy	Seeks to be a pioneer in the development of health by combining education, training and scientific research.

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**Annex 5: Survey of Similar Missions of Accredited Programs at Reference Universities**

University	Faculty	Program	Mission
Cairo-Egypt	Pharmacy	Bachelor in Pharmacy Sciences	We are committed to qualify graduates who adhere to values and Ethics of the pharmacy profession. Graduates are able to compete locally and internationally via academic and professional programs that meet the market need by using advanced teaching strategies.
Beirut-Arab - Lebanon	Pharmacy	Bachelor in Pharmacy	BAU has been committed, since its establishment in 1960, to offer outstanding educational programs and to provide an embracing environment for academic creativity and development of leadership skills, instilling the concept of social responsibility, while respecting diversity and multicultural understanding. The University promotes a stimulating academic atmosphere for its academic staff to ensure excellence in research and the dissemination of its outcomes to address community needs, both nationally and internationally. BAU relies on the contribution of the University's expertise in the sustainable development of the local community while maintaining engagement with its alumni. BAU believes in its highly efficient leadership, well-structured governance system and greatly motivated academic staff.
Jouf-University-KSA	Pharmacy	Bachelor in Pharmacy	Preparing competent pharmacists equipped with state of the art knowledge and skills to ethically practice various pharmaceutical disciplines with the ability to contribute in research and community development.
Al-Ain-UAE	Pharmacy	Bachelor in Pharmacy	The mission of the Bachelor of Science in Pharmacy (BSc. Pharm) program is to graduate outstanding, highly competent and motivated pharmacists with advanced knowledge and understanding of pharmacy practice; problem solving and transferable skills; ability to think independently to meet higher level expectations in the health care needs of the society, improve delivery of essential pharmacy services, ensure human health through optimization of using effective, safe and economic drug therapy and enhance pharmaceutical activities through pharmaceutical care and pharmaceutical industry, especially in areas of continued-education, services and research.
Eastern Mediterranean - Northern Cyprus	Pharmacy	Bachelor in Pharmacy	The fundamental mission of the Eastern Mediterranean University Pharmacy Faculty is to graduate qualified pharmacists and scientists who have conceived the principles and ethical concepts of pharmacy as a profession and who are equipped with high level fit-out at international standards to serve as first-step health advisors in the community. The

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University	Faculty	Program	Mission
			Faculty also aims to contribute to the scientific research both locally and globally, to use the obtained knowledge for the benefit of the community and, last but not least, to become the best and the most respected faculty of pharmacy within our region by passing on knowledge necessary for obtaining employment in international drug industry and the other branches of this profession.
National-Oman	Pharmacy	Bachelor in Pharmacy	Transform students into global citizens with a quest for knowledge and its application, for the betterment of society.
Zamzam-Sudan	Pharmacy	Bachelor in Pharmacy	Leadership and excellence in building knowledge and research society
King Saud-KSA	Pharmacy	Bachelor in Pharmacy	we are committed to graduating pioneers in pharmacology by providing high-quality education and scientific research aimed at serving the community and developing the profession.

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**Annex 6: Survey of Similar Objectives of Accredited Programs at Reference Universities**

University	Faculty	Program	Objectives
Cairo-Egypt	Pharmacy	Bachelor in Pharmacy Sciences	The main aim of the undergraduate program is to foster pharmacists who can attain a successful career and provide skilled and ethical pharmaceutical care. This is achieved through developing a program with an appropriate mix of basic, pharmaceutical, medical, social, behavioral management, health and environmental sciences. The multidisciplinary courses of our program prepare our pharmacy graduates to work in any of the various fields of pharmacy including community pharmacies, hospitals, pharmaceutical firms, pharmaceutical Industrial companies as well as, academic and research institutes..
Beirut-Arab-Lebanon	Pharmacy	Bachelor in Pharmacy	<ul style="list-style-type: none"> <li>• Preparing pharmacists who are able to apply their unique knowledge and skills during their professional practice, and are committed to the code of ethics, and dedicated to life-long learning.</li> <li>• Continuous development of the curriculum to keep up with the global changes and to cope with the growing professional and community needs.</li> <li>• Enhancing the intended outcomes and competencies necessary to attain the international standards of the pharmacy profession.</li> <li>• Advancement of professional training programs for pharmacy students and graduates to maintain high quality pharmaceutical care.</li> <li>• Enhancement of the scientific research at the Faculty and supporting the collaboration with local and international peer institutions.</li> <li>• Providing the community with research experts capable of effective participation in the advancement and preservation of the environment.</li> <li>• Supporting the collaboration with regulatory authorities, pharmaceutical and health care settings, and other community sectors.</li> </ul>
Jouf-University-KSA	Pharmacy	Bachelor in Pharmacy	<p>1. Provide high quality education, training and occupational development to students by using the most recent technologies, which is essential for highly professional pharmacists.</p> <p>2. Promote self-learning, professionalism, ethics, teamwork, and continuing educational concepts.</p>

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University	Faculty	Program	Objectives
			<p>3. Encourage research activities and prepare research facilities to perform objective research in core areas of the program, which fit institutional and community need</p> <p>4. Prepare graduates to become leaders who improve the health and wellness of the Public through drug discovery and development, pharmacy practice models, and community health services</p>
Al-Ain-UAE	Pharmacy	Bachelor in Pharmacy	
Eastern Mediterranean - Northern Cyprus	Pharmacy	Bachelor in Pharmacy	
National-Oman	Pharmacy	Bachelor in Pharmacy	<ul style="list-style-type: none"> <li>○ To impart knowledge, skills and values to practice the profession of Pharmacy anywhere in the globe</li> <li>○ To provide students with the basic knowledge of clinical science for patient centered pharmaceutical care</li> <li>○ To improve students' knowledge in information technology and other soft skills to practice profession of pharmacy in any sector</li> <li>○ To help students become self-directed lifelong learners and display self-awareness and self-improvement</li> <li>○ To foster students curiosity and inquisitiveness to build their research capability in clinical pharmacy or pharmaceutical sciences</li> <li>○ To prepare students to practice the profession with utmost dignity, integrity and ethics</li> <li>○ To inculcate professional competency to become leaders in practice setup and able to tackle the future challenges successfully.</li> </ul> <p>To encourage the student's mindset for creativity and innovation for entrepreneurship.</p>
Zamzam-Sudan	Pharmacy	Bachelor in Pharmacy	<p>Within ten years, we have endeavored to be a model in terms of raising the quality of university scientific programs and meeting the needs of the community and the needs of the civil service in the public and private sectors, taking into consideration the changes in the needs of the labor market in the fields of service and industry. We also aim to participate in the work of sustainable development of the Sudanese society not only in education but also through consultative and voluntary work in coordination with the official authorities and civil society through:</p>

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University	Faculty	Program	Objectives
			<ul style="list-style-type: none"> <li>* Contribute to the development of higher education in various disciplines and branches.</li> <li>* Ensure that the learning process is parallel with the teaching process.</li> <li>• Achieve alignment between university outputs and development requirements.</li> <li>* Developing a stimulating educational and research environment for students, professors and researchers.</li> <li>* Utilizing modern techniques in teaching and evaluation with periodic evaluation to keep pace with the continuous development in the academic field.</li> <li>* Double the collection of books, reference books and digital resources annually</li> <li>* Integration of academic programs with scientific and psychological counseling programs in order to be a modern academic institution by all standards.</li> <li>* Recruit the best cadres, especially retired Sudanese and returnees to their homeland.</li> <li>* Building relationships with similar institutions in Arab, African, Asian, European and American countries.</li> <li>* Interest in the improvement of the required languages according to specialized studies (at least two languages).</li> <li>* Linking the college's programs with the requirements of the internal and external labor market and establishing</li> </ul>
King Saud-KSA	Pharmacy	Bachelor in Pharmacy	Graduating highly qualified pharmacists Establish, develop and maintain the best graduate and post-doctoral training programs Conducting pharmaceutical research that serves national priorities Developing the pharmacy profession in various fields Creating opportunities that diversify the college's revenues Enhance the college's image as service providers to the community

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**Annex- 7, Aligning the Mission of University, and Mission of Faculty:**

Key Words		University Missions				
		Educational and research service	Standards of the academic accreditation and quality assurance	Prepare graduates with scientific, professional, and ethical	Compete in the work market	Contribute to community service
<b>Faculty Missions</b>	Educational and research service	√				
	Standards of the academic accreditation and quality assurance		√			
	Prepare graduates with scientific, professional, and ethical			√		
	Compete in the work market				√	
	Contribute to community service					√

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**Annex- 8, Aligning the Mission of Faculty and Mission of Department(program)**

Key Words		Faculty Missions				
		Educational and research service	Standards of the academic accreditation and quality assurance	Prepare graduates with scientific, professional, and ethical	Compete in the work market	Contribute to community service
<b>Department (program) Missions</b>	Educational and research service in the field of Pharmacy	√				
	matching the academic accreditation requirements		√			
	prepare pharmacists qualified scientifically, practically, professionally and ethically			√		
	compete in the labor market and contribute in improving the pharmacy services				√	
	provided to the community.					√

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**Annex 9, Aligning the Mission of the Program and Similar Missions of Accredited Programs at Reference Universities**

Key Words		Missions of Similar Programs							
		Cairo University Faculty of Pharmacy	Arabic Beirut University Faculty of Pharmacy	Jouf University Faculty of Pharmacy	Al-Ain University Faculty of Pharmacy	Eastern Mediterranean University Faculty of Pharmacy	National University Faculty of Pharmacy	Zamzam University Faculty of Pharmacy	King Saud University Faculty of Pharmacy
Program Missions	Educational and research service in the field of Pharmacy	√	√	√	√	√	--	√	√
	matching the academic accreditation requirements	--	√	--	--	√	--	--	--
	prepare pharmacists qualified scientifically, practically, professionally and ethically	√	--	--	√	√	--	√	√
	compete in the labor market and contribute in improving the pharmacy services	√	--	√	√	√	--	--	--
	provided to the community.	--	√	√	√	√	√	--	√

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**Annex 10: Aligning the Mission of the Program and Objectives of Program**

Key Words		Faculty Missions				
		Excellent pharmacy educational, training and research standards.	Standards of the academic accreditation and quality assurance	To perform the missions related to different aspects pharmacy profession	Committed to graduate competent pharmacists	Contribute to pharmaceutical services for the community
Program Objectives	Deliver competent pharmacists supplied with knowledge, skills and ethical values and are capable to compete in the work market.	√	--	--	√	--
	Provide, develop & update pharmacy education training and research to serve the community and meet its needs and advancement in pharmacy profession and meet the local and international standards.	√	√	√	--	√
	Augment the relationship with the local, regional and international pharmaceutical academic and research institutes and other entities related to Pharmacy profession	√	√	√	--	--

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**Annex 11: Aligning the Objectives of the Program and Similar Objectives of Accredited Programs at Reference Universities**

Key Words		Objectives of Similar Programs							
		Cairo University Faculty of Pharmacy Egypt	Arabic Beirut University Faculty of Pharmacy Lebanon	Jouf University Faculty of Pharmacy KSA	Al-Ain University Faculty of Pharmacy Emirate	Eastern Mediterranean University Faculty of Pharmacy Cyprus Western	National University Faculty of Pharmacy Oman	Zamzam University Faculty of Pharmacy Sudan	King Saud University Faculty of Pharmacy KSA
Program Objectives	Deliver competent pharmacists supplied with knowledge, skills and ethical values and are capable to compete in the work market.	√	√	√	--	--	√	√	√
	Provide, develop & update pharmacy education training and research to serve the community and meet its needs and advancement in pharmacy profession and meet the local and international standards.	√	√	√	--	--	√		√
	Augment the relationship with the local, regional and international pharmaceutical	√	√	√	--	--	√	√	√

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	academic and research institutes and other entities related to Pharmacy profession								
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**Annex- 12: Survey of Similar Accredited Programs at Reference Universities (Benchmarks)**

Program No	The academic program	The University	The Faculty	The Department	The Country	Degree Award at Program Completion	Program Accrediting Body	Year of Accreditation	Study Duration	Web site
Current program	Pharmacy	Al-Razi University	Faculty of medicine & health sciences	Pharmacy department	Yemen	BSc. Pharmacy	Council for Accreditation of quality Assurance Standards, Yemen Republic Standards for Specialist Education and Practice	2007	5 years	<a href="https://med.alraziuni.edu.ye/en/faculty-departments/pharmacy">https://med.alraziuni.edu.ye/en/faculty-departments/pharmacy</a>
1 <sup>st</sup> Program	Pharmacy	Cairo University	Faculty of Pharmacy	Pharmacy	Egypt	BSc. Pharmacy	The National Authority for Education Quality Assurance and Accreditation-Egypt	1955	5 years	<a href="https://www.pharma.cu.edu.eg/english/AcademicPrograms/UgPrograms/Regular/UgCourses.aspx">https://www.pharma.cu.edu.eg/english/AcademicPrograms/UgPrograms/Regular/UgCourses.aspx</a>
2 <sup>nd</sup> Program	Pharmacy	Beirut-Arab University	Faculty of Pharmacy	Pharmacy	Lebanon	BSc. Pharmacy	Ministry of Higher Education & Scientific Research -Lebanon			<a href="https://www.bau.edu.lb/Program/Pharmacy/Bachelor/Pharmacy">https://www.bau.edu.lb/Program/Pharmacy/Bachelor/Pharmacy</a>
3 <sup>rd</sup> Program	Pharmacy	Jouf-University	Pharmacy	Pharmacy	KSA	BSc. Pharmacy		1430	5 years	<a href="https://www.ju.edu.sa/en/colleges/health-college/college-of-pharmacy/b-pharm-program/vision-mission-and-goals-of-bpharm-program/">https://www.ju.edu.sa/en/colleges/health-college/college-of-pharmacy/b-pharm-program/vision-mission-and-goals-of-bpharm-program/</a>
4 <sup>th</sup> Program	BSc. Pharmaceutical Sciences	Al-Ain Emirate University	Faculty of Pharmacy	Pharmacy	UAE	BSc. Pharmacy	Ministry of Higher Education & Scientific Research -Emirate	2007	5 years	<a href="https://pharmacy.aau.ac.ae/en/programs/bachelor-of-science-in-pharmacy">https://pharmacy.aau.ac.ae/en/programs/bachelor-of-science-in-pharmacy</a>
5 <sup>th</sup> Program	Pharmacy	Eastern Mediterranean – University	Faculty of Pharmacy	Pharmacy	Northern Cyprus	BSc. Pharmacy	Ministry of Higher Education & Scientific Research - Northern Cyprus	1969	5 years	<a href="https://www.emu.edu.tr/en/programs/pharmacy-bpharm-undergraduate-program/814?tab=curriculum">https://www.emu.edu.tr/en/programs/pharmacy-bpharm-undergraduate-program/814?tab=curriculum</a>
6 <sup>th</sup> Program	Pharmacy	National University	Faculty of Pharmacy	Pharmacy	Oman	BSc. Pharmacy	Ministry of Higher Education & Scientific Research -Oman		5 years	<a href="https://www.nu.edu.om/content/details.aspx?id=20">https://www.nu.edu.om/content/details.aspx?id=20</a>
7 <sup>th</sup> Program	Pharmacy	Zamzam University	Faculty of Pharmacy	Pharmacy	Sudan	BSc. Pharmacy	Ministry of Higher Education & Scientific Research -Sudan		5 years	<a href="http://zamzam.edu.sd/curriculum-b-pharmacy/">http://zamzam.edu.sd/curriculum-b-pharmacy/</a>
8 <sup>th</sup> Program	Pharmacy	King Saud University	Faculty of Pharmacy	Pharmacy	KSA	BSc. Pharmacy	Ministry of Higher Education & Scientific Research -King Saudi Arabia		5 years	<a href="https://dar.ksu.edu.sa/sites/dar.ksu.edu.sa/files/imce_images/bphs.pdf">https://dar.ksu.edu.sa/sites/dar.ksu.edu.sa/files/imce_images/bphs.pdf</a>

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**Annex 13: Survey of the Study System Current Program and Similar Programs at Reference Universities:**

No.	The Country	The University	The Faculty	The Program	Study System	Credited hours	No. Courses	Notes
<b>Current Program</b>								
	Yemen	Al-Razi Uni.	Faculty of Medicine and Health Sciences	Pharmacy	Semester type, 5 years (10 semesters)	186 hr.	77	
<b>Correspondence programs</b>								
1	KSA	King Saud Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	174 hr.	64	
2	Egypt	Cairo Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	163 hr.	59	
3	Lebanon	Beirut-Arab Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	180 hr.	75	
4	KSA	Jouf Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	170 hr.	72	
5	UAE	Al-Ain Emirate Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	160 hr.	59	
6	Northern Cyprus	Eastern Mediterranean University	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	190 hr.	63	
7	Oman	National Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 4 years (11 semesters)	146 hr.	51	
8	Sudan	Zamzam Uni.	Faculty of Pharmacy	Pharmacy	Semester type, 5 years (10 semesters)	189 hr.	72	

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**Annex 14: Learning outcomes of the Pharmacy Program**

Upon successful completion of an undergraduate Pharmacy Program, graduates should be able to:

Fields	Code	Learning Outcomes (PILOs)
A. Knowledge & Understanding	A1	<b>A1.</b> Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.
	A2	<b>A2.</b> Explain the essential knowledge about designing, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.
	A3	<b>A3.</b> Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.
	A4	<b>A4.</b> Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.
	A5	<b>A5.</b> Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmaco-economic, pharmacoinformatic etc) to optimize the therapeutic outcomes.
B. Cognitive & Intellectual skills	B1	<b>B1.</b> Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.
	B2	<b>B2.</b> Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..
	B3	<b>B3.</b> Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.
	B4	<b>B4.</b> Determine possible strategies to support the national pharmaceutical industries (technologies/formulations) based on potential business opportunities in meeting medical needs of the patient and community.
	B5	<b>B5.</b> Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.

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Fields	Code	Learning Outcomes (PILOs)
C. Practical & Professional skills	C1	<b>C1.</b> Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.
	C2	<b>C2.</b> Practice extraction/synthesis and analysis of pharmaceutical potential agents.
	C3	<b>C3.</b> Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.
	C4	<b>C4.</b> Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.
	C5	<b>C5.</b> Advise/ educate them on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.
	C6	<b>C6.</b> Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.
D. Transferable skills	D1	<b>D1.</b> Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills
	D2	<b>D2.</b> Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.
	D3	<b>D3.</b> Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.

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**Annex 15: Survey of Similar Graduates Attributes of Accredited Programs at Reference Universities.**

No	University/Faculty	Graduate Attributes
1.	Cairo University Egypt	<p>The graduates of the Faculty of Pharmacy, Cairo University should demonstrate outstanding skills as follows:</p> <p>I.1. Be able to deal with and handle chemicals and natural products in a safe way.                      I.2. Handle pharmaceutical products effectively according to pharmacy law and legislations.                      I.3. Use materials from different sources in preparation and formulation of different products.                      I.4. Formulate and dispense different pharmaceutical products.                      I.5. Store and distribute drug products according to good storage practice                      I.6. Apply principles of quality control and quality assurance for pharmaceutical products and natural products.                      I.7. Analyze qualitatively and quantitatively raw materials, pharmaceutical products, and biological samples                      I.8. Perform according to Good Laboratory Practice (GLP), Good Pharmaceutical Manufacturing Practice (GPMP) and current Good Manufacturing Practice (cGMP) guidelines                      I.9. Educate patients and community about proper and safe use of medications as well as risks of abuse drugs, radiation and different xenobiotics.                      I.10. Provide patients with information about the purpose and use of medications and medical devices as well as management of toxicities and medical emergencies.                      I.11. Demonstrate principles of understanding of etiology, pathophysiology and management of diseases.                      I.12. Work effectively with different health care professionals using evidence based information.                      I.13. Plan, design and conduct research                      I.14. Demonstrate good presentation, marketing and business administration skills                      I.15. Develop numeracy and statistics skills                      I.16. Develop information technology skills                      I.17. Communicate clearly with different professions                      I.18. Demonstrate problem solving and time management skills.                      I.19. Demonstrate capability of decision-making and working in a team.                      I.20. Apply legal, ethical, social, cultural, economical and professional codes.                      I.21. Implement different professional skills throughout his professional career.                      I.22. Upgrade his/her professional and scientific information by continuous learning</p>
	Beirut Arab University Lebanon	Not found
	Jouf University KSA	1. Knowledge and Understanding: Possessing in-depth knowledge and understanding of various disciplines of pharmacy like pharmaceuticals,

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No	University/Faculty	Graduate Attributes
		<p>pharmaceutical chemistry, biomedical science, clinical pharmacy, pharmacology, and pharmacognosy.</p> <p>2. Problem Solving Skills: Having the ability to critically analyze and apply the knowledge and basic principles of various disciplines of pharmacy in solving problems and making decisions during daily pharmacy practice.</p> <p>3. Research Skills: Practicing research techniques to solve problems in the various disciplines of pharmacy.</p> <p>4. Practical and Physical Skills: Performing complex practical experiments in the field of pharmacy, taking into consideration the proper usage of available resources and application of safety measures.</p> <p>5. Communication Skills: Communicating effectively with pharmacy and medical communities and society through writing effective reports, making effective presentations.</p> <p>6. Information Technology Skills: Having the ability to use a variety of information technology tools and applications to support pharmacy related research.</p> <p>7. Ethics: Demonstrating integrity, professional and academic ethics and commitment to citizenship principles while delivering pharmacy services.</p> <p>8. Autonomy and Personal Development: Mastering selflearning skills required for life-long learning and professional development in the various disciplines of pharmacy practice.</p>
4.	Al-Ain University Emirate	Not found
5.	Eastern Mediterranean – University Cyprus Western	Not found
6.	National University Oman	Not found
7.	Zamzam University	Not found
8.	King Saud University KSA	Not found

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**Annex 16: Survey of Similar Learning Outcomes of Accredited Programs at Reference Universities.**

No.	University	Learning Domains	Learning Outcomes
1.	Cairo University Egypt	Knowledge & Understand	II.1. Basic principles of physical, organic, inorganic and analytical chemistry. II.2. Basic principles of mathematics, computer sciences, and biophysics. II.3. Principles of pharmaceutical, medical, health and environmental sciences as well as pharmacy practice. II.4. Principles of social, behavioural and pharmacy management sciences. II.5. Types of active and inactive ingredients used in the preparation of pharmaceutical products as well as their physical and chemical properties. II.6. Principles of biotechnology and radio-labelled products. II.7. Different analytical procedures taking into account GLP guidelines and different validation procedures II.8. Principles of isolation, purification, identification and standardization methods of active substances and primary chemicals from natural and synthetic origin. II.9. Principles of synthesis and purification of active pharmaceutical ingredients II.10. Basics of stereoisomerism, drug-receptor interaction using various techniques. II.11. Pharmacodynamics of existing drugs to develop and synthesize new drugs. II.12. Fundamentals of clinical applications of targeted therapies II.13. Different types of pharmaceutical dosage forms. II.14. Properties and advantages of novel drug delivery systems II.15. Principles of equipment and techniques used in different stages of pharmaceutical industry including synthesis, and distribution of pharmaceutical compounds. II.16. Unit operation and unit processes; sampling, packaging, labelling and proper storage of pharmaceutical compounds from different origins. II.17. Basics of pharmacokinetics and biopharmaceutics principles. II.18. Therapeutic drug monitoring, dose adjustment and bioequivalence studies. II.19. Principles of hospital pharmacy including total parenteral nutrition and drug distribution system II.20. Sources and control of microbial contaminations, sanitation, disinfection, and other public health issues. II.21. Principles of sterilization and microbiological quality control of pharmaceutical products. II.22. Principles of physiology and pathophysiology. II.23. Principles of genomics and molecular biology technique. II.24. Biochemical pathways and their correlation with various diseases. II.25. Etiology, signs and symptoms of different diseases. II.26. Interpretation of different laboratory diagnostic results.

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No.	University	Learning Domains	Learning Outcomes
			II.27. Mechanism of action, therapeutic use, dosage of different pharmacological drug classes as well as, from natural origin. II.28. Adverse drug reactions, interactions, contraindications and other properties of different pharmacological drug classes including drugs of natural sources. II.29. Basis of clinical pharmacology, and rational drug use. II.30. Principles of alternative and complementary therapy.
		Cognitive/ Intellectual Skills	III.1. Proper use of international union of pure and applied chemistry (IUPAC) nomenclature as well as pharmaceutical and medical terminology. III.2. Handle chemicals and natural products according to safety guidelines. III.3. Dispose hazardous solvents in laboratories using safety measures. III.4. Demonstrate skills in compounding and dispensing pharmaceutical preparations III.5. Apply adequate conditions for storing, handling and distribution of pharmaceutical preparations according to their nature and constitution as stated in the specified storage conditions. III.6. Extract and isolate active ingredients from different sources. III.7. Synthesize preliminary chemical substances and active constituents of different drug categories. III.8. Purify and identify the newly synthesized chemical compounds or drugs. III.9. Detect impurities in different pharmaceutical preparations and assess their limits. III.10. Estimate different active ingredients using various analytical tools and techniques. III.11. Select the appropriate medication therapy for a given disease based on its etiology, pathophysiology, severity, patient medical history, possible interactions and age-related factors. III.12. Evaluate the selected drug therapy based on the patient`s progress and laboratory results. III.13. Perform the suitable laboratory tests to diagnose infectious and non-infectious diseases. III.14. Apply the appropriate techniques for qualitative and quantitative assessment of microbial growth. III.15. Assess the activity of different antimicrobial agents in controlling microbial growth. III.16. Investigate toxicity profiles of different xenobiotics III.17. Test for poisons in biological samples. III.18. Determine drug metabolites in biological samples
		Practical and Professional Skills	IV.1. Use pharmaceutical knowledge in formulating safe and effective medicines. IV.2. Deal properly with new drug delivery systems. IV.3. Implement GLP, GMP, GSP, GCP and GPMP guidelines in pharmacy practice. IV.4. Select appropriate tools or analytical method for the assay and quality control of raw materials and pharmaceutical products. IV.5. Select appropriate biological method for the assay of different drug classes. IV.6. Predict and prevent physical, chemical and biological incompatibilities during dispensing process. IV.7. Select suitable methods for isolation, identification and standardization of active pharmaceutical substances.

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No.	University	Learning Domains	Learning Outcomes
			IV.8. Select suitable methods for synthesis, purification and identification of active pharmaceutical substances. IV.9. Apply mathematics, computer-aided facilities, biological databases and bioinformatics in drug design. IV.10. Apply molecular modelling techniques in drug design. IV.11. Utilize different tools to estimate the properties of biopharmaceuticals natural pharmaceutical products. IV.12. Select different methods for infection control and improve public health. IV.13. Apply pharmacological and pharmacotherapeutic principles in the proper selection of drugs from different sources for the management of different diseases. IV.14. Adjust the dose of different medication based on patient condition and select appropriate dose regimen. IV.15. Identify adverse drug reactions, interactions and contra-indications of different pharmaceutical drug classes. IV.16. Apply the Pharmacoeconomics principles in maintaining drug effectiveness with reducing the drug. IV.17. Interpret and report on results obtained from experimental studies. IV.18. Evaluate data from published literature using critical analysis. IV.19. Apply evidence-based guidelines, involving sciences, technology, psychology and professional principles required in pharmacy practice.
		Transferable Skills	V.1. Communicate clearly by verbal means. V.2. Write report on the interpreted results of his/her research projects. V.3. Search the literature from different sources including the library, internet ....etc. V.4. Evaluate the information obtained from different sources. V.5. Share and participate effectively in team work. V.6. Calculate and statistically analyze data. V.7. Demonstrate good information technology skills. V.8. Demonstrate self-learning skills. V.9. Be coherent with pharmaceutical ethical, legal and safety guidelines. V.10. Implement different skills required for sales, marketing and pharmacy administration.
2.	Beirut Arab University Lebanon	Knowledge & Understand Cognitive/Intellectual Skills Practical and Professional Skills Transferable Skills	The pharmacy program provides opportunities for students to develop and demonstrate fundamental knowledge and understanding skills, supported by other professional and practical skills appropriate for attaining a Bachelor Degree in Pharmacy.  After completing the academic program all graduates will be able to: <ul style="list-style-type: none"> <li>• Practice Pharmaceutical Care;</li> <li>• Assume ethical, legal, and professional responsibilities;</li> <li>• Access, retrieve, evaluate and disseminate relevant information;</li> <li>• Communicate and educate effectively;</li> <li>• Manage drug distribution;</li> <li>• Apply practice management knowledge and skills;</li> <li>• Demonstrate the ability to work in a pharmaceutical plant;</li> </ul>

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No.	University	Learning Domains	Learning Outcomes
			<ul style="list-style-type: none"> <li>Practice rational distribution and manufacturing of drugs from natural sources.</li> </ul>
3.	Jouf University KSA	Knowledge & Understand	<ol style="list-style-type: none"> <li>Demonstrate knowledge and understanding of the theories, principles and concepts in biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences associated with the development and use of pharmaceuticals for prevention and treatment of diseases.</li> <li>Demonstrate knowledge and in-depth understanding of different classes of drugs, their sources, isolation, purification, physicochemical properties, synthesis, structure activity relationship, pharmacokinetics, mechanisms of action, adverse effects, formulation, manufacturing, analysis and use.</li> <li>Demonstrate awareness of the pathophysiology and diagnosis of diseases, pharmacotherapy approaches as well as Pharmacoeconomics, pharmaceutical marketing and management, biostatistics, pharmaceutical care and drug regulatory affairs required to practice the pharmacy profession in health care setups.</li> <li>Demonstrate knowledge of the methods, strategies and techniques required to independently conduct research in the fields of drug discovery, drug development, drug delivery and patient care.</li> </ol>
		Cognitive/ Intellectual Skills	<ol style="list-style-type: none"> <li>Apply the concepts, principles and theories of biomedical, pharmaceutical, behavioral, administrative, clinical sciences, and pathophysiology to identify the causes of diseases, diagnose the diseases, identify sources of drugs, synthesize drugs, prepare pharmaceutical dosage forms, explain drug action &amp; interactions, solve therapeutic problems, and advance patient-centered care.</li> <li>Investigate scientific literature to critically analyze and solve complex unpredictable problems in pharmaceutical and clinical sciences.</li> </ol>
		Practical and Professional Skills	<ol style="list-style-type: none"> <li>Perform the practical in biomedical and pharmaceutical science through selection of the appropriate procedures, materials, equipment and lab safety protocols and interpreting results.</li> <li>Perform and report the laboratory experiment and tasks related to clinical pharmacy and pharmacy practice using standard protocols.</li> <li>Communicate effectively verbally and nonverbally with colleagues, patients, health care professionals and supportive staff.</li> <li>Apply the principles of mathematics and statistics to perform pharmaceutical calculations, analyses relevant to pharmacokinetics, pharmaceutical analysis, dispensing, and pharmacy practice.</li> <li>Use state-of-the art information technology in academic, pharmaceutical research and patient care setups.</li> </ol>
		Transferable Skills	<ol style="list-style-type: none"> <li>Exhibit professional ethics, integrity, attitudes and behavior by respecting others, avoiding malpractices, and cooperating with his fellows to achieve the professional goals.</li> <li>Demonstrate abilities to work as a member or leader of a team through effective collaboration with patients or colleagues or other professionals.</li> <li>Engage in self-learning practices and inter-professional healthcare education activities.</li> </ol>

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No.	University	Learning Domains	Learning Outcomes
4.	Al-Ain Emirate University	Knowledge & Understand	A1. Demonstrate knowledge and ability to integrate and apply basic concepts and principles of biomedical science, pharmaceutical sciences, clinical sciences and social and behavioral sciences required for drug discovery, drug development, and pharmacy practice context, to promote population health and patient centered care. A2. Describe, conduct, interpret and appraise pharmaceutical and clinical research, ethics, principles and methodologies.
		Cognitive/ Intellectual Skills	B1. Recognize and use pharmacy operational systems, appropriate medication dispensing, medication storage, and inventory control, appropriate distribution of prescription and non-prescription products and patient's education and counselling. B2. Provide patient-centered care by collecting, reviewing and utilizing relevant patient socioeconomic and medical data; to assess, develop, modify and implement a care plan in collaboration with the patient and other healthcare providers. B3. Apply the relevant cognitive and technical skills to each stage of drug discovery, drug development, and pharmacy practice context.
		Practical and Professional Skills	C1. Operate in a professional attitude and behavior by being qualified, patient advocate, altruist, accountable, empathetic, responsible and respectful to the patient and the other healthcare providers.
		Transferable Skills	D1. Locate and employ relevant medical literature, guidelines and evidence-based practice to enhance clinical decision making and to ensure the appropriateness, safety and effectiveness of medication. D2. Describe, conduct, interpret and appraise pharmaceutical and clinical research, ethics, principles and methodologies.
5.	Eastern Mediterranean – University Cyprus Western	Knowledge & Understand	Not Found
		Cognitive/ Intellectual Skills	
		Practical and Professional Skills	
		Transferable Skills	
6.	National University Oman	Knowledge & Understand	<ol style="list-style-type: none"> <li>Apply basic knowledge and fundamental skills from chemical, biological, biomedical, phyto-chemical and behavioral sciences to develop concepts of disease, disorder and drug therapy.</li> <li>Correlate the physicochemical properties of drugs to their biological action and use this knowledge in the development and formulation of drug delivery.</li> <li>Prepare formulation of various drug dosage forms, analyse composition and assess their quality according to official guidelines/publications.</li> <li>Construct patient care plan based on patient history, clinical condition, medication regime and the knowledge of biochemical, microbiological,</li> </ol>

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No.	University	Learning Domains	Learning Outcomes
			<p>pharmacological, pharmacokinetic, therapeutics and safety profile of medication.</p> <p>5. Explain communicable and non-communicable diseases, effective methods to prevent, control and treat with due emphasis on antimicrobial and antiviral resistance.</p> <p>6. Apply pharmaceutical science knowledge to each stage of develop drug discovery, development and commercialization.</p> <p>7. Serve as an expert and a team player in the field of pharmaceutical sciences, trainer in professional development activities and in committees to develop policies and procedures required for good pharmacy, clinical, warehouse and manufacturing practices.</p> <p>8. Demonstrate written, verbal and digital communication skills required for interpersonal communication and collaborative professional activities to excel at workplace.</p>
		Cognitive/Intellectual Skills	<p>1. Demonstrate practical skills in formulation of dosage forms and evaluation.</p> <p>2. Apply leadership knowledge, qualities and skills to engage in innovative activities to accomplishing professional and/or business goals.</p> <p>3. Organize logistics in pharmacy management in liaison with regulatory authorities and demonstrate entrepreneurship skills</p>
		Practical and Professional Skills	<p>4. Critically appraise, evaluate and recommend safe and effective drug dosage regimen and resolve drug therapy challenges using knowledge of pharmacokinetics and pharmacodynamics of agents</p> <p>5. Demonstrate effective critical thinking to synthesize, integrate, and evaluate data from diverse sources into research question, ethical decisions making and in carrying out meaningful research.</p>
		Transferable Skills	<p>1. Demonstrate professional behaviour, display self-awareness, self-improvement and practice the profession in an ethically responsible manner.</p> <p>2. Demonstrate leadership quality, teamwork and ability to advocate health and wellness promotional activities to provide cost-effective optimal care through quality pharmaceutical care practice.</p>
7.	Zamzam University Sudan	Knowledge & Understand	Not found
		Cognitive/Intellectual Skills	
		Practical and Professional Skills	
		Transferable Skills	
8.	King Saud University KSA	Knowledge & Understand	Not found
		Cognitive/Intellectual Skills	
		Practical and Professional Skills	
		Transferable Skills	

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**Annex 17: Aligning the Mission, and the Graduates Attributes of the Program:**

Key Words		Program Missions				
		Educational and research service in the field of Pharmacy	matching the academic accreditation requirements	prepare pharmacists qualified scientifically, practically, professionally and ethically	compete in the labor market and contribute in improving the pharmacy services	provided to the community.
program Graduate Attributes	<b>Knowledgeable:</b> Comprehensive knowledge associated with practice of pharmacy.	√	--	√	√	--
	<b>Professional practice:</b> recalling knowledge for manufacturing and development of pharmaceutical products and pharmacy practice	√	√	√	√	--
	<b>Care Provider:</b> providing patients with pharmaceutical are ethically and legally.	√	√	√	√	--
	<b>Ethical:</b> acting responsibly in preparing and dispensing medications legally, ethically and with integrity within social and cultural contexts.	√	√	--	√	√
	<b>Problem solver:</b> identifying and solving problems related to pharmacy practice.	√	--	√	√	√
	<b>Communicator:</b> with pharmacists, patients and other health care providers.	√	√	√	--	--
	<b>Leader:</b> performing necessary pharmacy administrative duties and pharmacy practice.	√	√	--	√	√
	<b>Lifelong learning:</b> self-commitment to <b>independent</b> and lifelong learning using upto date technology.	√	--	√	√	--

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**Annex 18: Aligning the Graduate Specifications in the Current Program with (NARS) as well as with the Accredited Programs at Reference Universities:**

\* مواصفات الخريج في البرنامج الحالي هي ذاتها مواصفات الخريج في NARS-Yemen المعتمد من مجلس الاعتماد و ضمان الجودة – وزارة التعليم العالي – اليمن 2022

**Annex 18: Aligning the Graduate Specifications in the Current Program with (NARS) as well as with the Accredited Programs at Reference Universities:**

**B- With other universities**

Key Words	Graduate Attributes of Similar Programs							
	Cairo University	Arabic-Beirut University	Jouf University	Al-Ain University	Eastern Mediterranean University	National University	Zamzam University	King Saud University
<b>Knowledgeable:</b> Comprehensive knowledge associated with practice of pharmacy.	√	--	√	--	--	--	--	--
<b>Professional practice:</b> recalling knowledge for manufacturing and development of pharmaceutical products and pharmacy practice	√	--	√	--	--	--	--	--
<b>Care Provider:</b> providing patients with pharmaceutical are ethically and legally.	√	--	√	--	--	--	--	--
<b>Ethical:</b> acting responsibly in preparing and dispensing medications legally, ethically and with integrity within social and cultural contexts.	√	--		--	--	--	--	--
<b>Problem solver:</b> identifying and solving problems related to pharmacy practice.	√	--	√	--	--	--	--	--
<b>Communicator:</b> with pharmacists, patients and other health care providers.	√	--	√	--	--	--	--	--

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Key Words	Graduate Attributes of Similar Programs							
	Cairo University	Arabic-Beirut University	Jouf University	Al-Ain University	Eastern Mediterranean University	National University	Zamzam University	King Saud University
<b>Leader:</b> performing necessary pharmacy administrative duties and pharmacy practice.	√	--	--	--	--	--	--	--
<b>Lifelong learning:</b> self-commitment to <b>independent</b> and lifelong learning using upto date technology.	√	--	√	--	--	--	--	--

**Annex 19: Aligning the Mission and Learning Outcomes of the Program.**

Learning Outcomes		Program Missions				
		Educational and research service in the field of Pharmacy	matching the academic accreditation requirements	prepare pharmacists qualified scientifically, practically, professionally and ethically	compete in the labor market and contribute in improving the pharmacy services	provided to the community.
Knowledge and understanding	A1	√	--	---	√	---
	A2	√	--	√	√	---
	A3	√	--	√	√	--
	A4	--	√	--	√	--
	A5		√	√		√
Cognitive/ Intellectual Skills	B1	√	--	√	√	√
	B2	√	--	√	√	----
	B3	√	---	√	√	----
	B4	√	√	----	√	----
	B5		√	√		√
Practical and Professional Skills	C1	√	√	---	√	----
	C2	√	√	√	√	----
	C3	√	---	√	√	√
	C4	√	√	---	√	----
	C5		√	√	√	
	C6	√	√	√		
General and Transfer able Skills	D1	----	----	----	√	√
	D2	√	√	√	√	√
	D3	---	----	√	√	----

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**Annex 20: Aligning the Objectives and Learning Outcomes of the Program.**

Learning Outcomes		Program Objectives		
		Deliver competent pharmacists supplied with knowledge, skills and ethical values and are capable to compete in the work market.	Provide, develop & update pharmacy education, training and research to serve the community and meet its needs and advancement in pharmacy profession and meet the local and international standards.	Augment the relationship with the local, regional and international pharmaceutical academic and research institutes and other entities related to Pharmacy profession
Knowledge and understanding	A1	√	√	---
	A2	√	--	√
	A3	√	√	√
	A4	√	√	√
	A5		√	√
Cognitive/ Intellectual Skills	B1	√	√	--
	B2	√	√	√
	B3	√	√	√
	B4	√	√	√
	B5		√	√
Practical and Professional Skills	C1	√	√	√
	C2	√	√	√
	C3	√	√	√
	C4	√	√	√
	C5	√	√	
	C6	√	√	
General and Transfer able Skills	D1	√	√	√
	D2	√	√	-----
	D3	---	√	√

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**Annex 21: Aligning the Learning Outcomes of the Program and Similar Learning Outcomes of Accredited Programs at Reference Universities.**

Fields	Code	Program Learning Outcomes (PILOs)	Similar Learning Outcomes of the Programs				
			Cairo Uni. Egypt	Beirut Arab Uni. Lebanon	Jouf Uni. KSA	Al-Ain Uni. Emirate	National Uni. Oman
Knowledge & Understanding	A1	A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	√	√	√	----	-----
	A2	A2. Explain the essential knowledge about designing, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	√	√	√	√	√
	A3	A3. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	√	√	√	√	√
	A4	A4. Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	√	√	√	----	-----
	A5	A5. Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilence, Pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic etc) to optimize the therapeutic outcomes.					
Cognitive & Intellectual skills	B1	B1. Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.	√	√	√	√	√
	B2	B2. Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing,	√	√	√	√	√

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Fields	Code	Program Learning Outcomes (PILOs)	Similar Learning Outcomes of the Programs				
			Cairo Uni. Egypt	Beirut Arab Uni. Lebanon	Jouf Uni. KSA	Al-Ain Uni. Emirate	National Uni. Oman
		preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..					
	B3	<b>B3.</b> Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	√	√	√	√	√
	B4	<b>B4.</b> Determine possible strategies to support the national pharmaceutical industries (technologies/formulations) based on potential business opportunities in meeting medical needs of the patient and community.	√	√	---	----	----
	B5	<b>B5.</b> Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.					
Practical & Professional skills	C1	<b>C1.</b> Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.	√	√	√	---	---
	C2	<b>C2.</b> Practice extraction/synthesis and analysis of pharmaceutical potential agents.	√	√	√	---	----
	C3	<b>C3.</b> Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	√	√	√	√	√

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Fields	Code	Program Learning Outcomes (PILOs)	Similar Learning Outcomes of the Programs				
			Cairo Uni. Egypt	Beirut Arab Uni. Lebanon	Jouf Uni. KSA	Al-Ain Uni. Emirate	National Uni. Oman
	C4	C4. Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	√	√	√	√	√
	C5	C5. Advise/ educate them on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.					
	C6	C6. Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.					
Transferable skills	D1	Participate effectively in teamwork activities.	√	√	√	---	√
	D2	Demonstrate ethical conduct, discipline life respect and desire to serve community.	√	√	√	√	√
	D3	Communicate efficiently with colleagues, supervisors, teachers, patients and members of healthcare team.	√	√	√	√	√

### Annex 23: Structure of Pharmacy Program

No.	Requirements	No. of Courses	Credit Hours	Rational Weight%	
1.	University Requirements	Obligatory	8	16	8.6%
		Elective	--	--	--
2.	Faculty Requirements	Obligatory	17	40	21.5%
		Elective	--	--	--
3.	Specialization Requirements	Obligatory	50	126	67.7%
		Elective	--	--	--

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4	Pharmacy training	Obligatory	2	4	2.2%
		Elective	--	--	--
Total			77	186	100%

**Annex 26: Aligning the Learning Outcomes of the Program and Study Plan for the Pharmacy Program.**

Fields	Program PILOs	Fields					
		University Requirements		Faculty Requirements		Specification Requirements	
		Obligatory	Elective	Obligatory	Elective	Obligatory	Elective
Knowledge & Understanding	A1	x	--	9	--	26	--
	A2	x	--	7	--	41	--
	A3	3	--	8	---	45	--
	A4	3	--	5	---	51	--
	A5	2	--	4	--	22	--
Cognitive & Intellectual skills	B1	2	--	11	---	44	--
	B2	3	--	16	--	50	--
	B3	2	--	6	--	34	--
	B4	1	---	3	---	34	---
	B5	1	--	3	--	26	--
Practical & Professional skills	C1	x	---	6	---	28	---
	C2	1	---	6	---	32	---
	C3	x	--	6	--	28	--
	C4	5	--	8	--	11	--
	C5	3	--	5	--	15	--
	C6	2	--	4	--	17	--
Transferable skills	D1	1	--	7	--	32	--
	D2	2	--	9	--	36	--
	D3	4	---	9	---	30	---

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**Annex 27: Survey of Similar Study Plan Courses of the Current Program and Accredited Programs at Reference Universities.**

N o.	Code	Current Program	Cairo Uni. Faculty of Pharmacy Egypt	Beirut Arab Uni. Faculty of Pharmacy Lebanon	Jouf Uni. Faculty of Pharmacy KSA	Eastern Mediterranean – Uni. Cyprus Western	Al-Ain Uni. Faculty of Pharmacy Emirates	Coherence Ratio
1.	PHP115	Introduction to pharmacy profession	History of pharmacy + pharmacy orientation	Orientation to Pharmacy Practice	Introduction to Pharmacy Profession	History and Ethics of Pharmacy	Introduction to Pharmacy and Pharmacy law	100%
2.	PHM128	Drug Discovery & Development	X	X	Drug Discovery & Development	X	X	20%
3.	PHT124	Mathematics	Mathematics	X	X	Mathematics	Calculus I	60%
4.	PHM126	Organic chemistry	Organic chemistry I	Pharmaceutical Organic Chemistry I	X	Organic chemistry I	Pharmaceutical Organic Chemistry 1	80%
5.	PHT211	Physical pharmacy	Physical pharmacy	Physical pharmacy	X	X	X	40%
6.	PHM214	Pharmaceutical Organic chemistry	Organic chemistry II	Pharmaceutical Organic Chemistry II	Medicinal Chemistry I	Organic chemistry II	Pharmaceutical Organic Chemistry 2	100%
7.	PHG216	Botany	Botany and medicinal plants	X		pharmaceutical botany	X	40%
8.	PHT217	Pharmaceutical calculation skills	X	X		X	Pharmaceutical Compounding and calculations	20%
9.	PHT222	Pharmaceutics I	Pharmaceutics I	Pharmaceutical Dosage forms I	Pharmaceutics I	Pharmaceutical technology I	Pharmaceutics I	100%
10.	PHM223	Pharmaceutical analytical chemistry I	Analytical chemistry I	Pharmaceutical analytical chemistry I	Introduction to Analytical chemistry	Analytical chemistry I	Pharmaceutical analytical chemistry	100%
11.	PHG224	Pharmacognosy I	Pharmacognosy I	X	Pharmacognosy I	Pharmacognosy I	X	60%
12.	PHT225	Pharmaceutical Microbiology	Pharmaceutical microbiology	Pharmaceutical microbiology I	Pharmaceutical Microbiology I	Medical microbiology	Microbiology & immunology	100%
13.	PHM227	Medicinal Chemistry I	Pharmaceutical Chemistry I	Medicinal Chemistry I	Medicinal Chemistry II	Pharmaceutical Chemistry I	Medicinal Chemistry I	100%
14.	PHC228	Pharmacology I	Pharmacology I	Pharmacology I	Pharmacology I	Pharmacology I	Pharmacology I	100%
15.	PHM311	Medicinal Chemistry II	Pharmaceutical Chemistry II	Medicinal Chemistry II	Medicinal Chemistry III	Pharmaceutical Chemistry II	Medicinal Chemistry II	100%
16.	PHT312	Pharmaceutics II	Pharmaceutics II	Pharmaceutical Dosage forms II	Pharmaceutics II	Pharmaceutical technology II	Pharmaceutics II	100%

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N o.	Code	Current Program	Cairo Uni. Faculty of Pharmacy Egypt	Beirut Arab Uni. Faculty of Pharmacy Lebanon	Jouf Uni. Faculty of Pharmacy KSA	Eastern Mediterranean – Uni. Cyprus Western	Al-Ain Uni. Faculty of Pharmacy Emirates	Coherence Ratio
17.	PHC314	Pathophysiology	X	X	Pathophysiology I	X	X	20%
18.	PHG315	Pharmacognosy II	Pharmacognosy II	X	Pharmacognosy II	Pharmacognosy II	X	60%
19.	PHC316	Pharmacology II	Pharmacology II	Pharmacology II	Pharmacology II	Pharmacology II	Pharmacology II	100%
20.	PHM317	Pharmaceutical analytical chemistry I I	Analytical chemistry 2	Pharmaceutical analytical chemistry II	Instrumental analysis	Analytical chemistry II	X	80%
21.	PHG321	Phytochemistry I	Phytochemistry I	Phytochemistry	Pharmacognosy III	Pharmacognosy III	X	80%
22.	PHC322	Pharmacology III	Pharmacology III	Pharmacology III	Pharmacology III	Pharmacology III	Pharmacology III	100%
23.	PHT323	Pharmaceutics III	Pharmaceutics III	Pharmaceutical Dosage forms III	Pharmaceutics III	Pharmaceutical technology III	Pharmaceutics III	100%
24.	PHP324	Pharmacotherapy I	X	Pharmacotherapy I	Pharmacotherapy I	Pharmacotherapy I	Pharmacotherapy I	80%
25.	PHM325	Pharmaceutical instrumental analysis I	Analytical chemistry 3	Pharmaceutical analytical chemistry III	X	X	X	40%
26.	PHM326	Medicinal Chemistry III	Pharmaceutical Chemistry III	Medicinal Chemistry III	Medicinal Chemistry IV	Pharmaceutical Chemistry III	X	80%
27.	PHP327	Clinical Pharmacy I	Clinical pharmacy & therapeutics	Pharmacy practice I	Clinical skills for pharmacists	X	Pharmacy Practice and Pharmaceutical Care	80%
28.	PHP328	Integrated-Case based Learning I	X	Pharmacy practice II	X	X	Integrated-Case based Learning I	40%
29.	PHM411	Pharmaceutical instrumental analysis II	Instrumental analysis	X	X	X	X	20%
30.	PHT412	Cosmetic preparations	Cosmetic products	Cosm. pharmaceuticals	Pharmaceutics-VIII (Cosmetics)	Cosmetic sciences	X	80%
31.	PHG413	Phytochemistry II	Phytochemistry II	X	Substances of Abuse	Pharmacognosy III	X	60%
32.	PHP414	Clinical Pharmacy care II	Clinical pharmacology	Pharmacy practice III	Pharmaceutical care	X	X	60%
33.	PHP415	Pharmacotherapy II	X	Pharmacotherapy II	Pharmacotherapy II	Pharmacotherapy II	Pharmacotherapy II	80%

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N o.	Code	Current Program	Cairo Uni. Faculty of Pharmacy Egypt	Beirut Arab Uni. Faculty of Pharmacy Lebanon	Jouf Uni. Faculty of Pharmacy KSA	Eastern Mediterranean – Uni. Cyprus Western	Al-Ain Uni. Faculty of Pharmacy Emirates	Coherence Ratio
34.	PHP416	Integrated-Case based Learning II	X	Pharmacy practice IV	X	X	Integrated-Case based Learning II	40%
35.	PHC417	Experimental Pharmacology	X	Pharmacology V	Pharmacology V	X	X	40%
36.	PHC418	Pharmacology IV	X	Pharmacology IV	Pharmacology IV	X	X	40%
37.	PHT421	Advanced Drug Delivery Systems	Novel dosage form	Drug delivery systems	Pharmaceutics-VII	Pharmaceutical technology IV	X	80%
38.	PHT422	Industrial Pharmacy	Industrial pharmacy	X	Pharmaceutics-V	Pharmaceutical technology IV	X	60%
39.	PHG423	Phytotherapy	Herbal Medicine	Recent Approaches In Phytotherapy	Recent Approaches in Medicinal Plants Analysis	Phytotherapy	Phytotherapy and Dietary Supplements	100%
40.	PHM425	Pharmaceutical quality Control	Quality control & quality assurance	X	Pharmaceutical quality control & Good manufacturing practice	X	X	40%
41.	PHT426	Biopharmaceutics	Biopharmaceutics & Pharmacokinetics	Biopharmaceutics & Pharmacokinetics	Pharmaceutics-IV	X	Biopharmaceutics and Pharmacokinetics	80%
42.	PHP427	Community Pharmacy	Pharmacy practice	Pharmacy practice experience III	Pharmacy Practice	X	X	60%
43.	PHC428	Toxicology	Toxicology	Toxicology	Toxicology	Pharmaceutical toxicology	Pharmaceutical toxicology	100%
44.	PHT511	Pharmaceutical Biotechnology	Biotechnology	X	Pharmaceutical Biotechnology	Pharmaceutical Biotechnology and Cell Culture	Pharmaceutical Biotechnology and Cell Culture	80%
45.	PHP514	Hospital Pharmacy	Hospital pharmacy	Hospital pharmacy	Pharmacy Management	X	X	60%
46.	PHC515	Pharmacogenomics and Gene therapy	Biotechnology	X	Pharmaceutical Biotechnology	Pharmaceutical Biotechnology and Cell Culture	Pharmaceutical Biotechnology and Cell Culture	80%
47.	PHT517	Pharmacokinetics	Biopharmaceutics & Pharmacokinetics	Biopharmaceutics & Pharmacokinetics	Basic Pharmacokinetics	X	X	60%

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N o.	Code	Current Program	Cairo Uni. Faculty of Pharmacy Egypt	Beirut Arab Uni. Faculty of Pharmacy Lebanon	Jouf Uni. Faculty of Pharmacy KSA	Eastern Mediterranean – Uni. Cyprus Western	Al-Ain Uni. Faculty of Pharmacy Emirates	Coherence Ratio
48.	PHT518	Nuclear Pharmacy	Novel dosage forms	Drug delivery systems	Pharmaceutics-VI	Pharmaceutical technology IV	Pharmaceutical technology IV	100%
49.	PHP521	Pharmacoeconomics	Pharmacoeconomics	Principles of Pharmacoeconomics	X	Pharmacoeconomics	Pharmacoeconomics	80%
50.	PHP524	Pharmaceutical Marketing	Marketing	Pharmaceutical Marketing	Pharmaceutical Marketing	X	X	60%

ملاحظة: تم مقارنة مواد التخصص فقط، ولم يتم مقارنة متطلبات الجامعة، أو متطلبات الكلية:

**Annex 28: Study Plan Is Distributed to Theoretical, Practical and Field Training.**

Requirements	Theme code	Course Type	Course code	No.	Course Title	Credit Hours		
						Theor	Pract	Total
University Requirements	RAZ	Theory	RAZ111	111	Arabic language I	2	--	2
	RAZ	Theory	RAZ112	112	English language	2	--	2
	RAZ	Theory/Practical	RAZ113	113	Computer skills	1	1	2
	RAZ	Theory	RAZ114	114	Islamic culture	2	--	2
	RAZ	Theory	RAZ121	121	Arabic language II	2	--	2
	RAZ	Theory	RAZ122	122	Communication skills	2	--	2
	RAZ	Theory	RAZ128	128	National culture	2	--	2
RAZ	Theory	RAZ218	218	Arab-Israel Conflict	2	--	2	
<b>Total</b>						<b>15</b>	<b>1</b>	<b>16</b>
Faculty Requirements	MSC	Theory/Practical	MSC116	116	General Biology	2	1	3
	MSC	Theory/Practical	MSC117	117	General Chemistry	2	1	3
	MSC	Theory/Practical	MSC123	123	Physics	2	1	3
	MSC	Theory	MSC125	125	English for medical purposes	2	--	2
	MSC	Theory/Practical	MSC127	127	Anatomy	2	1	3
	MSC	Theory	MSC212	212	Psychology	2	--	2
	MSC	Theory	MSC213	213	Human Physiology I	2	--	2
	MSC	Theory	MSC215	215	Medical biochemistry	2	1	3
	MSC	Theory	MSC221	221	Human Physiology II	2	--	2
	MSC	Theory	MSC226	226	Pathology	2	--	2
	MSC	Theory/Practical	MSC313	313	Medical parasitology	2	1	3
	MSC	Theory	MSC512	512	Biostatistics	2	--	2
MSC	Theory	MSC513	513	Research methodology	2	--	2	

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Requirements	Theme code	Course Type	Course code	No.	Course Title	Credit Hours		
						Theor	Pract	Total
	MSC	Theory	MSC522	522	Public Health	2	--	2
	MSC	Theory	MSC318	318	First Aid	2	--	2
	MSC	Theory	MSC523	523	Professional ethics and regulations	2	--	2
	MSC	Practical	MSC525	525	Graduation Research project	2	--	2
<b>Total</b>						<b>34</b>	<b>6</b>	<b>40</b>
	<b>I. Pharmaceutics related courses</b>							
	PHT	Theory	PHT124	124	Mathematics	2	--	2
	PHT	Theory/ Practical	PHT211	211	Physical pharmacy	2	1	3
	PHT	Theory	PHT217	217	Pharmaceutical calculation	2	--	2
	PHT	Theory/ Practical	PHT222	222	Pharmaceutics I	2	1	3
	PHT	Theory/ Practical	PHT225	225	Pharmaceutical microbiology	2	1	3
	PHT	Theory/ Practical	PHT312	312	Pharmaceutics II	2	1	3
	PHT	Theory/ Practical	PHT323	323	Pharmaceutics III	2	1	3
	PHT	Theory/ Practical	PHT412	412	Cosmetic preparations	2	1	3
	PHT	Theory	PHT421	421	Advanced drug delivery systems	2	--	2
	PHT	Theory	PHT422	422	Industrial pharmacy	2	--	2
	PHT	Theory	PHT426	426	Biopharmaceutics	2	--	2
	PHT	Theory	PHT511	511	Pharmaceutical biotechnology	2	--	2
	PHT	Theory	PHT517	517	Pharmacokinetics	2	--	2
	PHT	Theory	PHT518	518	Nuclear pharmacy	2	--	2
	<b>Total</b>					<b>29</b>	<b>7</b>	<b>35</b>
	<b>II. Medicinal chemistry and related courses</b>							
	PHM	Theory	PHM128	128	Drug Discovery & Development	2	--	2
	PHM	Theory/ Practical	PHM126	126	Organic Chemistry	3	1	4
	PHM	Theory/ Practical	PHM214	214	Pharmaceutical Organic Chemistry	3	1	4
	PHM	Theory/ Practical	PHM223	223	Pharmaceutical analytical chemistry I	2	1	3
	PHM	Theory/ Practical	PHM227	227	Medicinal chemistry I	3	1	4
	PHM	Theory/ Practical	PHM311	311	Medicinal chemistry II	3	1	4

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Requirements	Theme code	Course Type	Course code	No.	Course Title	Credit Hours		
						Theor	Pract	Total
	PHM	Theory/ Practical	PHM317	317	Pharmaceutical analytical chemistry II	2	1	3
	PHM	Theory/ Practical	PHM325	325	Pharmaceutical instrumental analysis I	2	1	3
	PHM	Theory/ Practical	PHM326	326	Medicinal chemistry III	3	1	4
	PHM	Theory/ Practical	PHM411	411	Pharmaceutical instrumental analysis II	2	1	3
	PHM	Theory/ Practical	PHM425	425	Pharmaceutical quality control	2	1	3
	<b>Total</b>					<b>27</b>	<b>10</b>	<b>37</b>
<b>III. Pharmacognosy and related courses</b>								
	PHG	Theory/ Practical	PHG216	216	Botany	2	1	3
	PHG	Theory/ Practical	PHG224	224	Pharmacognosy I	2	1	3
	PHG	Theory/ Practical	PHG315	315	Pharmacognosy II	2	1	3
	PHG	Theory/ Practical	PHG321	321	Phytochemistry I	2	1	3
	PHG	Theory/ Practical	PHG413	413	Phytochemistry II	2	1	3
	PHG	Theory	PHG423	423	Phytotherapy	2	---	2
	<b>Total</b>					<b>12</b>	<b>5</b>	<b>17</b>
<b>IV. Pharmacology and related courses</b>								
	PHP	Theory	PHP228	228	Pharmacology I	2	---	2
	PHP	Theory	PHP314	314	Pathophysiology	2	---	2
	PHP	Theory	PHP316	316	Pharmacology II	2	---	2
	PHP	Theory	PHP322	322	Pharmacology III	2	---	2
	PHP	Theory	PHP324	324	Therapeutics I	2	---	2
	PHP	Theory	PHP415	415	Therapeutics II	2	---	2
	PHP	Theory/ Practical	PHP417	417	Experimental pharmacology	2	1	3
	PHP	Theory	PHP418	418	Pharmacology IV	2	---	2
	PHP	Theory	PHP521	521	Pharmacoeconomics & Pharmacoeepidemiology	2	---	2
	PHP	Theory	PHP515	515	Pharmacogenomics and Gene therapy	2	---	2
	<b>Total</b>					<b>20</b>	<b>1</b>	<b>21</b>
<b>V. Pharmacy practice and related courses</b>								
	PHC	Theory	PHC115	115	Introduction to pharmacy	2	---	2
	PHC	Theory	PHC327	327	Clinical pharmacy I	2	---	2

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Requirements	Theme code	Course Type	Course code	No.	Course Title	Credit Hours		
						Theor	Pract	Total
	PHC	Practical	PHC328	328	Integrated-case based learning I	----	1	1
	PHC	Theory	PHC414	414	Clinical pharmacy II	2	---	2
	PHC	Practical	PHC416	416	Integrated-case based learning II	----	1	1
	PHC	Theory	PHC427	427	Hospital pharmacy	2	---	2
	PHC	Theory	PHC428	428	Toxicology	2	---	2
	PHC	Theory	PHC514	514	Community Pharmacy	2	---	2
	PHC	Theory	PHC524	524	Pharmaceutical marketing	2	---	2
	<b>Total</b>					<b>14</b>	<b>2</b>	<b>16</b>
<b>VI. Pharmacy Training</b>								
	PHF		PHF424	424	Pharmacy training I	----	2	2
	PHF		PHF516	516	Pharmacy training II	---	2	2
	<b>Total</b>						<b>4</b>	<b>4</b>
<b>Total</b>						<b>141</b>	<b>45</b>	<b>186</b>
<b>100%</b>						<b>75.8%</b>	<b>24.2%</b>	<b>100%</b>

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**Annex 29: Distribution of Total Credit Hour**

Distribution of Total Credit Hour:														
Courses		No. of Course Cred. Hr. %	First Level		Second Level		Third Level		Fourth level		Fifth level		Total	%
			1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	1 <sup>st</sup>	2 <sup>nd</sup>		
University Requirements	Obligatory	No. of Course	5	2	1	--	--	--	--	--	--	--	8	8.24%
		Credit Hour	10	4	2	--	--	--	--	--	--	--	16	
		%	--	--	--	--	--	--	--	--	--	--	--	
	Electives	No. of Course	--	--	--	--	--	--	--	--	--	--	--	
		Credit Hour	--	--	--	--	--	--	--	--	--	--	--	
		%	--	--	--	--	--	--	--	--	--	--	--	
Faculty Requirements	Obligatory	No. of Course	2	3	3	2	2	--	--	--	2	3	17	21.43%
		Credit Hour	6	8	7	4	5	--	--	--	4	6	40	
		%	--	--	--	--	--	--	--	--	--	--	--	
	Electives	No. of Course	--	--	--	--	--	--	--	--	--	--	--	
		Credit Hour	--	--	--	--	--	--	--	--	--	--	--	
		%	--	--	--	--	--	--	--	--	--	--	--	
Program Specifications	Obligatory	No. of Course	1	3	4	6	6	8	8	7	5	2	50	70.33%
		Credit Hour	2	8	12	18	17	20	19	16	10	4	126	
		%	--	--	--	--	--	--	--	--	--	--	--	
	Electives	No. of Course	--	--	--	--	--	--	--	--	--	--	--	
		Credit Hour	--	--	--	--	--	--	--	--	--	--	--	
		%	--	--	--	--	--	--	--	--	--	--	--	
Training Field		No. of Course	--	--	--	--	--	--	--	1	1	--	--	
		Credit Hour	--	--	--	--	--	--	--	--	2	2	--	--
		%	--	--	--	--	--	--	--	--	--	--	--	2%
Total	No. of Course	8	8	8	8	8	8	8	8	8	5	77	100%	
	Credit Hour	18	20	21	22	22	20	19	18	16	10	186		
	%	9.7%	10.75%	11.3%	11.8%	11.8%	10.75%	10.2%	9.7%	8.6%	5.4%	100%		

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	Level	%	20.45%	23.1%	22.55%	19.9%	14	100%	
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**Annex 30: Survey of Number of Courses and Credit Hours for Current Program and Accredited Programs at Reference Universities.**

University	Al-Razi University		Cairo University Egypt		Beirut Arab University Lebanon		Jouf University KSA		Eastern Mediterranean University Cyprus Western		Al-Ain University			
	Cr. hr.	Courses	Cr. hr.	Courses	Cr. hr.	Courses	Cr. hr.	Courses	Cr. hr.	Courses	Cr. hr.	Courses		
Total Courses & Cr. Hr.														
University Requirements	Obligatory	16	8	----	----	6	2	12	6	---	----	24	8	
	Elective	----	----	---	---	6	2	----	----	9	3	----	----	
	Percentage	8.6%	10.4%	----	----	6.7%	5.7%	6.7%	8.3%	5%	5%	15%	14.8%	
Faculty Requirements	Obligatory	40	17	----	----	162	64	34	16	23	8	21	7	
	Elective	---	----	---	---	6	2	---	----	--	--	----	----	
	Percentage	21.5%	22.1%	----	----	93.3%	94.3	19.1%	22.2	12.8%	13.3%	13.1%	13%	
Specification Requirements	Obligatory	130	52	153	57	162	64	132	50	133	45	115	39	
	Elective	---	----	10	10	6	2	----	----	15	4	----	----	
	Percentage	69.9%	67.5%			93.3%	94.3	74.2%	69.4%	82.2%	81.7	71.9%	72.2%	
Training Field	Obligatory	----	----	----	----	----	----	----	----	----	----	----	----	
	Elective	----	----	----	----	----	----	----	----	----	----	----	----	
	Percentage	----%	----%	----%	----%	----%	----%	----%	----%	----%	----%	----%	----%	
Other courses	----	----	----	----	----	----	----	----	----	----	----	----		
Total	Cr. hr.													
		186	77	163	67	170	70	178	72	180	60	160	54	

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**Annex 31: Comparison of Program Courses and Similar Programs Courses**

No.	Current Program	Cairo Uni. Faculty of Pharmacy Egypt				Beirut Arab Uni. Faculty of Pharmacy Lebanon				Jouf Uni. Faculty of Pharmacy KSA				Eastern Mediterranean – Uni. Cyprus Western				Al-Ain Uni. Faculty of Pharmacy Emirates												
		Credit hr.				Credit hr.				Credit hr.				Credit hr.				Credit hr.												
		L	P	C	CH	L	P	C	CH	L	P	C	CH	L	P	C	CH	L	P	C	CH									
1.	Introduction to pharmacy profession	2	-	-	2	History of pharmacy + pharmacy orientation	2	-	-	2	Orientation to Pharmacy Practice	2	-	-	2	Introduction to Pharmacy Profession	1	-	-	1	History and Ethics of Pharmacy	1	-	-	1	Introduction to Pharmacy and Pharmacy law	3	-	-	3
2.	Drug Discovery & Development	2	-	-	2	X					X	-	-	-	-	Drug Discovery & Development	2	-	-	2	X	-	-	-	-	X	-	-	-	-
3.	Mathematics	2	-	-	2	Mathematics	2	-	-	2	X					X					Mathematics	3	1	-	4	Calculus I	3	-	-	3
4.	Organic chemistry	3	1	-	4	Organic chemistry I					Pharmaceutical Organic Chemistry I	2	1	-	3	X	-	-	-	-	Organic chemistry I	3	1	-	4	Pharmaceutical Organic Chemistry 1	2	1	-	3
5.	Physical pharmacy	2	1	-	3	Physical pharmacy					Physical pharmacy	2	1	-	3	X	-	-	-	-	X	-	-	-	-	X	-	-	-	-
6.	Pharmaceutical Organic chemistry	3	1	-	4	Organic chemistry II					Pharmaceutical Organic Chemistry II	2	1	-	3	Medicinal Chemistry I	2	1	-	3	Organic chemistry II	3	-	1	4	Pharmaceutical Organic Chemistry 2	2	-	-	2
7.	Botany	2	1	-	3	Botany and medicinal plants					X	-	-	-	-	x	-	-	-	-	pharmaceutical botany	2	-	1	3	X	-	-	-	-
8.	Pharmaceutical calculation skills	2	-	-	2	X	-	-	-	-	X	-	-	-	-	X	-	-	-	-	X	-	-	-	-	Pharmaceutical Compoundi	3	1	-	4

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Dr. Nabil Albaser	Dr. Abdullah Al-Bajali			
Dr. Ameen Alwosabi	Dr. Anis Thabit			



No.	Current Program	Cairo Uni. Faculty of Pharmacy Egypt				Beirut Arab Uni. Faculty of Pharmacy Lebanon				Jouf Uni. Faculty of Pharmacy KSA				Eastern Mediterranean – Uni. Cyprus Western				Al-Ain Uni. Faculty of Pharmacy Emirates											
																		ng and calculations											
9.	Pharmaceutics I	2	1	-	3	Pharmaceutics I				Pharmaceuti cal Dosage forms I	2	-	-	2	Pharmaceutic s I	2	1	-	3	Pharmaceutica l technology I	3	-	1	4	Pharmaceuti cs I	2	1	-	3
10.	Pharmaceutical analytical chemistry I	2	1	-	3	Analytical chemistry I				Pharmaceuti cal analytical chemistry I	2	1	-	3	Introduction to Analytical chemistry	1	1	-	2	Analytical chemistry I	3	1	-	4	Pharmaceuti cal analytical chemistry	3	1	-	4
11.	Pharmacognosy I	2	1	-	3	Pharmacogno sy I				X	-	-	-	-	Pharmacogn osy I	2	1	-	3	Pharmacognos y I	2	-	1	3	X				
12.	Pharmaceutical Microbiology	2	1	-	3	Pharmaceutical microbiology				Pharmaceutical microbiology I	2	1	-	3	Pharmaceutica l Microbiology I	2	1	-	3	Medical microbiology	3	-	-	3	Microbiology & immunology	2	1	-	3
13.	Medicinal Chemistry I	3	1	-	4	Pharmaceutic al Chemistry I				Medicinal Chemistry I	2	1	-	3	Medicinal Chemistry II	2	1	-	3	Pharmaceutica l Chemistry I	2	-	1	3	Medicinal Chemistry I	3	1	-	4
14.	Pharmacology I	2	-	-	2	Pharmacology I				Pharmacolo gy I	1	-	-	1	Pharmacolog y I	3	1	-	4	Pharmacology I	3	-	-	3	Pharmacolo gy I	3	-	-	3
15.	Medicinal Chemistry II	3	1	-	4	Pharmaceutic al Chemistry II				Medicinal Chemistry II	2	1	-	3	Medicinal Chemistry III	2	1	-	3	Pharmaceutica l Chemistry II	2	-	1	3	Medicinal Chemistry II	2	1	-	3
16.	Pharmaceutics II	2	1	-	3	Pharmaceutics II				Pharmaceuti cal Dosage forms II	2	1	-	3	Pharmaceutic s II	2	1	-	3	Pharmaceutica l technology II	3	-	1	4	Pharmaceuti cs II	2	1	-	3
17.	Pathophysiology	2	-	-	2	X	-	-	-	X	-	-	-	-	Pathophysiol ogy I	2	-	-	2	X	-	-	-	-	X	-	-	-	-
18.	Pharmacognosy II	2	1	-	3	Pharmacogno sy II				X	-	-	-	-	Pharmacogn osy II	2	1	-	3	Pharmacognos y II	2	-	1	3	X	-	-	-	-
19.	Pharmacology II	2	-	-	2	Pharmacology II				Pharmacolo gy II	1	-	-	1	Pharmacolog y II	2	1	-	3	Pharmacology II	3	-	-	3	Pharmacolo gy II	3	-	-	3

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No.	Current Program				Cairo Uni. Faculty of Pharmacy Egypt				Beirut Arab Uni. Faculty of Pharmacy Lebanon				Jouf Uni. Faculty of Pharmacy KSA				Eastern Mediterranean – Uni. Cyprus Western				Al-Ain Uni. Faculty of Pharmacy Emirates									
20.	Pharmaceutical analytical Chemistry II	2	1	-	3	Analytical chemistry 2					Pharmaceutical analytical chemistry II	2	1	-	3	Instrumental analysis	4	-	-	4	Analytical chemistry II	3	-	-	3	X	-	-	-	-
21.	Phytochemistry I	2	1	-	3	Phytochemistry I					Phytochemistry	2	1	-	3	Pharmacognosy III	2	-	-	2	Pharmacognosy III	2	-	1	3	X	-	-	-	-
22.	Pharmacology III	2	-	-	2	Pharmacology III					Pharmacology III	1	-	-	1	Pharmacology III	2	-	-	2	Pharmacology III	2	-	-	2	Pharmacology III	3	-	-	3
23.	Pharmaceutics III	2	1	-	3	Pharmaceutics III					Pharmaceutical Dosage forms III	2	1	-	3	Pharmaceutics III	2	1	-	3	Pharmaceutical technology III	2	-	1	3	Pharmaceutics III	2	1	-	3
24.	Pharmacotherapy I	2	-	-	2	X	-	-	-	-	Pharmacotherapy I	2	-	-	2	Pharmacotherapy I	2	1	-	3	Pharmacotherapy I	3	-	-	3	Pharmacotherapy I	3	-	-	3
25.	Pharmaceutical instrumental analysis I	2	1	-	3	Analytical chemistry 3					Pharmaceutical analytical chemistry III	1	1	-	2	X	-	-	-	-	X	-	-	-	-	X	-	-	-	-
26.	Medicinal Chemistry III	3	1	-	4	Pharmaceutical Chemistry III					Medicinal Chemistry III	2	1	-	3	Medicinal Chemistry IV	2	1	-	3	Pharmaceutical Chemistry III	2	-	1	3	X	-	-	-	-
27.	Clinical Pharmacy I	2	-	-	2	Clinical pharmacy & therapeutics					Pharmacy practice I	1	1	-	2	Clinical skills for pharmacists	2	-	-	2	X	-	-	-	-	Pharmacy Practice and Pharmaceutical Care	2	1	-	3
28.	Integrated-Case based Learning I	-	1	-	1	X	-	-	-	-	Pharmacy practice II	1	1	-	2	X	-	-	-	-	X	-	-	-	-	Integrated-Case based Learning I	2	-	-	2
29.	Pharmaceutical instrumental analysis II	2	1	-	3	Instrumental analysis					X	-	-	-	-	X	-	-	-	-	X	-	-	-	-	X	-	-	-	-

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No.	Current Program				Cairo Uni. Faculty of Pharmacy Egypt				Beirut Arab Uni. Faculty of Pharmacy Lebanon				Jouf Uni. Faculty of Pharmacy KSA				Eastern Mediterranean – Uni. Cyprus Western				Al-Ain Uni. Faculty of Pharmacy Emirates									
30.	Cosmetic preparations	2	1	-	3	Cosmetic products					Cosm. pharmaceuticals	1	-	-	1	Pharmaceutic s-VIII (Cosmetics)	0	1	-	1	Cosmetic sciences	2	-	-	2	X	-	-	-	
31.	Phytochemistry II	2	1	-	3	Phytochemistry II					X	-	-	-	-	Substances of Abuse	1	-	-	1	Pharmacognosy III	2	-	1	3	X	-	-	-	
32.	Clinical Pharmacy care II	2	-	-	2	Clinical pharmacology					Pharmacy practice III	1	1	-	2	Pharmaceutic al care	3	-	-	3	X	-	-	-	-	X	-	-	-	
33.	Pharmacotherapy II	2	-	-	2	X	-	-	-	-	Pharmacoth erapy II	2	-	-	2	Pharmacoth erapy II	2	1	-	3	Pharmacoth erapy II	3	-	-	3	Pharmacoth erapy II	3	-	-	3
34.	Integrated-Case based Learning II	-	1	-	1	X	-	-	-	-	Pharmacy practice IV	1	1	-	2	X	-	-	-	-	X	-	-	-	-	Integrated-Case based Learning II	2	1	-	3
35.	Experimental Pharmacology	2	1	-	3	X	-	-	-	-	Pharmacolo gy V	1	-	-	1	Pharmacolog y V	2	1	-	3	X	-	-	-	-	X	-	-	-	
36.	Pharmacology IV	2	-	-	2	X	-	-	-	-	Pharmacolo gy IV	1	-	-	1	Pharmacolog y IV	2	-	-	2	X	-	-	-	-	X	-	-	-	
37.	Advanced Drug Delivery Systems	2	-	-	2	Novel dosage form					Drug delivery systems	1	1	-	2	Pharmaceutic s-VII	2	1	-	3	Pharmaceutica l technology IV	2	-	1	3	X	-	-	-	
38.	Industrial Pharmacy	2	-	-	2	Industrial pharmacy					X	-	-	-	-	Pharmaceutic s-V	3	1	-	4	Pharmaceutica l technology IV	2	-	1	3	Industrial Pharmacy - Training	-	2	-	2
39.	Phytotherapy	2	-	-	2	Herbal Medicine					Recent Approaches In Phytotherapy	1	1	-	2	Recent Approaches in Medicinal Plants Analysis	2	2	-	4	Phytotherapy	2	-	-	2	Phytotherapy and Dietary Supplements	3	-	-	3
40.	Pharmaceutical quality Control	2	1	-	3	Quality control & quality assurance					X	-	-	-	-	Pharmaceutica l quality control & Good manufacturing practice	2	1	-	3	X	-	-	-	-	X	-	-	-	

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41.	Biopharmaceutics	2	-	-	2	Biopharmaceutics & Pharmacokinetics					Biopharmaceutics & Pharmacokinetics	2	-	-	2	Pharmaceutics-IV	2	1	-	3	X	-	-	-	-	Biopharmaceutics and Pharmacokinetics	3	-	-	3
42.	Hospital Pharmacy	2	-	-	2	Hospital pharmacy					Hospital pharmacy	1	-	-	1	Pharmacy Management	1	1	-	2	X	-	-	-	-	X	-	-	-	-
43.	Toxicology	2	-	-	2	Toxicology					Toxicology	2	-	-	2	Toxicology	2	-	-	2	Pharmaceutical toxicology	3	-	1	4	Toxicology & Emergency Medicine	2	-	-	2
44.	Pharmaceutical Biotechnology	2	-	-	2	Biotechnology					X	-	-	-	-	Pharmaceutical Biotechnology	2	1	-	3	Pharmaceutical Biotechnology and Cell Culture	2	-	-	2	Medication Information and Literature Evaluation	3	-	-	3
45.	Community Pharmacy	2	-	-	2	Pharmacy practice					Pharmacy practice experience III	1	1	-	2	Pharmacy Practice	2	0	-	2	X	-	-	-	-	X	-	-	-	-
46.	Pharmacogenomics and Gene therapy	2	-	-	2	Biotechnology					X	-	-	-	-	Pharmaceutical Biotechnology	2	1	-	3	Pharmaceutical Biotechnology and Cell Culture	2	-	-	2	Pharmacogenomics	2	-	-	2
47.	Pharmacokinetics	2	-	-	2	Biopharmaceutics & Pharmacokinetics					Biopharmaceutics & Pharmacokinetics	1	-	-	1	Basic Pharmacokinetics	2	1	-	3	X	-	-	-	-	X	-	-	-	-
48.	Nuclear Pharmacy	2	-	-	2	Novel dosage forms					Drug delivery systems	1	-	-	1	Pharmaceutics-VI	2	1	-	3	Pharmaceutical technology IV	2	-	1	3	X	-	-	-	-
49.	Pharmacoeconomics	2	-	-	2	Pharmacoeconomics					Principles of Pharmacoeconomics	1	-	-	1	X	-	-	-	-	Pharmacoeconomics	3	-	-	3	Pharmacoeconomics	2	-	-	2

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50.	Pharmaceutical Marketing	2	-	-	2	Marketing					Pharmaceuti cal Marketing	1	-	-	1	Pharmaceutic al Marketing	2	-	-	2	X	-	-	-	-	Marketing	1	-	-	1

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**Annex- 32, Coding System**

Theme Code	Theme
RAZ	Al-Razi University Required Courses (RAZ).
MSC	Faculty of Medical Sciences Required Courses (MSC).
PH	Pharmacy Department Required Courses (PHA)
PHT	Pharmaceutics related Courses
PHM	Medicinal and Analytical Chemistry Related Courses
PHG	Pharmacognosy Related Courses
PHP	Pharmacology Related Courses
PHC	Clinical Pharmacy Related Courses

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الجمهورية العربية السورية

وزارة التعليم العالي والبحث العلمي

**جامعة الرازي**

كلية الطب والعلوم الصحية

قسم الصيدلة

# توصيف المقررات الدراسية



السنة الأولى  
 الفصل الأول

FIRST level ( 1 <sup>st</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr	Cr.hr	
17	Arabic language I	لغة عربية 1	RAZ111	2	-	2	---
18	Introduction to pharmacy	مقدمة في الصيدلة	PHP115	2	-	2	---
19	English language	لغة انجليزية	RAZ112	2	-	2	---
20	General Biology	أحياء عامة	MSC116	2	2	3	Co: MSC117
21	Computer skills	مهارات حاسوب	RAZ113	1	2	2	---
22	Islamic culture	ثقافة إسلامية	RAZ114	2	-	2	---
23	General Chemistry	كيمياء عامة	MSC117	2	2	3	Co: MSC116
24	National culture1	ثقافة وطنية 1	RAZ118	2	-	2	---
<b>Total</b>				<b>15</b>	<b>6</b>	<b>18</b>	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; : Pr: Prerequisite ; Co: Corequisite





المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification**

توصيف مقرر دراسي اللغة العربية

Course Code No. (RAZ111)

الكلية : جميع الكليات  
القسم: جميع الأقسام  
البرنامج : جميع البرامج



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I. معلومات عامة عن المقرر :General information about the course				
اسم المقرر		اللغة العربية (1)		
رمز المقرر ورقمه				
الساعات المعتمدة:		محاضرة	سمنار/تمارين	عملي
		2		
المستوى والفصل الدراسي		المستوى الأول – الفصل الأول		
المتطلبات السابقة لدراسة المقرر (إن وجدت)		لا يوجد.		
المتطلبات المصاحبة (إن وجدت)				
البرنامج الذي يدرس له المقرر		جميع برامج كليات الجامعة		
لغة تدريس المقرر:		اللغة العربية		
نظام الدراسة		انتظام – فصلي		
معد توصيف المقرر		أ.د. صالح علي النهاري		
تاريخ اعتماد توصيف		2022م		
الجهة التي اعتمدت التوصيف		جامعة الرازي		

II. وصف المقرر :Course Description	
<p>يعد هذا المقرر من المقررات المهمة في الجامعة . ويهدف إلى تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات النحو العربي وبالجملة الاسمية ونواسخها والقواعد الكتابية المتعلقة بكتابة الهمزات وقواعد كتابة حرفي الضاد والطاء وحرفي التاء والهاء ، ومواضع كتابة علامات الترقيم في الكتابة العربية وتوظيف تلك القواعد لتحسين الأداء نطقاً وكتابة من خلال القيام بتطبيقات لغوية (شعرية ونثرية ) وسيستخدم استراتيجيات التعليم والتعلم والتقويم المناسبة لربط الجانب النظري بالجانب التطبيقي. .</p>	
III. أهداف المقرر :Course Aims	
<p>يهدف المقرر إلى:</p> <ol style="list-style-type: none"> <li>1. تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات النحو العربي وبالجملة الاسمية ونواسخها وتوظيفها</li> <li>2. تزويد الطلبة بالقواعد الكتابية المتعلقة بكتابة الهمزات وكتابة حروف الضاد والتاء والهاء وعلامات الترقيم وتوظيفها</li> <li>3. استخدام مصادر التعلم المختلفة بهدف الإلمام بأشهر أبواب النحو واستيعاب القواعد الكتابية والكتابة الوظيفية..</li> </ol>	

IV. مخرجات التعلم المقصودة للمقرر (CILOs) :Course Intended Learning Outcomes	
المعرفة والفهم	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات البرنامج (معرفة وفهم)	مخرجات المقرر (معرفة وفهم)
بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:
A يظهر المعرفة والفهم بمفاهيم اللغة العربية والمواد الثقافية ويوظفها.	a1 - يوضح القواعد النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها.
	a2 - يوضح القواعد الأساسية المتعلقة بكتابة الهمزات وقواعد كتابة الحروف الضاد والطاء والتاء والهاء ، الرسائل الإدارية وعلامات الترقيم ويوظفها.

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المهارات الذهنية Intellectual Skills:	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات ذهنية)	مخرجات البرنامج (مهارات ذهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
b1- يوظف المفاهيم النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..	B: يحلل المفاهيم المتعلقة باللغة العربية والمواد الثقافية
المهارات العملية والمهنية Professional and Practical Skills:	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات عملية ومهنية)	مخرجات البرنامج (مهارات عملية ومهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها .	C يستخدم الموارد التعليمية ومصادر التعلم بشكل فعال.

المهارات الانتقالية (العامة) Transferable (General) Skills:	
يتم ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات انتقالية عامة)	مخرجات البرنامج (مهارات انتقالية عامة)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على
d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية.	D يتواصل بفاعلية ويمارس العمل في فريق في المواقف المختلفة.

V. ربط مخرجات التعلم باستراتيجيات التدريس والتقييم		
أولاً: ربط مخرجات تعلم المقرر/المعرفة والفهم باستراتيجية التدريس والتقييم:		
مخرجات المقرر/ المعرفة والفهم	إستراتيجية التدريس	إستراتيجية التقييم
a1 - يوضح القواعد النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها. a2 - يوضح القواعد الأساسية المتعلقة بكتابة الهزات وقواعد كتابة الحروف الضاد والطاء والتاء والهاء ، الرسائل الإدارية وعلامات الترقيم ويوظفها.	- الإلقاء الفاعل(المحاضرات) - الحوار والمناقشة - العروض الايضاحية - مجموعات العمل - خرائط المفاهيم. - العصف الذهني - التكاليف	- اختبارات شفوية - تقويم التكاليف - تقويم مشاركات الدارس في المناقشة
ثانياً: ربط مخرجات تعلم المقرر/المهارات الذهنية باستراتيجية التدريس والتقييم		
مخرجات المقرر/ المهارات الذهنية	إستراتيجية التدريس	إستراتيجية التقييم
b1- يوظف المفاهيم النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..	- الحوار والمناقشة - عمل تطبيقات على النصوص	- اختبارات تحريرية قصيرة - تقويم عمل تطبيقات على النصوص - تقويم مشاركات الدارس في المناقشة
ثالثاً: ربط مخرجات تعلم المقرر/المهارات المهنية والعملية باستراتيجية التدريس والتقييم:		
مخرجات المقرر/ المهارات المهنية والعملية	إستراتيجية التدريس	إستراتيجية التقييم

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أ.د. صالح علي النهاري	أ.د/ هادي شمسان	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

- تستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها .	- التكاليف - البحوث العلمية - حل المشكلات	- تقويم التكاليف - تقويم البحوث - تقويم التطبيق
<b>رابعاً: ربط مخرجات تعلم المقرر/المهارات الانتقالية (العامة) بإستراتيجية التدريس والتقييم:</b>		
<b>مخرجات المقرر/ المهارات الانتقالية (العامة)</b>	<b>إستراتيجية التدريس</b>	<b>إستراتيجية التقييم</b>
d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية.	- البحوث العلمية - التكاليف - تطبيقات عملية	- تقويم البحوث - تقويم التكاليف - تقويم التطبيق

**VI . كتابة مواضيع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.**

**وحدات /مواضيع محتوى المقرر**

**أولاً: الجانب النظري:**

الرقم No.	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر CILOs
1	أقسام الكلمة والمعربات في النحو العربي وتطبيقات (نثرية وشعرية) عليها	- أقسام الكلام وعلامات كل قسم - تطبيقات (نثرية وشعرية) .	1	2	a 1+a 2 +b 1+ c 1+d 1
		- الإعراب وأنواعه وعلاماته. - تطبيقات (نثرية وشعرية) .	1	2	
		- الأسماء المعربة بحركة أصلية والمعربة بالحروف. - تطبيقات (نثرية وشعرية) .	1	2	
		- الأفعال المعربة - تطبيقات (نثرية وشعرية) .	1	2	
2	القواعد الكتابية	- قواعد كتابة همزتي الوصل والقطع - تطبيقات (نثرية وشعرية) .	1	2	a 1+a 2 +b 1+ c 1+d 1
		- قواعد كتابة الهمزة المتوسطة والمتطرفة	1	2	
3	اختبار نصفي	- تحريري	1	2	a 1+a 2 +b 1+ c 1+d 1
4	المبنيات في النحو العربي والنصوص التطبيقية عليها	- تعريف البناء وعلامات بناء الأفعال - تطبيقات (نثرية وشعرية) .	1	2	a 1+a 2 +b 1+ c 1+d 1
		- الأسماء المبنية وعلامات بنائها - تطبيقات (نثرية وشعرية) .	1	2	
5	تابع / القواعد الكتابية	- قواعد كتابة حرفي الضاد والطاء والناء والهاء	1	2	a 1+a 2 +b 1+ c 1+d 1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
أ.د. صالح علي النهاري	أ.د/ هادي شمسان	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

VI. كتابة مواضيع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.				
وحدات /مواضيع محتوى المقرر				
أولاً: الجانب النظري:				
الرقم No.	وحدات/موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	مخرجات تعلم المقرر CIOs
	الجملة الاسمية ونواسخها وتطبيقات (نثرية وشعرية) عليها	- الجملة الاسمية (المبتدأ والخبر). - تطبيقات (نثرية وشعرية) .	1	a 1+a 2 +b 1+ c 1+d 1
		- كان وأخواتها وكاد وأخواتها. - تطبيقات (نثرية وشعرية) .	1	
		- إن وأخواتها. - تطبيقات (نثرية وشعرية) .	1	
6	تابع/القواعد الكتابية	- علامات الترقيم في الكتابة العربية	1	a 1+a 2 +b 1+ c 1+d 1
7	الكتابة الوظيفية	- الرسائل الإدارية	1	a 1+a 2 +b 1+ c 1+d 1
8	اختبار نهاية الفصل	تحريري	1	a 1+a 2 +b 1+ c 1+d 1
إجمالي عدد الأسابيع والساعات			16	32 ساعة

VII. استراتيجيات التدريس	
1-	الإلقاء الفاعل (المحاضرات)
2-	الحوار والمناقشة
3-	العصف الذهني
4-	العروض الايضاحية
5-	خرائط المفاهيم.
6-	التكاليف
7-	عمل تطبيقات على النصوص
8-	البحوث العلمية
9-	حل المشكلات
10-	التعلم التعاوني

1-الأنشطة:				
الرقم No.	النشاط / التكاليف	مخرجات التعلم CIOs	الأسبوع	الدرجة
1	قيام الطالب بعمل التكاليف والأبحاث حول الموضوعات المقررة عليهم.	b2،b1، c2،d1	كل محاضرة	10

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1- الأنشطة :				
الرقم No.	النشاط / التكليف	مخرجات التعلم CILOs	الأسبوع	الدرجة
2	قيام الطالب بحل التطبيقات والتدريبات المتعلقة بالمقرر بطريقة فردية أو جماعية.	b2،b1، c2،d1	كل محاضرة	10

2- تقييم التعلم : Learning Assessment					
م	أنشطة التقييم	الأسبوع Week due	الدرجة Mark	نسبة الدرجة إلى درجة التقويم النهائي	المخرجات التي يحققها
1	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة	ابتداء من المحاضرة الرابعة	20	%20	تقييم تكاليف/ أبحاث/دراسات والمشاركة في القاعة
2	اختبار نصفي	بعد المحاضرة السادسة	20	%20	اختبار نصفي
3	الاختبار النهائي	بعد آخر أسبوع	60	%60	الاختبار النهائي
المجموع Total			100	%100	

VIII. مصادر التعلم Learning Resources	
المراجع الرئيسية: Textbooks	
1. اللغة العربية (1) :أ.د. صالح علي النهاري : الناشر : جامعة الرازي الطبعة الأولى 2020م.	
المراجع المساعدة: Essential References	
1. النحو الشافي، محمود حسني مغالسة ( 1418هـ). الطبعة الثالثة، مؤسسة الرسالة، بيروت، لبنان.	
2. الإملاء و الترقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م..	
3. فن التحرير العربي، د. محمد صالح الشنطي، دار النفائس، بيروت، 2004 م.	
4. الإملاء و الترقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م.	
5. تقديم وعناية عبد الفتاح أبو غدة، الترقيم وعلاماته في اللغة العربية، أحمد زكي باشا، مكتب المطبوعات الإسلامية، حلب، ط. الثالثة، 1416هـ / 1995م.	
6. فن الكتابة الصحيحة، دار المعرفة الجامعية، محمود سليمان ياقوت، الإسكندرية، 2003م.	
7. في أساسيات اللغة العربية، الكتابة الإملائية والوظيفية، عبد العزيز نبوي، مؤسسة المختار، القاهرة 2003م.	
8. الخلاصة في قواعد الإملاء وعلامات الترقيم، نبيل مسعد السيد غزي، دار غريب، القاهرة 2000م.	
مواد إلكترونية وإنترنت: (إن وجدت) Electronic Materials and Web Sites	
عرض باوربوينت. سيديهايات .	
مكتبة المصطفى موقع الوراق	<a href="http://www.al-mostafa.com/index.htm">http://www.al-mostafa.com/index.htm</a>
	<a href="http://www.alwaraq.net/index">http://www.alwaraq.net/index</a>

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مكتبة مشكاة	<a href="http://www.almeshkat.net/books/index.php">http://www.almeshkat.net/books/index.php</a>
الإسلام	<a href="http://www.alukah.net">/http://www.alukah.net</a>
الألوكة	<a href="http://www.iwan.fajjal.com">/http://www.iwan.fajjal.com</a>
الإيوان	<a href="http://www.alarabiyah.ws">/http://www.alarabiyah.ws</a>
صوت العربية	<a href="http://www.alfaseeh.com/vb/index.php">http://www.alfaseeh.com/vb/index.php</a>
شبكة الفصح	

I. Course Policies:	
1.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3.	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.



Second Part of Course Specification  
Faculty of Medical Science  
Department of Pharmacy  
Program of Pharmacy Bachelor

Course Plan (Syllabus) of  
اللغة العربية 1  
Course Code No. (RAZ111)

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	أ.د. صالح علي النهاري	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

IX. وصف المقرر :Course Description
يعد هذا المقرر من المقررات المهمة في الجامعة . ويهدف إلى تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات النحو العربي وبالجملية الاسمية ونواسخها والقواعد الكتابية المتعلقة بكتابة الهمزات وقواعد كتابة حرفي الضاد والطاء وحرفي التاء والهاء ، ومواضع كتابة علامات الترقيم في الكتابة العربية وتوظيف تلك القواعد لتحسين الأداء نطقاً وكتابة من خلال القيام بتطبيقات لغوية (شعرية ونثرية ) وسيستخدم استراتيجيات التعليم والتعلم والتقويم المناسبة لربط الجانب النظري بالجانب التطبيقي. .
X. أهداف المقرر :Course Aims
يهدف المقرر إلى:
4. تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات النحو العربي وبالجملية الاسمية ونواسخها وتوظيفها
5. تزويد الطلبة بالقواعد الكتابية المتعلقة بكتابة الهمزات وكتابة حروف الضاد والتاء والهاء وعلامات الترقيم وتوظيفها
6. استخدام مصادر التعلم المختلفة بهدف الإلمام بأشهر أبواب النحو واستيعاب القواعد الكتابية والكتابة الوظيفية..

XI. مخرجات التعلم المقصودة للمقرر (CILOs) :Course Intended Learning Outcomes	
المعرفة والفهم	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات البرنامج (معرفة وفهم)	مخرجات المقرر (معرفة وفهم)
بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:

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a1 - يوضح القواعد النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها.	A يظهر المعرفة والفهم بمفاهيم اللغة العربية والمواد الثقافية ويوظفها.
a2 - يوضح القواعد الأساسية المتعلقة بكتابة الهمزات وقواعد كتابة الحروف الضاد والطاء والتاء والهاء ، الرسائل الإدارية وعلامات الترقيم ويوظفها.	

### المهارات الذهنية Intellectual Skills:

ربط مخرجات البرنامج بمخرجات المقرر

مخرجات المقرر (مهارات ذهنية)	مخرجات البرنامج (مهارات ذهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
b1- يوظف المفاهيم النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..	B: يحلل المفاهيم المتعلقة باللغة العربية والمواد الثقافية

### المهارات العملية والمهنية Professional and Practical Skills:

ربط مخرجات البرنامج بمخرجات المقرر

مخرجات المقرر (مهارات عملية ومهنية)	مخرجات البرنامج (مهارات عملية ومهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها .	C يستخدم الموارد التعليمية ومصادر التعلم بشكل فعال.

### المهارات الانتقالية (العامة) Transferable (General) Skills:

يتم ربط مخرجات البرنامج بمخرجات المقرر

مخرجات المقرر (مهارات انتقالية عامة)	مخرجات البرنامج (مهارات انتقالية عامة)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على
d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية.	D يتواصل بفاعلية ويمارس العمل في فريق في المواقف المختلفة.

### XI ربط مخرجات التعلم باستراتيجيات التدريس والتقييم

أولاً: ربط مخرجات تعلم المقرر/المعرفة والفهم باستراتيجية التدريس والتقييم:

مخرجات المقرر/ المعرفة والفهم	استراتيجية التدريس	استراتيجية التقييم
a1 - يوضح القواعد النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها.	- الإلقاء الفاعل(المحاضرات)	- اختبارات شفوية
a2 - يوضح القواعد الأساسية المتعلقة بكتابة الهمزات وقواعد كتابة الحروف الضاد والطاء والتاء والهاء ، الرسائل الإدارية وعلامات الترقيم ويوظفها.	- الحوار والمناقشة	- تقويم التكليف
	- العروض الايضاحية	- تقويم مشاركات الدارس في المناقشة
	- مجموعات العمل	
	- خرائط المفاهيم.	
	- العصف الذهني	
	- التكاليف	

ثانياً: ربط مخرجات تعلم المقرر/المهارات الذهنية باستراتيجية التدريس والتقييم

مخرجات المقرر/ المهارات الذهنية	استراتيجية التدريس	استراتيجية التقييم
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مخرجات المقرر/ المعرفة والفهم	إستراتيجية التدريس	إستراتيجية التقييم
b1- يوظف المفاهيم النحوية المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..	- الحوار والمناقشة - عمل تطبيقات على النصوص	- اختبارات تحريرية قصيرة - تقويم عمل تطبيقات على النصوص - تقويم مشاركات الدارس في المناقشة
ثالثا: ربط مخرجات تعلم المقرر/المهارات المهنية والعملية بإستراتيجية التدريس والتقييم:		
مخرجات المقرر/ المهارات المهنية والعملية	إستراتيجية التدريس	إستراتيجية التقييم
c1- يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بمقدمات النحو العربي والجملة الاسمية ونواسخها .	- التكاليف - البحوث العلمية - حل المشكلات	- تقويم التكاليف - تقويم البحوث - تقويم التطبيق
رابعا: ربط مخرجات تعلم المقرر/المهارات الانتقالية (العامة) بإستراتيجية التدريس والتقييم:		
مخرجات المقرر/ المهارات الانتقالية (العامة)	إستراتيجية التدريس	إستراتيجية التقييم
d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية.	- البحوث العلمية - التكاليف - تطبيقات عملية	- تقويم البحوث - تقويم التكاليف - تقويم التطبيق

XI. كتابة مواضيع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.					
وحدات /مواضيع محتوى المقرر					
أولاً: الجانب النظري:					
الرقم No.	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر CILOs
1	أقسام الكلمة والمعربات في النحو العربي وتطبيقات (نثرية وشعرية) عليها	- أقسام الكلام وعلامات كل قسم - تطبيقات (نثرية وشعرية) .	1	2	a 1+a 2 +b 1+c 1+d 1
		- الإعراب وأنواعه وعلاماته. - تطبيقات (نثرية وشعرية) .	1	2	
		- الأسماء المعربة بحركة أصلية والمعربة بالحروف. - تطبيقات (نثرية وشعرية) .	1	2	
		- الأفعال المعربة - تطبيقات (نثرية وشعرية) .	1	2	
2	القواعد الكتابية	- قواعد كتابة همزتي الوصل والقطع - تطبيقات (نثرية وشعرية) .	1	2	a 1+a 2 +b 1+c 1+d 1
		- قواعد كتابة الهمزة المتوسطة والمتطرفة	1	2	
3	اختبار نصفي	- تحريري	1	2	a 1+a 2 +b 1+c 1+d 1

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XI. كتابة مواضع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.					
وحدات /مواضيع محتوى المقرر					
أولاً: الجانب النظري:					
الرقم No.	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر CILOs
4	المبنيات في النحو العربي والنصوص التطبيقية عليها	- تعريف البناء وعلامات بناء الأفعال	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات (نثرية وشعرية).	1	2	
5	تابع / القواعد الكتابية	- الأسماء المبنية وعلامات بنائها	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات (نثرية وشعرية).	1	2	
		- قواعد كتابة حرفي الضاد والطاء والتاء والهاء	1	2	
6	الجملة الاسمية ونواسخها وتطبيقات (نثرية وشعرية) عليها	- الجملة الاسمية (المبتدأ والخبر).	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات (نثرية وشعرية).	1	2	
		- كان وأخواتها وكاد وأخواتها.	1	2	
7	تابع/القواعد الكتابية	- إن وأخواتها.	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات (نثرية وشعرية).	1	2	
8	تابع/القواعد الكتابية	- علامات الترقيم في الكتابة العربية	1	2	a 1+a 2 +b 1+ c 1+d 1
7	الكتابة الوظيفية	- الرسائل الإدارية	1	2	a 1+a 2 +b 1+ c 1+d 1
8	اختبار نهاية الفصل	تحرير	1	2	a 1+a 2 +b 1+ c 1+d 1
إجمالي عدد الأسابيع والساعات			16	32 ساعة	

XIV. استراتيجيات التدريس
11- الإلقاء الفاعل (المحاضرات)
12- الحوار والمناقشة
13- العصف الذهني
14- العروض الإيضاحية
15- خرائط المفاهيم.
16- التكاليف
17- عمل تطبيقات على النصوص
18- البحوث العلمية

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<b>XIV. استراتيجيات التدريس</b>
19- حل المشكلات
20- التعلم التعاوني

3- الأنشطة :				
الدرجة	الأسبوع	مخرجات التعلم CILOs	النشاط / التكلفة	الرقم No.
10	كل محاضرة	b2،b1، c2،d1	قيام الطالب بعمل التكاليف والأبحاث حول الموضوعات المقررة عليهم.	1
10	كل محاضرة	b2،b1، c2،d1	قيام الطالب بحل التطبيقات والتدريبات المتعلقة بالمقرر بطريقة فردية أو جماعية.	2

4- تقييم التعلم Learning Assessment:					
م	أنشطة التقييم	الأسبوع Week due	الدرجة Mark	نسبة الدرجة إلى درجة التقويم النهائي	المخرجات التي يحققها
1	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة	ابتداء من المحاضرة الرابعة	20	%20	تقييم تكاليف/ أبحاث /دراسات والمشاركة في القاعة
2	اختبار نصفي	بعد المحاضرة السادسة	20	%20	اختبار نصفي
3	الاختبار النهائي	بعد آخر أسبوع	60	%60	الاختبار النهائي
<b>Total المجموع</b>			100	%100	

XV. مصادر التعلم Learning Resources:	
المراجع الرئيسية: Textbooks	
2. اللغة العربية (1): أ.د. صالح علي النهاري : الناشر : جامعة الرازي الطبعة الأولى 2020م.	
المراجع المساعدة: Essential References	
9. النحو الشافي، محمود حسني مغالسة ( 1418هـ). الطبعة الثالثة، مؤسسة الرسالة، بيروت، لبنان.	
10. الإملاء و الترقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م.	
11. فن التحرير العربي، د. محمد صالح الشنطي، دار النفائس، بيروت، 2004 م.	
12. الإملاء و الترقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م.	
13. تقديم وعناية عبد الفتاح أبو غدة، الترقيم وعلاماته في اللغة العربية، أحمد زكي باشا، مكتب المطبوعات الإسلامية، حلب، ط. الثالثة، 1416 هـ / 1995م.	
14. فن الكتابة الصحيحة، دار المعرفة الجامعية، محمود سليمان ياقوت، الإسكندرية، 2003م.	
15. في أساسيات اللغة العربية، الكتابة الإملائية والوظيفية، عبد العزيز نبوي، مؤسسة المختار، القاهرة 2003م.	
16. الخلاصة في قواعد الإملاء وعلامات الترقيم، نبيل مسعد السيد غزي، دار غريب، القاهرة 2000م.	
مواد إلكترونية وإنترنت: (إن وجدت) Electronic Materials and Web Sites	

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<b>XV. مصادر التعلم :Learning Resources</b>	
<b>المراجع الرئيسية: Textbooks</b>	
عرض باوربوينت. سيديهايات .	
مكتبة المصطفى	<a href="http://www.al-mostafa.com/index.htm">http://www.al-mostafa.com/index.htm</a>
موقع الوراق	<a href="http://www.alwaraq.net/index">http://www.alwaraq.net/index</a>
مكتبة مشكاة الإسلام	<a href="http://www.almeshkat.net/books/index.php">http://www.almeshkat.net/books/index.php</a>
الألوكة	<a href="http://www.alukah.net">/http://www.alukah.net</a>
الإيوان	<a href="http://www.iwan.fajjal.com">/http://www.iwan.fajjal.com</a>
صوت العربية	<a href="http://www.alarabiyah.ws">/http://www.alarabiyah.ws</a>
شبكة الفصيح	<a href="http://www.alfaseeh.com/vb/index.php">http://www.alfaseeh.com/vb/index.php</a>

<b>II. Course Policies:</b>	
<b>1</b>	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
<b>2</b>	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
<b>5</b>	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
<b>6</b>	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**INTRODUCTION TO PHARMACY**  
Course No. (PHP115)

2022



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I. Course Identification and General Information:					
1	Course Title:	Introduction to Pharmacy			
2	Course Code & Number:	PHP115			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	1 <sup>st</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Prs: Pr:PHP418			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhawlani			
13	Date of Approval:	2022			

II. Course Description:
The course provides the student with introduction to the profession of pharmacy in the past (History) present and future. The course focuses on different aspects of the profession in these eras: including missions of pharmacy, local regional and international foundations of pharmacy, the relation of pharmacists with other health care professionals, types of pharmacy educations and the pharmacy career opportunities.

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
1. Alignment CILOs to PILOs	
PILOs	CILOs
<b>Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:	
<b>A4</b> Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health	<b>a1.</b> Enumerate the current missions of pharmacy profession and the duties of pharmacists as drug experts.

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

1. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:		
	products, and devices to promote the public healthcare and wellness.	<p><b>a2.</b> Identify the basic pharmacy sciences, academic programs and the foundations that control pharmacy laws</p> <p><b>a3.</b> Discuss the progress of pharmacy throughout history and its current and future development and fields.</p> <p><b>a4.</b> Describe the current carriers of pharmacy profession and the new</p>
<b>Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Classify drug risks benefits.
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C6</b>	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	<b>c1.</b> Use the media technologies to communicate, search and present thoughts
<b>Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<p><b>d1.</b> Demonstrate the ability to work effectively within a team.</p> <p><b>d2.</b> Demonstrate the ability to community and patients serving through understanding of his/her mission as drug experts.</p>

2. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies

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a1. Enumerate the current missions of pharmacy profession and the duties of pharmacists as drug experts.	Active lecture	written exam, assignment
a2. Identify the basic pharmacy sciences, academic programs and the foundations that control pharmacy laws		
a3. Discuss the progress of pharmacy throughout history and its current and future development and fields.		
a4. Describe the current carriers of pharmacy profession and the new		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Classify drug risks benefits.	Active lecture, feed-back learning	written exam, quizzes
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Use the media technologies to communicate, search and present thoughts	Feed-back learning, Group-project.	Assignment, Written- exam
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate the ability to work effectively within a team.	Active lecture	Written exam
d2. Demonstrate the ability to community and patients serving through understanding of his/her mission as drug experts.	Active lecture	Group Assignment

<b>IV. Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	Pharmacy and pharmacists	a1, a2,d1, d2	<ul style="list-style-type: none"> <li>definitions (pharmacy, pharmacist, drugs, medications, drug products)</li> <li>pharmacy motto</li> <li>Pharmacy profession missions</li> </ul>	2	4

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<b>IV. Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
			<ul style="list-style-type: none"> <li>foundations of pharmacy (world, Asian, Arabic and Yemeni)</li> <li>Relation of pharmacists with other health care professionals.</li> </ul>		
2	<b>Current pharmacy practices</b>	a2, a4,c1	<ul style="list-style-type: none"> <li>Pharmacy career opportunities (academic, industrial, researcher, developer, hospital, clinical and community pharmacists)</li> </ul>	2	4
3	<b>Education of pharmacy</b>	a2, a4	<ul style="list-style-type: none"> <li>basic pharmacy sciences</li> <li>academic Baccalaureate programs, higher programs.</li> </ul>	1	2
4	<b>Pharmacists as drug experts</b>	a1,b1	<ul style="list-style-type: none"> <li>drugs benefits</li> <li>drugs risks</li> <li>Role of pharmacists as drug experts</li> <li>sources of information (primary, secondary, tertiary).</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2
5	<b>History of pharmacy</b>	a3, c1	History of pharmacy in: <ul style="list-style-type: none"> <li>in Sumerian,</li> <li>Egyptian</li> <li>Chinese, Indian,</li> <li>Roman, Greek</li> <li>Arabic and Islamic</li> <li>Western civilization</li> </ul>	5	10
6	<b>Future aspects of pharmacy</b>	a3, a4,c1, d1,d2	<ul style="list-style-type: none"> <li>factors influencing future of pharmacy.</li> <li>current development of pharmacy profession.</li> <li>newer pharmacy disciplines e.g., Complementary and alternative therapy, gene therapy and radio-pharmacy.</li> </ul>	2	4
<b>Course Review</b>		a1, a2, a3, a4, b1, c1, d1, d2	Review of the course topics by discussion session	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16	6 units

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### V. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search-report on one of the newer pharmacy disciplines.	c1, d2	4-13	6
2	<b>Group</b> : each group of students will be assigned to do a search report on one of the famous ancient Muslim Pharmacist	c1, d1, d2	14	4

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	10	10 %	b1
		Assignments	7, 12	10	10 %	c1, d1, d2
2	Mid-semester exam of theoretical part (written exam)	7	20	20 %	a1, a2, a4, b1, d2	
3	Final exam of theoretical part (written exam)	16	60	60 %	a1, a2, a3, a4, b1, c1, d2	
TOTAL			100	100		

### VIII. Learning Resources:

**1- Required Textbook(s) (maximum two ).**

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhwilani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

1. Lillian M. Azzopardi. Lecture notes in pharmacy practice, 2010, pharmaceutical press
<b>2- Essential References.</b>
1. Kevin M.G.Taylor. Pharmacy Practice, 2011, Taylor & Francis
<b>3- Electronic Materials and Web Sites etc.</b>
<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758081/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758081/</a>

IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Second Part of Course Specification  
 Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**Introduction to Pharmacy**

Course Code No. (PHP115)

<b>I. - Information about Faculty Member Responsible for the Course:</b>							
<b>Name of Faculty Member</b>	Dr. Mohammed Alkhawlani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
The course provides the student with introduction to the profession of pharmacy in the past (History) present and future. The course focuses on different aspects of the profession in these eras: including missions of pharmacy, local regional and international foundations of pharmacy, the relation of pharmacists with other health care professionals, types of pharmacy educations and the pharmacy career opportunities.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>III. Intended learning outcomes of the course (CILOs)</b>	
<b>1. Alignment CILOs</b>	
<b>A: Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:	
<b>a1.</b> Enumerate the current missions of pharmacy profession and the duties of pharmacists as drug experts.	
<b>a2.</b> Identify the basic pharmacy sciences, academic programs and the foundations that control pharmacy laws	
<b>a3.</b> Discuss the progress of pharmacy throughout history and its current and future development and fields.	
<b>a4.</b> Describe the current carriers of pharmacy profession and the new	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
<b>b1.</b> Classify drug risks benefits.	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
<b>c1.</b> Use the media technologies to communicate, search and present thoughts	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
<b>d1.</b> Demonstrate the ability to work effectively within a team.	
<b>d2.</b> Demonstrate the ability to community and patients serving through understanding of his/her mission as drug experts.	

<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Enumerate the current missions of pharmacy profession and the duties of pharmacists as drug experts.	Active lecture	written exam, assignment
<b>a2.</b> Identify the basic pharmacy sciences, academic programs and the foundations that control pharmacy laws		
<b>a3.</b> Discuss the progress of pharmacy throughout history and its current and future development and fields.		
<b>a4.</b> Describe the current carriers of pharmacy profession and the new		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>b1.</b> Classify drug risks benefits.	Active lecture, feed-back learning	written exam, quizzes
<b>(c)Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Use the media technologies to communicate, search and present thoughts	Feed-back learning, Group-project.	Assignment, Written-exam
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate the ability to work effectively within a team.	Active lecture	Written exam
<b>d2.</b> Demonstrate the ability to community and patients serving through understanding of his/her mission as drug experts.	Active lecture	Group Assignment

<b>III.Course Content:</b>					
<b>Or der</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Pharmacy and pharmacists</b>	a1, a2,d1, d2	<ul style="list-style-type: none"> <li>• definitions (pharmacy, pharmacist, drugs, medications, drug products)</li> <li>• pharmacy motto</li> <li>• Pharmacy profession missions</li> <li>• foundations of pharmacy (world, Asian, Arabic and Yemeni)</li> <li>• Relation of pharmacists with other health care professionals.</li> </ul>	2	4
2	<b>Current pharmacy practices</b>	a2, a4,c1	<ul style="list-style-type: none"> <li>• Pharmacy career opportunities (academic, industrial, researcher , developer, hospital, clinical and community pharmacists)</li> </ul>	2	4
3	<b>Education of pharmacy</b>	a2, a4	<ul style="list-style-type: none"> <li>• basic pharmacy sciences</li> <li>• academic Baccalaureate programs, higher programs.</li> </ul>	1	2
4	<b>Pharmacists as drug experts</b>	a1,b1	<ul style="list-style-type: none"> <li>• drugs benefits</li> <li>• drugs risks</li> <li>• Role of pharmacists as drug experts</li> <li>• sources of information (primary, secondary, tertiary).</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

5	History of pharmacy	a3, c1	History of pharmacy in : <ul style="list-style-type: none"> <li>○ in Sumerian,</li> <li>○ Egyptian</li> <li>○ Chinese, Indian,</li> <li>○ Roman, Greek</li> <li>○ Arabic and Islamic</li> <li>○ Western civilization</li> </ul>	5	10
6	Future aspects of pharmacy	a3, a4, c1, d1, d2	<ul style="list-style-type: none"> <li>• factors influencing future of pharmacy</li> <li>• current development of pharmacy profession</li> <li>• newer pharmacy disciplines e.g., Complementary and alternative therapy, gene therapy and radiopharmacy.</li> </ul>	2	4
Course Review		a1, a2, a3, a4, b1, c1, d1, d2	Review of the course topics by discussion session.	1	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16	6 Units

#### IV. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

#### V. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search-report on one of the newer pharmacy disciplines.	c1, d2	4-13	6

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



2	<b>Group:</b> each group of students will be assigned to do a search report on one of the famous ancient Muslim Pharmacist	c1, d1, d2	14	4
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VI. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
2	Term Works	Quizzes	4-13, 14	10	10 %	b1
		Assignments	7, 12	10	10 %	c1, d2
3	Mid-semester exam of theoretical part (written exam)		7	20	20 %	a1, a2, a4, b1, d2
4	Final exam of theoretical part (written exam)		16	60	60 %	a1, a2, a3, a4, b1, c1, d2
TOTAL				100	100%	

VII. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. Lillian M. Azzopardi . Lecture notes in pharmacy practice, 2010, pharmaceutical press	
<b>2- Essential References</b>	
1. Kevin M.G.Taylor. Pharmacy Practice, 2011, Taylor & Francis	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758081/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3758081/</a>	

IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhwilani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



المعهد العالي للدراسات والبحوث  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**ENGLISH LANGUAGE**  
Course Code No. (RAZ112)

**2022**



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**ENGLISH LANGUAGE**

<b>I. Course Identification and General Information:</b>						
1	Course Title:	ENGLISH LANGUAGE				
2	Course Code & Number:	RAZ112				
3	Credit hours:	C.H				TOTAL
		L.	Tu.	S.	P	
		2	2	-	-	-
4	Study level/ semester at which this course is offered:	First Year – 1 <sup>ST</sup> semester				
5	Pre –requisite (if any):	none				
6	Co –requisite (if any):	none				
7	Program (s) in which the course is offered:	All BC programs offered by the university				
8	Language of teaching the course:	ENGLISH				
9	Location of teaching the course:	IN THE UNIVERSITY				
10	Prepared By:	Samah SHAKER				
11	Date of Approval	9/2014				

<b>II. Course Description:</b>	
This course provides the student with basic structure and grammars in English language.	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Samah SHAKER	Dr. Sharaf Shana	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>III. Program Intended learning outcomes (PILOs) &amp; the Course Intended learning outcomes (CILOs) and their alignment to teaching and assessment strategies</b>			
<b>(A) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>			
PILOs	CILOs	Teaching strategies	Assessment Strategies
<b>A3</b>	<b>a1-comperhind the basic grammars and rule of basic English</b>	<b>lecture, Tutorial</b>	<b>written exam , assignments, quizzes</b>
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>			
PILOs	CILOs	Teaching strategies	Assessment Strategies
<b>B2</b>	<b>b1-Differentiate between various English words &amp; phrases</b>	<b>lecture, Tutorial</b>	<b>written exam , assignments, quizzes</b>
<b>(C)Alignment Course Intended Learning Outcomes of Professional and Practical Skillsto Teaching Strategies and Assessment Strategies:</b>			
PILOs	CILOs	Teaching strategies	Assessment Strategies
<b>C4</b>	<b>c1- Effectively &amp; correctly use language grammars &amp; fundamental skills (reading, writing and speech) to present thoughts/ideas.</b>	<b>lecture, Tutorial</b>	<b>written exam , assignments, quizzes</b>
<b>(D) Alignment Course Intended Learning Outcomes of Transfer able Skills to Teaching Strategies and Assessment Strategies:</b>			
PILOs	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>D3</b>	<b>d1- demonstrate self learning and time management skills.</b>	<b>lecture, Tutorial</b>	<b>assignments</b>

<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/Topics List</b>	<b>Learning Outcomes</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>contact hours</b>
1	<b>Basic English</b>	b1, c1, d1	<ul style="list-style-type: none"> <li>English letters : A to Z, capitals, small letters</li> <li>Classification of words                             <ul style="list-style-type: none"> <li>Nouns</li> <li>Articles</li> <li>Pronouns</li> <li>Quantity</li> <li>Adjective</li> <li>Adverbs</li> <li>Prepositions</li> </ul> </li> <li>verbs : Be, have, do , Modal auxiliaries and related verbs</li> </ul>	4	12
2	<b>The sentence</b>	b1, c1, d1	<ul style="list-style-type: none"> <li>Simple, compound, complex</li> <li>Passive and causative</li> <li>Questions, answers, negatives</li> <li>Conditional sentences</li> <li>Direct and indirect speech</li> <li>The infinitive and the "ing" form</li> </ul>	3	12
<b>MID-SEMESTER EXAM</b>				1/2	2
3	<b>Tenses</b>	b1, c1, d1	<ul style="list-style-type: none"> <li>Past simple</li> </ul>	1/2	2
			<ul style="list-style-type: none"> <li>Past perfect</li> <li>Past continuous (progressive)</li> <li>Present simple</li> <li>Present perfect</li> <li>Present continuous (progressive)</li> <li>Future simple</li> <li>Future perfect</li> <li>Future continuous (progressive)</li> </ul>	7	28
<b>Total</b>				<b>15</b>	<b>56</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>15</b>	<b>3</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Samah SHAKER	Dr. Sharaf Shana	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

### V. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

### VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Tutorial exercises	b1, c1, d1	3	2
2	Homework Exercises	b1, c1, d1	7	1

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5 %	b1, c1, d1
2	Assignments (1 + 2)	4, 14	10	10 %	b1, c1, d1
3	Quiz 1 + Quiz 2	7, 12	5	5 %	b1, c1, d1
4	Mid-semester exam of theoretical part ( written exam)	7	20	20 %	b1, c1, d1
5	Final exam of theoretical part ( written exam)	17	60	60 %	b1, c1, d1
TOTAL			100	100 %	

### VII. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

L.G. Alexander, 2007, Longman English grammar practice, , Longman Group, UK

#### 2- Essential References.

Mary Lou, 2011, The English Teacher's Survival Guide: Ready-To-Use Techniques & Materials for Grades 7-12 , 2nd Edition, Jossey-Bass teachers, USA

#### 3- Electronic Materials and Web Sites etc.

[www.ego4u.com/](http://www.ego4u.com/)

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Samah SHAKER	Dr. Sharaf Shana	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



### VIII. Course Policies:

1.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work.
5.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course.
6.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.



Second Part of Course Specification  
Faculty of Medical Science  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**ENGLISH LANGUAGE**  
Course Code No. (RAZ112)

II. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Samah SHAKER	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail				12- 1		10 - 11	

II. Course Description:
This course provides the student with basic structure and grammars in English language.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Samah SHAKER	Dr. Sharaf Shana	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>III. Program Intended learning outcomes (CILOs) and their alignment to teaching and assessment strategies</b>		
<b>A) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
CILOs	Teaching strategies	Assessment Strategies
a1-comperhind the basic grammars and rule of basic English	lecture, Tutorial	written exam , assignments, quizzes
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
CILOs	Teaching strategies	Assessment Strategies
b1-Differentiate between various English words & phrases	lecture, Tutorial	written exam , assignments, quizzes
<b>(C)Alignment Course Intended Learning Outcomes of Professional and Practical Skillsto Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1- Effectively & correctly use language grammars & fundamental skills (reading, writing and speech) to present thoughts/ideas.	lecture, Tutorial	written exam , assignments, quizzes
<b>(D) Alignment Course Intended Learning Outcomes of Transferable Skillsto Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- demonstrate self learning and time management skills.	lecture, Tutorial	assignments

<b>IV. Course Content:</b>					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	<b>Basic English</b>	b1, c1, d1	<ul style="list-style-type: none"> <li>• English letters : A to Z, capitals, small letters</li> <li>• Classification of words                             <ul style="list-style-type: none"> <li>○ Nouns</li> <li>○ Articles</li> <li>○ Pronouns</li> </ul> </li> </ul>	4	12

IV. Course Content:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
			<ul style="list-style-type: none"> <li>○ Quantity</li> <li>○ Adjective</li> <li>○ Adverbs</li> <li>○ Prepositions</li> <li>● verbs : Be, have, do , Modal auxiliaries and related verbs</li> </ul>		
2	The sentence	b1, c1, d1	<ul style="list-style-type: none"> <li>● Simple, compound, complex</li> <li>● Passive and causative</li> <li>● Questions, answers, negatives</li> <li>● Conditional sentences</li> <li>● Direct and indirect speech</li> <li>● The infinitive and the "ing" form</li> </ul>	3	12
MID-SEMESTER EXAM				1/2	2
3	Tenses	b1, c1, d1	<ul style="list-style-type: none"> <li>● Past simple</li> </ul>	1/2	2
			<ul style="list-style-type: none"> <li>● Past perfect</li> <li>● Past continuous (progressive)</li> <li>● Present simple</li> <li>● Present perfect</li> <li>● Present continuous (progressive)</li> <li>● Future simple</li> <li>● Future perfect</li> <li>● Future continuous (progressive)</li> </ul>	7	28
Total				15	56
<b>Number of Weeks /and Units Per Semester</b>				<b>15</b>	<b>3</b>

#### V. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Samah SHAKER	Dr. Sharaf Shana	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

### V. Teaching strategies of the course:

brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

### VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Tutorial exercises	b1, c1, d1	3	2
2	Homework Exercises	b1, c1, d1	7	1

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5 %	b1, c1, d1
2	Assignments (1 + 2)	4, 14	10	10 %	b1, c1, d1
3	Quiz 1 + Quiz 2	7, 12	5	5 %	b1, c1, d1
4	Mid-semester exam of theoretical part ( written exam)	7	20	20 %	b1, c1, d1
5	Final exam of theoretical part ( written exam)	17	60	60 %	b1, c1, d1
<b>TOTAL</b>			<b>100</b>	<b>100 %</b>	

### VIII. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

L.G. Alexander, 2007, Longman English grammar practice, , Longman Group, UK

#### 2- Essential References.

Mary Lou, 2011, The English Teacher's Survival Guide: Ready-To-Use Techniques & Materials for Grades 7-12 , 2nd Edition, Jossey-Bass teachers, USA

#### 3- Electronic Materials and Web Sites etc.

[www.ego4u.com/](http://www.ego4u.com/)

### IX. Course Policies:

- Class Attendance:** At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam

<b>IX. Course Policies:</b>	
<b>2.</b>	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
<b>3.</b>	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
<b>4.</b>	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
<b>5</b>	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
<b>6</b>	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Samah SHAKER	Dr. Sharaf Shana	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Science

**Department of Pharmacy**

**Faculty Requirements**

Course Specification of

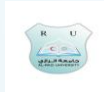
**General biology**

Course Code No. (MSC116)

2022



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<b>I. Course Identification and General Information:</b>					
1	<b>Course Title:</b>	General biology			
2	<b>Course Code &amp; Number:</b>	MSC116			
3	<b>Credit Hours: 3</b>	<b>Credit Hours</b>	<b>Theory Hours</b>		<b>Lab. Hours</b>
			<b>Lecture</b>	<b>Exercise</b>	
		3	2	--	1
4	<b>Study Level/ Semester at which this Course is offered:</b>	First Level / First Semester			
5	<b>Pre –Requisite (if any):</b>	-----			
6	<b>Co –Requisite (if any):</b>	None			
7	<b>Program (s) in which the Course is Offered:</b>	Bachelor of Pharmacy			
8	<b>Language of Teaching the Course:</b>	English			
9	<b>Study System:</b>	Credit Hour System			
10	<b>Mode of Delivery:</b>	Full Time			
11	<b>Location of Teaching the Course:</b>	Faculty of Medicine and Health Science			
12	<b>Prepared by:</b>	Dr. Wadhah Hassan Edrees			
13	<b>Date of Approval:</b>	2022			

<b>II. Course Description:</b>
<p>The course is designed to provide students with principles and concepts of biology. The course covers topics including introduction, basic biological chemistry, cell structure and function, cell division, metabolism and energy transformation, genetics, protein synthesis, tissue, evolution, and other related topics. In addition, the course will provide students with scientific knowledge on experimental skills in biological sciences as well as develop their skills in interpreting the results and reporting findings and information in a clear, and accurate.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

III. Course Intended		
Referenced PILOs	Learning Outcomes (CILOs) :	
<b>A. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1: Recognize the components and function of a cell as a basic structural unit of living organisms.
		a2: Explain the chemical basis of life, cell structure and division, molecules of the cell, genetics, and evolution of organisms in nature.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	b1: Differentiate between different forms of living organisms based on their structural and functional characterizations.
		b2: Summarize processes of metabolism pathways of essential molecules and how living cells convert these molecules into energy.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
C6	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	c1: Applying scientific knowledge in practical situations
		c2: Operates and uses the compound microscope efficiently to observe microstructures
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1: Develop critical thinking and communication skills through the accomplishment of group tasks.

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<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1: Recognize the components and function of a cell as a basic structural unit of living organisms.	<ul style="list-style-type: none"> <li>▪ Active Lectures.</li> <li>▪ Seminars and tutorials.</li> <li>▪ Computer and web-based learning.</li> <li>▪ Use of communication and information technology,</li> <li>▪ Self-directed study and research</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> </ul>
a2: Explain the chemical basis of life, cell structure and division, molecules of the cell, genetics, and evolution of organisms in nature.		
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1: Differentiate between different forms of living organisms based on their structural and functional characterizations.	<ul style="list-style-type: none"> <li>▪ Active Lectures,</li> <li>▪ Case studies.</li> <li>▪ Seminars and tutorials,</li> <li>▪ Computer and web-based learning,</li> <li>▪ Self-directed study and research.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation.</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> </ul>
b2: Summarize processes of metabolism pathways of essential molecules and how living cells convert these molecules into energy.		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1: Applying scientific knowledge in practical situations	<ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Group discussion</li> <li>▪ Laboratory training,</li> <li>▪ Laboratory classes and Fieldwork.</li> <li>▪ Small group project.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> <li>▪ Laboratory reporting.</li> </ul>
c2: Operates and uses the compound microscope efficiently to observe microstructures		

<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1: Develop critical thinking and communication skills through the accomplishment of group tasks.	<ul style="list-style-type: none"> <li>▪ Active Lectures,</li> <li>▪ tutorials,</li> <li>▪ Computer and web-based learning,</li> <li>▪ Use of communication and information technology,</li> <li>▪ Self-directed study and research</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> </ul>

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
<b>No.</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
1	<b>Introduction</b>	<ul style="list-style-type: none"> <li>– Definition of biology</li> <li>– Characteristics of life.</li> <li>– Levels of life organization</li> </ul>	1	2	a1, b1
2	<b>The chemical basis of life</b>	<ul style="list-style-type: none"> <li>– Organization of matter</li> <li>– Bonding between atoms</li> <li>– Elements in the human body</li> <li>– Water and its properties</li> <li>– Acids, bases, and salts</li> </ul>	1	2	a1, b1
3	<b>Cell structure and function</b>	<ul style="list-style-type: none"> <li>– Cell theory</li> <li>– Composition of cell structures</li> <li>– Comparison of prokaryotic and eukaryotic cells</li> <li>– Structural and functional organization of eukaryotic cells</li> </ul>	2	4	a1, a2, b1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
<b>No.</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
		<ul style="list-style-type: none"> <li>– Structural and functional organization of prokaryotic cells</li> <li>– Comparison between plant and animal cells.</li> </ul>			
<b>4</b>	<b>Cellular reproduction</b>	<ul style="list-style-type: none"> <li>– Prokaryotic cell reproduction</li> <li>– Eukaryotic cell reproduction</li> <li>– Stages of mitosis</li> <li>– Stages of meiosis</li> </ul>	2	4	a1, a2, b2
<b>5</b>	<b>The molecules of cell</b>	<ul style="list-style-type: none"> <li>– Carbohydrate</li> <li>– Proteins</li> <li>– Lipids</li> <li>– Nucleic acids</li> </ul>	1	2	a2, b2
<b>6</b>	<b>Mid-Term Theoretical Exam</b>	–	1	2	a1, a2, b1, b2
<b>7</b>	<b>Cellular transport</b>	<ul style="list-style-type: none"> <li>– Structure of cell membrane</li> <li>– Diffusion and osmosis</li> <li>– Facilitated and active transport</li> <li>– Pinocytosis and phagocytosis</li> </ul>	1	2	a1, a2, b2
<b>8</b>	<b>Bioenergetics</b>	<ul style="list-style-type: none"> <li>– Metabolism</li> <li>– Enzymes</li> <li>– Energy and ATP</li> <li>– Hydrogen and electron carriers</li> </ul>	1	2	a2, b2
<b>9</b>	<b>Molecular Biology of the Gene</b>	<ul style="list-style-type: none"> <li>– Mendel's laws of inheritance</li> <li>– Mendel's gene transmission</li> <li>– Hypothetical chromosomes</li> <li>– Activities of genes</li> </ul>	1	2	a2, b2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		– DNA and RNA structure and replication			
10	<b>Protein synthesis</b>	– Genetic code – Types of RNA – Transcription – Translation	1	2	B2
11	<b>Cellular respiration</b>	– Fermentation and anaerobic respiration – Aerobic respiration	1		b2
12	<b>Tissue types</b>	– Epithelial tissue. – Connective tissue. – Muscle tissue. – Nervous tissue.	1	2	a1, b1
13	<b>Origin of life and evolution</b>	– Formation of earth – Origin of heterotrophs and autotrophs – Rise of eukaryotes – Origin of multi-cellularity – Natural selection – Variation and speciation	1	2	a1, b1
	<b>Final Theoretical Exam</b>		1	2	a1, a2, b1, b2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

<b>B. Case Studies and Practical Aspect:</b>				
No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	- Introduction (laboratory policies)	1	2	c1

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<b>B. Case Studies and Practical Aspect:</b>				
<b>No.</b>	<b>Tasks/ Experiments</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
2	- Microscope	1	2	c1
3	- Cell structure of Eukaryotes cells	1	2	c1
4	- Preparation slide of animal cell	1	2	c1
5	- Preparation slide of plant cell	1	2	c1
6	- Cell structure of prokaryotes cell (Bacteria shape)	1	2	c1,c2
7	- Mid-Term Practical Exam	1	2	c1
8	- Cell Division (mitosis)	1	2	c1
9	- Cell Division (meiosis)	1	2	c1
10	- Osmotic behavior of red blood cells	1	2	c1
11	- Test for the presence of sugar, starch, proteins and fats in suitable plant and animal materials.	1	2	c1, c2
12	- Tissue types	1	2	c2
13	- Preparation blood thin smear	1	2	c1
14	- General review	1	2	c1, c2
15	- <b>Final practical examination</b>	1	2	c1, c2
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

<b>V. Teaching Strategies of the Course:</b>
<ul style="list-style-type: none"> <li>- Active Lectures,</li> <li>- Case studies.</li> <li>- Computer and web-based learning,</li> <li>- Group discussion</li> </ul>

- Laboratory classes and Fieldwork.
- Laboratory training,
- Self-directed study and research
- Seminars and tutorials.
- Small group project.
- Use of communication and information technology.

### VI. Assessment Methods of the Course:

- Class attendance and participation
- Laboratory reporting.
- Quiz and exams.
- Research.
- Short essays.
- Written assessments.

### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Conversion and discussion	3,6,9, 10	1.5	
2	Home task and requirements	5,7,10	2	
3	Data and reports presentation	11,12,13	1.5	
<b>Total</b>			<b>5</b>	

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	3-13	10	10%	a1, b1
2	Quiz 1	6	5	5%	a1, b1
3	Midterm Theoretical Exam	8	20	20%	a1, b1
4	Midterm Practical Exam	9	20	20%	c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

5	Quiz 2	12	5	5%	a1, b1
6	Final Practical Exam	15	30	30%	c1
7	Final Theoretical Exam	16	60	60%	a1, b1
<b>Total</b>			<b>150</b>		

## IX. Learning Resources:

- Written in the following order: Author, Year of publication, **Title**, Edition, Place of publication, Publisher.

### 1- Required Textbook(s) ( maximum two ) : مثال example

- 1- **Martha Taylor, Eric Simon, Jean Dickey, Kelly Hogan, Jane Reece (2018)**. Campbell Biology: Concepts & Connections. 9<sup>th</sup> Edition. Pearson Publisher.
- 2- **Starr, C. and R. Taggart (2015)**. Biology: The Unity and Diversity. 14<sup>th</sup> Ed. Thomson Brooks/Cole Publisher, CA, USA.

### 2- Essential References:

1. **Eldra Solomon , Charles Martin, Diana W. Martin, Linda R. Berg (2018)**. Biology. 11th Edition. Cengage Learning Publisher.
2. **Deborah T. Goldberg M. S (2017)**. Barron's AP Biology, 6<sup>th</sup> Edition Barron's Educational Series Publisher.

### 3- Electronic Materials and Web Sites etc.:

#### Websites:

<https://www.britannica.com/science/biology>

<https://en.wikipedia.org/wiki/Biology>

<https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/resources/lecture-1-introduction/>

#### Journals:

#### Other Web Sources:

## X. Course Policies: (Based on the Uniform Students' By law (2007)

### 1 Class Attendance:

Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
 Faculty of Medicine and Health Science

**Department of Pharmacy**

**Faculty Requirements**

Course Plan (Syllabus) of:

**General Biology**

Course No. (MSC116)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Wadhah Hassan Edrees						
Location & Telephone No.:	Sana'a -778555695	SA T	SU N	MO N	TU E	WE D	TH U
E-mail:	<a href="mailto:edress2020@gmail.com">edress2020@gmail.com</a>						

2022

II. Course Description:
<p>The course is designed to provide students with principles and concepts of biology. The course covers topics including introduction, basic biological chemistry, cell structure and function, cell division, metabolism and energy transformation, genetics, protein synthesis, tissue, evolution, and other related topics. In addition, the course will provide students with scientific knowledge on experimental skills in biological sciences as well as develop their skills in interpreting the results and reporting findings and information in a clear, and accurate.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

III. Course Intended
<b>Learning Outcomes (CILOs) :</b>
<b>B. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:
a1: Recognize the components and function of a cell as a basic structural unit of living organisms.
a2: Explain the chemical basis of life, cell structure and division, molecules of the cell, genetics, and evolution of organisms in nature.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:
b1: Differentiate between different forms of living organisms based on their structural and functional characterizations.
b2: Summarize processes of metabolism pathways of essential molecules and how living cells convert these molecules into energy.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:
c1: Applying scientific knowledge in practical situations
c2: Operates and uses the compound microscope efficiently to observe microstructures
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:
d1: Develop critical thinking and communication skills through the accomplishment of group tasks.

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1: Recognize the components and function of	<ul style="list-style-type: none"> <li>▪ Active Lectures.</li> </ul>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a cell as a basic structural unit of living organisms.	<ul style="list-style-type: none"> <li>▪ Seminars and tutorials.</li> <li>▪ Computer and web-based learning.</li> <li>▪ Use of communication and information technology,</li> <li>▪ Self-directed study and research</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> </ul>
a2: Explain the chemical basis of life, cell structure and division, molecules of the cell, genetics, and evolution of organisms in nature.		
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1: Differentiate between different forms of living organisms based on their structural and functional characterizations.	<ul style="list-style-type: none"> <li>▪ Active Lectures,</li> <li>▪ Case studies.</li> <li>▪ Seminars and tutorials,</li> <li>▪ Computer and web-based learning,</li> <li>▪ Self-directed study and research.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation.</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> </ul>
b2: Summarize processes of metabolism pathways of essential molecules and how living cells convert these molecules into energy.		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1: Applying scientific knowledge in practical situations	<ul style="list-style-type: none"> <li>▪ Lecture</li> <li>▪ Group discussion</li> <li>▪ Laboratory training,</li> <li>▪ Laboratory classes and Fieldwork.</li> <li>▪ Small group project.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> <li>▪ Laboratory reporting.</li> </ul>
c2: Operates and uses the compound microscope efficiently to observe microstructures		

<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1: Develop critical thinking and communication skills through the accomplishment of group tasks.	<ul style="list-style-type: none"> <li>▪ Active Lectures,</li> <li>▪ tutorials,</li> <li>▪ Computer and web-based learning,</li> <li>▪ Use of communication and information technology,</li> <li>▪ Self-directed study and research</li> </ul>	<ul style="list-style-type: none"> <li>▪ Class attendance and participation</li> <li>▪ Research.</li> <li>▪ Quiz and exams.</li> <li>▪ Short essays.</li> <li>▪ Written assessments.</li> </ul>

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
<b>No.</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
1	<b>Introduction</b>	<ul style="list-style-type: none"> <li>– Definition of biology</li> <li>– Characteristics of life.</li> <li>– Levels of life organization</li> </ul>	1	2	a1, b1
2	<b>The chemical basis of life</b>	<ul style="list-style-type: none"> <li>– Organization of matter</li> <li>– Bonding between atoms</li> <li>– Elements in the human body</li> <li>– Water and its properties</li> <li>– Acids, bases, and salts</li> </ul>	1	2	a1, b1
3	<b>Cell structure and function</b>	<ul style="list-style-type: none"> <li>– Cell theory</li> <li>– Composition of cell structures</li> <li>– Comparison of prokaryotic and eukaryotic cells</li> <li>– Structural and functional organization of eukaryotic cells</li> </ul>	2	4	a1, a2, b1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CLOs)
		<ul style="list-style-type: none"> <li>– Structural and functional organization of prokaryotic cells</li> <li>– Comparison between plant and animal cells.</li> </ul>			
<b>4</b>	<b>Cellular reproduction</b>	<ul style="list-style-type: none"> <li>– Prokaryotic cell reproduction</li> <li>– Eukaryotic cell reproduction</li> <li>– Stages of mitosis</li> <li>– Stages of meiosis</li> </ul>	2	4	a1, a2, b2
<b>5</b>	<b>The molecules of cell</b>	<ul style="list-style-type: none"> <li>– Carbohydrate</li> <li>– Proteins</li> <li>– Lipids</li> <li>– Nucleic acids</li> </ul>	1	2	a2, b2
<b>6</b>	<b>Mid-Term Theoretical Exam</b>	–	1	2	a1, a2, b1, b2
<b>7</b>	<b>Cellular transport</b>	<ul style="list-style-type: none"> <li>– Structure of cell membrane</li> <li>– Diffusion and osmosis</li> <li>– Facilitated and active transport</li> <li>– Pinocytosis and phagocytosis</li> </ul>	1	2	a1, a2, b2
<b>8</b>	<b>Bioenergetics</b>	<ul style="list-style-type: none"> <li>– Metabolism</li> <li>– Enzymes</li> <li>– Energy and ATP</li> <li>– Hydrogen and electron carriers</li> </ul>	1	2	a2, b2
<b>9</b>	<b>Molecular Biology of the Gene</b>	<ul style="list-style-type: none"> <li>– Mendel's laws of inheritance</li> <li>– Mendel's gene transmission</li> <li>– Hypothetical chromosomes</li> <li>– Activities of genes</li> </ul>	1	2	a2, b2

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<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		– DNA and RNA structure and replication			
10	<b>Protein synthesis</b>	– Genetic code – Types of RNA – Transcription – Translation	1	2	B2
11	<b>Cellular respiration</b>	– Fermentation and anaerobic respiration – Aerobic respiration	1		b2
12	<b>Tissue types</b>	– Epithelial tissue. – Connective tissue. – Muscle tissue. – Nervous tissue.	1	2	a1, b1
13	<b>Origin of life and evolution</b>	– Formation of earth – Origin of heterotrophs and autotrophs – Rise of eukaryotes – Origin of multi-cellularity – Natural selection – Variation and speciation	1	2	a1, b1
	<b>Final Theoretical Exam</b>		1	2	a1, a2, b1, b2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

<b>B. Case Studies and Practical Aspect:</b>				
No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	- Introduction (laboratory policies)	1	2	c1
2	- Microscope	1	2	c1

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<b>B. Case Studies and Practical Aspect:</b>				
<b>No.</b>	<b>Tasks/ Experiments</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
3	- Cell structure of Eukaryotes cells	1	2	c1
4	- Preparation slide of animal cell	1	2	c1
5	- Preparation slide of plant cell	1	2	c1
6	- Cell structure of prokaryotes cell (Bacteria shape)	1	2	c1,c2
7	- Mid-Term Practical Exam	1	2	c1
8	- Cell Division (mitosis)	1	2	c1
9	- Cell Division (meiosis)	1	2	c1
10	- Osmotic behavior of red blood cells	1	2	c1
11	- Test for the presence of sugar, starch, proteins and fats in suitable plant and animal materials.	1	2	c1, c2
12	- Tissue types	1	2	c2
13	- Preparation blood thin smear	1	2	c1
14	- General review	1	2	c1, c2
15	- <b>Final practical examination</b>	1	2	c1, c2
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

## V. Teaching Strategies of the Course:

- Active Lectures,
- Case studies.
- Computer and web-based learning,
- Group discussion
- Laboratory classes and Fieldwork.
- Laboratory training,
- Self-directed study and research
- Seminars and tutorials.
- Small group project.
- Use of communication and information technology.

## VI. Assessment Methods of the Course:

- Class attendance and participation
- Laboratory reporting.
- Quiz and exams.
- Research.
- Short essays.
- Written assessments.

## VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Conversion and discussion	3,6,9, 10	1.5	
2	Home task and requirements	5,7,10	2	
3	Data and reports presentation	11.12,13	1.5	
<b>Total</b>			<b>5</b>	

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### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	3-13	10	10%	a1, b1
2	Quiz 1	6	5	5%	a1, b1
3	Midterm Theoretical Exam	8	20	20%	a1, b1
4	Midterm Practical Exam	9	20	20%	c1
5	Quiz 2	12	5	5%	a1, b1
6	Final Practical Exam	15	30	30%	c1
7	Final Theoretical Exam	16	60	60%	a1, b1
<b>Total</b>			<b>150</b>		

### IX. Learning Resources:

- *Written in the following order: Author, Year of publication, Title, Edition, Place of publication, Publisher.*

#### 1- Required Textbook(s) ( maximum two ) : مثال example

3- **Martha Taylor, Eric Simon, Jean Dickey, Kelly Hogan, Jane Reece (2018).** Campbell Biology: Concepts & Connections. 9<sup>th</sup> Edition. Pearson Publisher.

4- **Starr, C. and R. Taggart (2015).** Biology: The Unity and Diversity. 14<sup>th</sup> Ed. Thomson Brooks/Cole Publisher, CA, USA.

#### 2- Essential References:

3. **Eldra Solomon , Charles Martin, Diana W. Martin, Linda R. Berg (2018).** Biology. 11th Edition. Cengage Learning Publisher.

4. **Deborah T. Goldberg M. S (2017).** Barron's AP Biology, 6<sup>th</sup> Edition Barron's Educational Series Publisher.

#### 3- Electronic Materials and Web Sites etc.:

##### Websites:

<https://www.britannica.com/science/biology>

<https://en.wikipedia.org/wiki/Biology>

<https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/resources/lecture-1-introduction/>

<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Wadhah Edrees	Dr. Amal Banafei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



الجمهورية العربية السورية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medical Sciences

Department of Pharmacy

Bachelor of Pharmacy

Course Specification of

**" COMPUTER SKILLS "**

Course Code No. (RAZ113)



<b>IX. Course Identification and General Information:</b>							
1	Course Title:	Computer Skills					
2	Course Code & Number:	RAZ113					
3	Credit hours:	C.H					TOTAL
		L.	Tut.	S.	P.	Tr.	
		2	-	-	2	-	3
4	Study level/ semester at which this course is offered:	( <i>first</i> ) Year – ( <i>1<sup>st</sup></i> ) semester					
5	Pre –requisite (if any):	None					
6	Co –requisite (if any):	None					
7	Program (s) in which the course is offered:	All BC programs offered by the university					
8	Language of teaching the course:	ENGLISH					
9	Location of teaching the course:	IN THE UNIVERSITY					
10	Prepared By:	Dr. Khalid Alakhram					
11	Date of Approval	10/2014					

<b>I. Course Description:</b>
This course is designed for students to develop basic understanding of uses of computer and its applications in nursing.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Khalid Alakhram	Dr. Hesham Haider	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>II. Intended learning outcomes (ILOs) of the course:</b>		
1-Discuss various concepts used in computer and the disk operating system. 2-Recognize features of computer aided teaching and testing. 3-Uses operating system, MS Office, multi-media, internet and Email. 4-Describe the use of hospital management system.		
<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1.Discuss various concepts used in computer and the disk operating system.	Lecture discussion Demonstration	Short answers Objective type
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Recognize features of computer aided teaching and testing.	Lecture discussion Demonstration	Short answers Objective type
<b>C. Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1.Uses operating system, MS Office, multi-media, internet and Email.	Lecture Discussion Demonstration Practice Session	Short answer questions Objective type Practical Exam
<b>(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Describe the use of hospital management system.	Lecture Discussion Demonstration Practice Session	Short answer questions Objective type Practical Exam

<b>III. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/Topics List	Sub Topics List	No. of Weeks	Contact hours	Learning Outcomes
1	Introduction	<ul style="list-style-type: none"> <li>▪ Concepts of Computers</li> <li>▪ Hardware and software; trends and technology</li> </ul>	2	4	a1, b1
2	Introduction to disk-operating system	<ul style="list-style-type: none"> <li>▪ DOS</li> <li>▪ Windows (all version)</li> <li>▪ Introduction to MS-Word</li> <li>▪ MS-Excel with pictorial presentation</li> </ul>	6	12	a1, c1

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		<ul style="list-style-type: none"> <li>▪ MS-Access</li> <li>▪ MS-Power point</li> </ul>			
3	Midterm exam		1	2	a1
4	Multimedia	<ul style="list-style-type: none"> <li>▪ Types &amp; uses</li> <li>▪ Computer aided teaching &amp; testing.</li> </ul>	2	4	b1,c1
5	Internet and e-mail	<ul style="list-style-type: none"> <li>▪ Internet</li> <li>▪ e-mail</li> </ul>	2	4	b1
6	Hospital Management System	<ul style="list-style-type: none"> <li>▪ Types</li> <li>▪ Uses</li> </ul>	1	2	d4
7	Final exam		1	2	a1, b1,d4
<b>Number of Weeks /and Units Per Semester</b>			<b>15</b>	<b>30</b>	

<b>IV. Teaching strategies of the course:</b>	
<ol style="list-style-type: none"> <li>1. Lecture - Discussion</li> <li>2. Demonstration</li> <li>3. <b>Student assignment</b></li> <li>4. <b>Practical session</b></li> </ol>	

<b>V. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Application of computers in community health	A1, B1,C6	2-10	5

<b>VI. Schedule of Assessment Tasks for Students during the Semester:</b>					
<b>Theoretical part</b>					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Activities	15th week	5	5%	A1, B1,D4
2	Student assignment	5th and 12th week	5	5%	A1, B1,C6
3	Mid-term exam	7th or 8th week	10	10%	A1
4	Final exam	16th-17th week	40	40 %	A1, B1,D4
<b>Total Theory Weight</b>			<b>60</b>	<b>60%</b>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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Practical part					
Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Attitude	14 <sup>th</sup> week	5	5%	C6
2	Semester work	1 <sup>st</sup> and 14 <sup>th</sup> week	10	10%	C6
3	Final exam (theory or oral )	15 <sup>th</sup> week	5	5%	C6
4	Final exam (practical)	16 <sup>th</sup> -17 <sup>th</sup> week	20	20%	C6
<b>Total Practical Weight</b>			<b>40</b>	<b>40%</b>	

#### VIII. Learning Resources:

##### 1- Required Textbook(s) (maximum two ).

1-N.K. Anand & Shikha Goel (2009). Computers for Nurses, A.I.T.B.S. Publishers ,India.

##### 2- Essential References.

1. Thacker N (2009). Computers for Nurses, India.

##### 3- Electronic Materials and Web Sites etc.

1-[www.google.com](http://www.google.com)  
2-[www.yahoo.com](http://www.yahoo.com)

#### IX. Course Policies:

1.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3.	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.



Second Part of Course Specification  
Faculty of Medical Science  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**" COMPUTER SKILLS "**  
Course Code No. (RAZ113)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Khalid Alakhram	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail			X				

II. Course Description:
This course is designed for students to develop basic understanding of uses of computer and its applications in nursing.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Khalid Alakhram	Dr. Hesham Haider	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>VII. Intended learning outcomes (ILOs) of the course:</b>		
1-Discuss various concepts used in computer and the disk operating system. 2-Recognize features of computer aided teaching and testing. 3-Uses operating system, MS Office, multi-media, internet and Email. 4-Describe the use of hospital management system.		
<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1.Discuss various concepts used in computer and the disk operating system.	Lecture discussion Demonstration	Short answers Objective type
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Recognize features of computer aided teaching and testing.	Lecture discussion Demonstration	Short answers Objective type
<b>C. Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1.Uses operating system, MS Office, multi-media, internet and Email.	Lecture Discussion Demonstration Practice Session	Short answer questions Objective type Practical Exam
<b>(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Describe the use of hospital management system.	Lecture Discussion Demonstration Practice Session	Short answer questions Objective type Practical Exam

<b>VIII. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/Topics List	Sub Topics List	No. of Weeks	Contact hours	Learning Outcomes
1	Introduction	<ul style="list-style-type: none"> <li>▪ Concepts of Computers</li> <li>▪ Hardware and software; trends and technology</li> </ul>	2	4	a1, b1
2	Introduction to disk-operating system	<ul style="list-style-type: none"> <li>▪ DOS</li> <li>▪ Windows (all version)</li> <li>▪ Introduction to MS-Word</li> <li>▪ MS-Excel with pictorial presentation</li> </ul>	6	12	a1, c1

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VIII. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Sub Topics List	No. of Weeks	Contact hours	Learning Outcomes
		<ul style="list-style-type: none"> <li>▪ MS-Access</li> <li>▪ MS-Power point</li> </ul>			
3	Midterm exam		1	2	a1
4	Multimedia	<ul style="list-style-type: none"> <li>▪ Types &amp; uses</li> <li>▪ Computer aided teaching &amp; testing.</li> </ul>	2	4	b1,c1
5	Internet and e-mail	<ul style="list-style-type: none"> <li>▪ Internet</li> <li>▪ e-mail</li> </ul>	2	4	b1
6	Hospital Management System	<ul style="list-style-type: none"> <li>▪ Types</li> <li>▪ Uses</li> </ul>	1	2	d4
7	Final exam		1	2	a1, b1,d4
<b>Number of Weeks /and Units Per Semester</b>			<b>15</b>	<b>30</b>	

IX. Teaching strategies of the course:
5. Lecture - Discussion 6. Demonstration 7. <b>Student assignment</b> 8. <b>Practical session</b>

X. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Application of computers in community health	A1, B1,C6	2-10	5

XI. Schedule of Assessment Tasks for Students during the Semester: Theoretical part					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Activities	15th week	5	5%	A1, B1,D4
2	Student assignment	5th and 12th week	5	5%	A1, B1,C6
3	Mid-term exam	7th or 8th week	10	10%	A1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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<b>XI. Schedule of Assessment Tasks for Students during the Semester:</b>					
<b>Theoretical part</b>					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
4	Final exam	16th-17th week	40	40 %	A1, B1,D4
<b>Total Theory Weight</b>			<b>60</b>	<b>60%</b>	

<b>Practical part</b>					
Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Attitude	14 <sup>th</sup> week	5	5%	C6
2	Semester work	1 <sup>st</sup> and 14 <sup>th</sup> week	10	10%	C6
3	Final exam (theory or oral )	15 <sup>th</sup> week	5	5%	C6
4	Final exam (practical)	16 <sup>th</sup> -17 <sup>th</sup> week	20	20%	C6
<b>Total Practical Weight</b>			<b>40</b>	<b>40%</b>	

<b>VIII. Learning Resources:</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
	1-N.K. Anand & Shikha Goel (2009). Computers for Nurses, A.I.T.B.S. Publishers ,India.
<b>2- Essential References.</b>	
	2. Thacker N (2009). Computers for Nurses, India.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1- <a href="http://www.google.com">www.google.com</a> 2- <a href="http://www.yahoo.com">www.yahoo.com</a>

<b>IX. Course Policies:</b>	
1	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.

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**IX. Course Policies:**

<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
<b>5</b>	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
<b>6</b>	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

## Template of Course Specification

### توصيف مقرر دراسي الثقافة الاسلامية

الكلية : جميع الكليات  
القسم: جميع الأقسام  
البرنامج : جميع البرامج



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### Course Specification

I. Course Identification and General Information:						
1	Course Title:	Islamic culture				
2	Course Code & Number:	RAZ114				
3		Th.	Seminar	Pr	Tr.	C.H
		2	-	-	-	2
4	Study level/ semester at which this course is offered:	First year/First semester				
5	Pre –requisite:	-				
6	Co –requisite :	-				
7	Program (s) in which the course is offered:	Pharmacy				
8	Language of teaching the course:	Arabic				
9	Location of teaching the course:	College of medical Science				
10	Prepared By:	Dr. Khalid Al-Garadi				
11	Date of Approval	2022				

II. Course Description:		وصف المقرر الدراسي
		<p>صمم هذا المقرر بهدف ترسيخ ثقافة المجتمع الإسلامي وهويته الإيمانية لدى الطلبة الجامعيين من خلال تزويدهم بالمفاهيم والمعارف والمهارات الأساسية ذات الصلة بطبيعة الثقافة الإسلامية والتحديات الثقافية التي تواجه المسلم اليوم، وكذلك إبراز أهم التحديات والقضايا المعاصرة التي تواجه الثقافة الإسلامية مع التركيز على بعض القضايا الطبية التي للشرع الإسلامي فيها حكم، وكذا الحرص على غرس قيم التسامح والتعايش والحوار، ونبذ العنف والغلو والتطرف لدى الطلبة، من أجل تكوين شخصية مسلمة وسوية معتدلة، ويعد هذا المقرر متطلباً جامعياً، يدرس في كليات الجامعة بجميع تخصصاتها.</p>

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III. Intended learning outcomes of the course (ILCOs) and their alignment to Program Intended learning outcomes (PILOs) : مخرجات التعلم المقصودة للمقرر:	
PILOs	CILOS
	الفهم والمعرفة: من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:
A1	1: أظهر المعرفة والفهم لطبيعة الثقافة الإسلامية والمفاهيم المرتبطة بها كمفهوم (الحضارة، والأنظمة في الإسلام، والتعصب والتطرف والغلو في الدين، والحرية في الإسلام، ومبدأ الحوار والسلام، وحقوق الانسان، في الإسلام).
	2: أن يشرح بوضوح مفهوم العقيدة الإسلامية وأركانها وأنواعها.
	3: مناقشة أبرز التحديات المعاصرة للثقافة الإسلامية كالغزو الفكري والعلمانية والتنصير والعولمة و... وكيفية التعامل معها.
	4: معرفة واستنباط احكام الشرع في بعض القضايا الطبية كالأجهاض وزراعة الأعضاء والاستنساخ، وتشريح الجثث، والموت الرحيم، والأدوية والإدمان، و...، وكذا انتشار ممارسة بعض العادات السيئة والضارة التي ظهرت وانتشرت في المجتمع كـ (تناول المخدرات، اللواط، العادة السرية، ...).
	5: أن يشرح ويعرض مبادئ الإسلام في تأسيس الأسرة واستمرارها، وإبراز مكانة المرأة في الإسلام، وشروط عملها خارج بيتها.
	المهارات الذهنية: من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:
B2	ب1: يكشف ويوضح آثار ومضار التطرف والغلو والتعصب على المجتمع اليمني واقتراح أساليب العلاج المناسبة.
	ب2: تحديد الفرق بين مفهومي الثقافة والحضارة.
	ب3: تحليل مظاهر التعصب والتطرف والغلو وآثارها الخطيرة على الفرد والمجتمع.
	ب4: استنتاج مخاطر الغزو الفكري وكذا العلمانية والعولمة التي تواجه الثقافة الإسلامية وطرق التصدي لمثل هذه القضايا.
	المهارات العامة والانتقالية : من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:
D1	د1: التعامل مع الافراد في ضوء المفاهيم والقيم الإسلامية كالمحبة والسلام والتسامح.
	د2: العمل بفعالية ضمن فريق لمناقشة القضايا والمشكلات الاجتماعية من منظور إسلامي.
	د3: فهم وتفسير القوانين الطبية واللوائح المنظمة للمهنة، وإدراك أهمية تجنب الأخطاء في المهنة وعقوبتها في الشرع والقانون.

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<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes مخرجات تعلم المقرر (المعرفة والفهم) باستراتيجيات التدريس والتقييم	Teaching strategies	Assessment Strategies
أ1: اظهار المعرفة والفهم لطبيعة الثقافة الإسلامية والمفاهيم المرتبطة بها كمفهوم (الحضارة، والأنظمة في الاسلام، والتعصب والتطرف والغلو في الدين، والحرية في الإسلام، ومبدأ الحوار والسلام، وحقوق الانسان، في الإسلام).	المحاضرة الحوار والنقاش العصف الذهني	الواجبات والتكاليف الاختبارات النصفية البحوث والمقالات الاختبارات النهائية
أ2: أن يشرح بوضوح مفهوم العقيدة الإسلامية وأركانها وأنواعها.		
أ3: مناقشة أبرز التحديات المعاصرة للثقافة الإسلامية كالغزو الفكري والعلمانية والتنصير والعولمة و... وكيفية التعامل معها.		
أ4: معرفة واستنباط احكام الشرع في بعض القضايا الطبية كالإجهاض وزراعة الأعضاء والاستنساخ، وتشريح الجثث، والموت الرحيم، والأدوية والادمان، و... وكذا انتشار ممارسة بعض العادات السيئة والضارة التي ظهرت وانتشرت في المجتمع كـ (تناول المخدرات، اللواط، العادة السرية،...).		
أ5: أن يشرح ويعرض مبادئ الإسلام في تأسيس الأسرة واستمرارها، وإبراز مكانة المرأة في الإسلام، وشروط عملها خارج بيتها.		
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes مخرجات تعلم المقرر (المهارات الثقافية) باستراتيجيات التدريس والتقييم:	Teaching strategies	Assessment Strategies
من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:	المحاضرات الحوار والنقاش العصف الذهني	الواجبات والتكاليف البحوث والمقالات الاختبارات الشفهية الاختبارات النهائية
ب1: يكشف ويوضح آثار ومضار التطرف والغلو والتعصب على المجتمع اليمني واقتراح أساليب العلاج المناسبة.		
ب2: تحديد الفرق بين مفهومي الثقافة والحضارة.		
ب3: تحليل مظاهر التعصب والتطرف والغلو وآثارها الخطيرة على الفرد والمجتمع.		
ب4: استنتاج مخاطر الغزو الفكري وكذا العلمانية والعولمة التي تواجه الثقافة الإسلامية وطرق التصدي لمثل هذه القضايا.		
<b>(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes مخرجات تعلم المقرر (المهارات العملية) باستراتيجيات التدريس والتقييم:	Teaching strategies	Assessment Strategies
<b>Not applicable</b>	-	-
<b>(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes مخرجات تعلم المقرر (المهارات العامة) باستراتيجيات التدريس والتقييم:	Teaching strategies	Assessment Strategies
من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:	المحاضرات	الواجبات والتكاليف البحوث والمقالات
د1: التعامل مع الافراد في ضوء المفاهيم والقيم الإسلامية كالمحبة والسلام والتسامح.		

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د2: العمل بفعالية ضمن فريق لمناقشة القضايا والمشكلات الاجتماعية من منظور إسلامي.	الحوار والنقاش العصف الذهني	الاختبارات النصفية الاختبارات النهائية
د3: فهم وتفسير القوانين الطبية واللوائح المنظمة للمهنة، وإدراك أهمية تجنب الأخطاء في المهنة وعقوبتها في الشرع والقانون.		

IV. Course Content: محتوى المقرر					
A – Theoretical Aspect:			الموضوعات النظرية		
Order	Units/Topics List	Sub Topics List	No. of Week	Contact hours	Learning Outcomes
1	تعريف الثقافة والحضارة	<ul style="list-style-type: none"> <li>تعريف الثقافة – الثقافة الإسلامية.</li> <li>مصادر الثقافة الإسلامية.</li> <li>خصائص الثقافة الإسلامية.</li> </ul>	2	2	A1، B1
2		<ul style="list-style-type: none"> <li>تعريف الحضارة ومكوناتها ومظاهرها</li> <li>الفرق بين الثقافة والحضارة.</li> </ul>			
3	النظام العقدي في الإسلام	<ul style="list-style-type: none"> <li>تعريف العقيدة.</li> <li>أركان العقيدة الإسلامية.</li> <li>أثر العقيدة على الفرد والمجتمع.</li> </ul>	1	2	A1، A2، D2
4	النظام الاجتماعي في الإسلام	<ul style="list-style-type: none"> <li>تعريف النظام الاجتماعي.</li> <li>تعريف الأسرة وأهميتها ومظاهر اهتمام الإسلام بها</li> <li>مبادئ الإسلام في تأسيس الأسرة واستمرارها:</li> <li>- مبادئ تراعى قبل الإقدام على الزواج.</li> <li>- مبادئ تراعى بعد المقدمات.</li> <li>- مبادئ تراعى عند حصول زعزعة أو خلاف بين الزوجين.</li> </ul>	1	2	A1، A2، A4
5	النظام السياسي في الإسلام	<ul style="list-style-type: none"> <li>مفهوم النظام السياسي.</li> <li>أسس النظام السياسي في الإسلام:-</li> <li>- السيادة للشرع- السلطة للأمة.</li> <li>- للأمة حاكم واحد.</li> <li>- الشورى.</li> <li>- واجبات الحاكم وحقوقه في النظام السياسي.</li> </ul>	1	2	A1، A2، D2
6	النظام الأخلاقي في الإسلام	<ul style="list-style-type: none"> <li>تعريف الأخلاق ومكانتها في الإسلام.</li> <li>الأخلاق كما وردت في القرآن الكريم.</li> </ul>	2	2	A1، A2، A5، D1، D2، D3

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IV. Course Content: محتوى المقرر					
A – Theoretical Aspect: الموضوعات النظرية					
Order	Units/Topics List	Sub Topics List	No. of Week	Contact hours	Learning Outcomes
7		<ul style="list-style-type: none"> <li>الأخلاق كما وردت في السنة النبوية.</li> </ul>		2	
		<ul style="list-style-type: none"> <li>مفهوم أخلاقيات المهنة.</li> <li>مصادر وأهمية أخلاقيات المهنة.</li> <li>تصنيف القيم الأخلاقية المهنية.</li> </ul>			
8		<ul style="list-style-type: none"> <li>امتحان نصفي</li> </ul>	1	2	A1، A2، A4، B1، D1، D2، D3
9	هدي الإسلام في الصحة والحفاظ عليها	<ul style="list-style-type: none"> <li>الإسلام والصحة.</li> <li>كيف نحافظ على أنفسنا من المهلكات.</li> <li>الطب الوقائي في الإسلام.</li> </ul>	1	2	A5، D1
10	أحكام شرعية وأخلاقية في بعض القضايا	<ul style="list-style-type: none"> <li>الأجهاض – عمليات التجميل – نقل الدم</li> <li>زراعة الأعضاء - الاستنساخ - وسائل منع الحمل.</li> </ul>	2	2	A3، A5، B2، D1، D2، D3
11		<ul style="list-style-type: none"> <li>تشريح الجثث – الموت الرحيم - الدواء والصوم.</li> <li>الأدوية والإدمان – التداوي بالأعشاب.</li> </ul>		2	
12	بعض المشكلات المعاصرة وكيف عالجها الإسلام	<ul style="list-style-type: none"> <li>سوء التغذية - انتشار الأمراض المعدية.</li> <li>حكم وأثر ممارسة بعض العادات الضارة:</li> <li>- المخدرات - المهدئات - اللواط - العادة السرية.</li> </ul>	1	2	A3، A5، B2، D1، D2، D3
13	قضايا معاصرة	<ul style="list-style-type: none"> <li>الغزو الفكري - حقوق الإنسان في الإسلام - التبشير - العلمانية - العولمة.</li> </ul>	2	2	A1، A3، A6، B3، D1، D2، D3
14		<ul style="list-style-type: none"> <li>الغلو والتطرف – التعصب – الإرهاب - المرأة في الإسلام وعملها خارج بيتها.</li> </ul>		2	
15		امتحان نهائي	1	2	A1 - A6، B1 - B3، D1 - D3
Number of Weeks /and Units Per Semester			15	30	

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V. Teaching strategies of the course: استراتيجيات تدريس المقرر				
1. المحاضرة. 2- المناقشة والحوار. 3- العصف الذهني.				
VI. Assignments: التقييم				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	تكليف عن الحضارات اليمينية	A1،A2،A3،A4،A5،B1،B2،	2-12	4
2	تكليف عن العادات والتقاليد في المجتمع	A1، B1	3-8	7
3	تكليف عن القضايا الاجتماعية والمشكلات المعاصرة	A3، A5، A6، B2، B3، D1، D2، D3	9-14	4

VII. Schedule of Assessment Tasks for Students During the Semester					
Theoretical part جدولة طرق/ أدوات التقييم خلال الفصل الدراسي					
No.	Assessment Method طرق التقييم	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Activities	15th week	5	5%	A1 - A6، B1 - B3، D1 - D3
2	Student assignment	5th and 12th week	10	10%	A1، B1
3	Assessment exam	3th and 6th and 10th week	5	5%	A1-A6، B1- B3، D1-D3
4	Mid-term exam	7th or 8th week	20	20%	A1، A2، A4، B1، D1، D2
5	Final exam	16th-17th week	60	60 %	A1 - A6 ، B1 - B5 ، D1 - D3
<b>Total Theory Weight</b>			<b>100</b>	<b>100%</b>	

VII. Learning Resources: مصادر التعلم	
<b>1- Required Textbook(s) الكتب المقررة</b>	
1-	عبد السلام عبده المخلافي (2014م): نظرات في الثقافة الإسلامية والقضايا المعاصرة، مكتبة الصادق، صنعاء.
2-	علي الاهدل وعبد الحكيم السروري (2006م): أضواء على الثقافة الإسلامية، دار القدس، صنعاء.
<b>2- Essential References المراجع المساعدة</b>	
1-	أحمد علي أحمد يعقوب (2017): الوافي في الثقافة الإسلامية، ط3، المتفوق للطباعة والنشر - صنعاء.
2-	حامد محمود إسماعيل (1999م): وآخرون: الثقافة الإسلامية، مكتبة الإرشاد، صنعاء.

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3- صالح السنباني، ورباب الأديمي (2017): الثقافة الإسلامية، ط3، جامعة أزال للتنمية البشرية.
4- عبد الحكيم بن عبد اللطيف السروري: الثقافة الإسلامية، جامعة صنعاء.
5- عبد الغني حيدر: الثقافة الإسلامية، كلية التربية، جامعة صنعاء.
6- عبد الكريم عثمان (1996م): معالم الثقافة الإسلامية، ط18، مؤسسة الرسالة، بيروت.
7- علي حسن الشرفي، قانون الجرائم والعقوبات اليمني، جامعة صنعاء.
8- عمر سليمان الأشقر (2002م): نحو ثقافة إسلامية أصيلة، ط12، دار النفائس، عمان.
9- محمد أحمد الجلال (2006م): الثقافة الإسلامية لطلاب الجامعة، مكتبة الشوكاني، صنعاء.
10- محمد أحمد كنعان: الموسوعة الفقهية الطبية.
11- موسى إبراهيم الإبراهيم (2003م): ثقافة المسلم بين الأصالة والتحديات، ط3، دار عمار، عمان.
12- نادية شريف العمري (1998م): أضواء على الثقافة الإسلامية، ط9، مؤسسة الرسالة، بيروت.

### 3- Electronic Materials and Web Sites etc.

1	<a href="https://books-library.net/c-General-Islam-Culture-best-download">https://books-library.net/c-General-Islam-Culture-best-download</a>
2	<a href="https://www.researchgate.net/publication/336305222_althqaft_alaslamyt_2018">https://www.researchgate.net/publication/336305222_althqaft_alaslamyt_2018</a>
3	<a href="http://www.almeshkat.net">http://www.almeshkat.net</a>
4	برنامج الموسوعة الشاملة

VIII. Course Policies: سياسات المقرر	
1.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3.	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course.
6.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

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**Course Plan (Syllabus)**

**خطة المقرر**

I. Information about Faculty Member Responsible for the Course: معلومات عن أستاذ المقرر						
<b>Name of Faculty Member</b>	Dr. Khalid Al-Gradi	<b>Office Hours</b>				
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>
<b>E-mail</b>	abobshar9000@gmail.com				X	

II. Course Description: وصف المقرر الدراسي
صمم هذا المقرر بهدف ترسيخ ثقافة المجتمع الإسلامي وهويته الإيمانية لدى الطلبة الجامعيين من خلال تزويدهم بالمفاهيم والمعارف والمهارات الأساسية ذات الصلة بطبيعة الثقافة الإسلامية والتحديات الثقافية التي تواجه المسلم اليوم، وكذلك إبراز أهم التحديات والقضايا المعاصرة التي تواجه الثقافة الإسلامية مع التركيز على بعض القضايا الطبية التي للشرع الإسلامي فيها حكم، وكذا الحرص على غرس قيم التسامح والتعايش والحوار، ونبذ العنف والغلو والتطرف لدى الطلبة، من أجل تكوين شخصية مسلمة وسوية معتدلة، ويعد هذا المقرر متطلباً جامعياً، يدرس في كليات الجامعة بجميع تخصصاتها.

III. Intended learning outcomes of the course (ILCOs) and their alignment to Program مخرجات التعلم المقصودة للمقرر: Intended learning outcomes (PILOs)	
PILOs	ILCOs
	من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:
A1	1- اظهار المعرفة والفهم لطبيعة الثقافة الإسلامية والمفاهيم المرتبطة بها كمفهوم (الحضارة، والأنظمة في الاسلام، والتعصب والتطرف والغلو في الدين، والحرية في الإسلام، ومبدأ الحوار والسلام، وحقوق الانسان، في الإسلام).
A2	2- أن يشرح بوضوح مفهوم العقيدة الإسلامية وأركانها وأنواعها.
A3	3- مناقشة أبرز التحديات المعاصرة للثقافة الإسلامية كالغزو الفكري والعلمانية والتنصير والعولمة و... وكيفية التعامل معها.
A4	4- معرفة واستنباط احكام الشرع في بعض القضايا الطبية كالإجهاض وزراعة الأعضاء والاستنساخ، وتشريح الجثث، والموت الرحيم، والأدوية والادمان، و...، وكذا انتشار ممارسة بعض العادات السيئة والضارة التي ظهرت وانتشرت في المجتمع كـ (تناول المخدرات، اللواط، العادة السرية، ...).
A5	5- أن يشرح ويعرض مبادئ الإسلام في تأسيس الأسرة واستمرارها، وإبراز مكانة المرأة في الإسلام، وشروط عملها خارج بيتها.
A6	6- يكشف ويوضح آثار ومضار التطرف والغلو والتعصب على المجتمع اليمني واقتراح أساليب العلاج المناسبة.
B1	
B2	
B3	7- تحديد الفرق بين مفهومي الثقافة والحضارة.

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D1	8- تحليل مظاهر التعصب والتطرف والغلو وآثارها الخطيرة على الفرد والمجتمع.
D2	9- استنتاج مخاطر الغزو الفكري وكذا العلمانية والعولمة التي تواجه الثقافة الإسلامية وطرق التصدي لها.
D3	10- التعامل مع الافراد في ضوء المفاهيم والقيم الإسلامية كالمحبة والسلام والتسامح. 11- العمل بفعالية ضمن فريق لمناقشة القضايا والمشكلات الاجتماعية من منظور إسلامي. 12- فهم وتفسير القوانين الطبية واللوائح المنظمة للمهنة، وإدراك أهمية تجنب الأخطاء في المهنة وعقوبتها في الشرع والقانون.

**(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:**

مخرجات تعلم المقرر (المعرفة والفهم) باستراتيجية التدريس والتقييم	Teaching strategies	Assessment Strategies
من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:		
A1. اظهار المعرفة والفهم لطبيعة الثقافة الإسلامية وخصائصها ومصادرها، والمعلومات والمفاهيم المرتبطة بها كمفهوم (الحضارة، ومظاهرها والأنظمة في الإسلام، والتعصب والتطرف والغلو في الدين، والحرية في الإسلام، ومبدأ الحوار والسلام، وحقوق الانسان، في الإسلام).	المحاضرات الحوار والنقاش العصف الذهني	الواجبات والتكاليف الاختبارات النصفية البحوث والمقالات الاختبارات النهائية
A2. أن يشرح بوضوح مفهوم العقيدة الإسلامية وأركانها وأنواعها، وكذلك الأخلاق في الإسلام وأخلاقيات المهنة.		
A3. مناقشة أبرز التحديات المعاصرة للثقافة الإسلامية كالعزو الفكري والعلمانية والتنصير والعولمة و... وكيفية التعامل معها.		
A4. شرح مبادئ الإسلام في تأسيس الأسرة واستمرارها، وإبراز مكانة المرأة في الإسلام، وشروط عملها خارج بيتها.		
A5. تثقيف أفراد المجتمع حول أخلاقيات المهنة وبعض القضايا الأخلاقية الطبية، وكذا كيف نحافظ على أنفسنا من المهلكات، وكذلك تجنب العادات الضارة والممارسات الخاطئة التي ظهرت وانتشرت في المجتمع ك (المخدرات، اللواط، العادة السرية).		
A6. تناول آثار ومظاهر كل من التعصب والتطرف والغلو على المجتمعات وأساليب العلاج المناسبة.		

**(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
مخرجات تعلم المقرر (المهارات الثقافية) باستراتيجية التدريس والتقييم:		
من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على:		
B1. تحديد الفرق بين مفهومي الثقافة والحضارة.	المحاضرات الحوار والنقاش العصف الذهني	الواجبات والتكاليف البحوث والمقالات الاختبارات الشفهية الاختبارات النهائية
B2. استنتاج مخاطر الغزو الفكري وكذا العلمانية والعولمة التي تواجه الثقافة الإسلامية وطرق التصدي لمثل هذه القضايا.		
B3. تحليل مظاهر التعصب والتطرف والغلو وآثارها الخطيرة على الفرد والمجتمع.		

**(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

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Course Intended Learning Outcomes مخرجات تعلم المقرر (المهارات العملية) باستراتيجية التدريس والتقييم:	Teaching strategies	Assessment Strategies
Not applicable	-	-
(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes مخرجات تعلم المقرر (المهارات العامة) باستراتيجية التدريس والتقييم:	Teaching strategies	Assessment Strategies
من المتوقع أن يكون الطالب بعد الانتهاء من دراسة هذا المقرر قادراً على: D1. التعامل مع الأفراد في ضوء المفاهيم والقيم الإسلامية كالمحبة والسلام والتسامح. D2. العمل بفعالية ضمن فريق لمناقشة القضايا والمشكلات الاجتماعية من منظور إسلامي. D3. فهم وتفسير القوانين الطبية واللوائح المنظمة للمهنة وأخلاقياتها، وإدراك أهمية تجنب الأخطاء في المهنة وعقوبتها في الشرع والقانون.	المحاضرات الحوار والنقاش العصف الذهني	الواجبات والتكاليف البحوث والمقالات الاختبارات النصفية الاختبارات النهائية

II. Course Content: محتوى المقرر			
•Distribution of Semester Weekly Plan of Course Topics/Items and Activities.			
A – Theoretical Aspect:		الموضوعات النظرية	
Order	Topics List	Week Due	Contact Hours
1	تعريف الثقافة والحضارة	1-2	4
2	النظام العقدي في الإسلام	3	2
3	النظام الاجتماعي في الإسلام	4	2
4	النظام السياسي في الإسلام:	5	2
5	النظام الأخلاقي في الإسلام	6-7	4
6	امتحان نصف الفصل	8	2
7	هدي الإسلام في الصحة والحفاظ عليها	9	2
8	أحكام شرعية وأخلاقية في بعض القضايا	10-11	4
9	بعض المشكلات المعاصرة وكيف عالجها الإسلام	12	2
10	قضايا معاصرة	13-14	4
11	امتحان نهائي	15	2
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>

B– Practical Aspect:			
Order	Topics List	Week Due	Contact hours
	Not applicable	-	-
<b>Number of Weeks /and Units Per Semester</b>			

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IX. Teaching strategies of the course: استراتيجيات تدريس المقرر				
2. المحاضرة. 2- المناقشة والحوار. 3- العصف الذهني.				
X. Assignments: التقييم				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	تكليف عن الحضارات اليمنية	A1،A2،A3،A4،A5،B1،B2،	2-12	4
2	تكليف عن العادات والتقاليد في المجتمع	A1، B1	3-8	7
3	تكليف عن القضايا الاجتماعية والمشكلات المعاصرة	A3، A5، A6، B2، B3، D1، D2، D3	9-14	4

VII. Schedule of Assessment Tasks for Students During the Semester Theoretical part					
No.	Assessment Method طرق التقييم	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Activities	15th week	5	5%	a1 - a6، b1 – b3، d1 - d3
2	Student assignment	5th and 12th week	10	10%	a1، b1
3	Assessment exam	3th and 6th and 10th week	5	5%	a1-a6، b1- b3، d1- d3
4	Mid-term exam	7th or 8th week	20	20%	a1، a2، a4، b1، d1، d2
5	Final exam	16th-17th week	60	60 %	a1 - a6 ، b1 - b5 ، d1 - d3
<b>Total Theory Weight</b>			<b>100</b>	<b>100%</b>	

Practical part					
Assessment	Type of Assessment Tasks	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Not applicable	-	-	-	-

XI. Learning Resources: مصادر التعلم	
1- Required Textbook(s) الكتب المقررة	
1- عبد السلام عبده المخلافي (2014م): نظرات في الثقافة الإسلامية والقضايا المعاصرة، مكتبة الصادق، صنعاء.	

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	2- على الاهدل وعبد الحكيم السروري (2006م): أضواء على الثقافة الإسلامية، دار القدس، صنعاء.
<b>2- Essential References</b> <span style="float: right;">المراجع المساعدة</span>	
1-	أحمد علي أحمد يعقوب (2017): الوافي في الثقافة الإسلامية، ط3، المتفوق للطباعة والنشر- صنعاء.
2-	حامد محمود إسماعيل (1999م): وآخرون: الثقافة الإسلامية، مكتبة الإرشاد، صنعاء.
3-	صالح السنباني، ورياب الأديمي (2017): الثقافة الإسلامية، ط3، جامعة أزال للتنمية البشرية.
4-	عبد الحكيم بن عبد اللطيف السروري: الثقافة الإسلامية، جامعة صنعاء.
5-	عبد الغني حيدر: الثقافة الإسلامية، كلية التربية، جامعة صنعاء.
6-	عبد الكريم عثمان (1996م): معالم الثقافة الإسلامية، ط18، مؤسسة الرسالة، بيروت.
7-	علي حسن الشرفي، قانون الجرائم والعقوبات اليمني، جامعة صنعاء.
8-	عمر سليمان الأشقر (2002م): نحو ثقافة إسلامية أصيلة، ط12، دار النفائس، عمان.
9-	محمد أحمد الجلال (2006م): الثقافة الإسلامية لطلاب الجامعة، مكتبة الشوكاني، صنعاء.
10-	محمد أحمد كنعان: الموسوعة الفقهية الطبية.
11-	موسى إبراهيم الإبراهيم (2003م): ثقافة المسلم بين الأصالة والتحديات، ط3، دار عمار، عمان.
12-	نادية شريف العمري (1998م): أضواء على الثقافة الإسلامية، ط9، مؤسسة الرسالة، بيروت.

<b>3- Electronic Materials and Web Sites etc.</b>	
1	<a href="https://books-library.net/c-General-Islam-Culture-best-download">https://books-library.net/c-General-Islam-Culture-best-download</a>
2	<a href="https://www.researchgate.net/publication/336305222_alhqaft_alaslamyt_2018">https://www.researchgate.net/publication/336305222_alhqaft_alaslamyt_2018</a>
3	<a href="http://www.almeshkat.net">http://www.almeshkat.net</a>
4	برنامج الموسوعة الشاملة

<b>13- Course Policies:</b> <span style="float: right;">سياسات المقرر</span>	
1	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise he/she will not be allowed to attend the final exam
2	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course.
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medical Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**GENERAL CHEMISTRY**  
Course No. (MSC117)

**2022**



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## I. Course Identification and General Information:

1	Course Title:	General Chemistry			
2	Course Code & Number:	MSC117			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	First Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	Co: Pr:MSC116			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Assoc. Dr. Sadeq Azzam			
13	Date of Approval:	2022			

## II. Course Description:

The course provides the student basic knowledge of chemistry of matters including chemical structure theories, periodic table of elements, chemical bonds, electronegativity, polarity, acidity, basicity, ionization constant, Quantum in chemistry, types of Chemical reactions and equilibrium. The practical part of the course is designed to provide the student practical skills of how to safely and effectively perform tests of chemical reactions and identification. Such knowledge and skills will help the student in performing such practice while studying more specific related courses e.g. pharmaceutical analytical chemistry, pharmaceutical organic chemistry and medicinal chemistry.

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<b>III. Intended learning outcomes of the course: (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>1. Alignment CILOs to PILOs</b>		
<b>PILOs</b>	<b>Intended learning outcomes of the course (CILOs)</b>	
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b> Explain the roles of chemistry in modern sciences . <b>a2.</b> Explicit the chemical structures of matters and their chemical properties <b>a3.</b> Discuss the principles and types of chemical reactions
<b>Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	<b>b1.</b> Interpret the type of chemical compound based on bond formed between atoms <b>b2.</b> Solve chemical problems related to chemical formula, electronic configuration , quantum (molecular weight, molarity, normality), pH, ionization constant and pKa. <b>b3.</b> Interpret the electronic configuration and transition in atoms <b>b4.</b> Compare between the different types of chemistry disciplines and also between inorganic and organic compounds. <b>b5.</b> Express the chemical compounds and elements using abbreviate letters. <b>b6.</b> Relate the atom reactivity to electronic configuration to. <b>b7.</b> Predict the outcomes of a chemical reaction between two chemical entities.
<b>Professional &amp; practical skills :</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the chemistry lab. <b>c2.</b> Operate the instruments and perform experiments successfully in the chemistry lab.
<b>Transferable skills :</b> Upon successful completion of the course, students will be able to:		

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<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues and in teacher in the lab..
<b>D2</b>	Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d2.</b> Demonstrate the ability of time management, self-learning and problem-solving skills. <b>d3.</b> Work successfully in team-work during performing experiments in chemistry lab.

## 2. Alignment CILOs to teaching strategies and assessment strategies

### (a) Alignment Course Intended Learning Outcomes of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the roles of chemistry in modern sciences .	<b>Active Lecture</b>	<b>written exams</b>
<b>a2.</b> Explicit the chemical structures of matters and their chemical properties		
<b>a3.</b> Discuss the principles and types of chemical reactions		

### (b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret the type of chemical compound based on bond formed between atoms	<b>Active Lecture, feed-back learning</b>	<b>Written exams , assignment, quizzes</b>
<b>b2.</b> .Solve chemical problems related to chemical formula, electronic configuration , quantum (molecular weight, molarity, normality), pH, ionization constant and pKa.		
<b>b3.</b> Interpret the electronic configuration and transition in atoms		
<b>b5.</b> Express the chemical compounds and elements using abbreviate letters.	<b>Active Lecture, feed-back learning</b>	<b>Written exams , assignment, quizzes</b>
<b>b6.</b> Relate the atom reactivity to electronic configuration to.		
<b>b7.</b> Predict the outcomes of a chemical reaction between two chemical entities.		

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b4. Compare between the different types of chemistry disciplines and also between inorganic and organic compounds.	Active Lecture	Written exams
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the chemistry lab.	Lab. Practice	Lab. term works, final practical exam
c2. Operate the instruments and perform experiments successfully in the chemistry lab.		
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues and in teacher in the lab..	Lab. Practice	Lab. term works, final practical exam
d2. Demonstrate the ability of time management, self-learning and problem-solving skills.	Lab. Practice, feed-back learning	Lab. practical works, individual assignment
d3. Work successfully in team-work during performing experiments in chemistry lab.	Lab. practice, group project	Lab. term works, group-assignment

## V. Course Content:

### A – Theoretical Aspect:

Order	Units/ Topics List	Aligned Course Learning Outcomes	Sub Topics List	No. of Weeks	contact hours
1	Introduction	a1, b4	<ul style="list-style-type: none"> <li>chemistry (definition, brief history)</li> <li>disciplines of chemistry : general, organic, inorganic, analytical, medicinal, physical, etc.)</li> <li>importance and allocations of chemistry in modern sciences.</li> <li>Matter, classifications, states, changes that matter undergoes, properties of matter.</li> </ul>	1	2
2	Chemical structures	a2, b1,	<ul style="list-style-type: none"> <li>SI- units measurements, conversion factor, S.F. accuracy and precision.</li> <li>atoms , atomic structure</li> </ul>	3	

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		b2, b3, b6	<ul style="list-style-type: none"> <li>Mole, molecules and molecular formula, chemical formula, IUPAC nomenclature of molecules and ions, classifications.</li> <li>elements, periodic table of elements, compounds (types).</li> <li>chemical bonds (ionic, covalent, etc).</li> </ul>		6
3	<b>Quantum in chemistry</b>	a2, b2	<ul style="list-style-type: none"> <li>Quantum theories, Quantum numbers, electronic configuration.</li> <li>Modern periodic table, Its Properties , atomic radius, electronegativity, dipole moments, polar and non-polar molecules.</li> </ul>	2	4
<b>MID-TERM EXAM</b>				1	2
4	<b>Chemical properties</b>	b2	<ul style="list-style-type: none"> <li>Acidity, basicity. (pH), ionization constant , pKa</li> <li>buffer systems</li> <li>atomic weight, molecular weight, equivalent weight, milliequivalent, moles.</li> <li>molarity, molality, normality .</li> </ul>	2	4
5	<b>Chemical reactions and equilibrium</b>	a3, b7, c2	<ul style="list-style-type: none"> <li>Types of reactions: Precipitation, Neutralization Rxn acid-base reactions, Redox reactions, addition reaction, elimination reactions, substitution reactions, decomposition reactions etc.</li> <li>Chemical reactivity, inertness, energy change and heat of reaction.</li> <li>chemical equations types and balance.</li> </ul>	3	6
6	<b>Inorganic chemistry</b>	b4, c2	<ul style="list-style-type: none"> <li>Comparison between inorganic and organic compounds.</li> <li>Identification and reactions of common inorganic compounds                             <ul style="list-style-type: none"> <li>Cationic radicals</li> <li>Anionic radicals</li> </ul> </li> </ul>	3	6
<b>Course Review and discussion session</b>				1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 units

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<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Learning Outcomes
1.	Introduction to chemistry lab: safety, td3ls, instruments, scope of experiments and reporting assignments. Chemical structures (atoms, molecules, bonds) using models	1	2	c1, c2 a2
2.	pH- meter principle and standard operation procedure: determination of pH of water, weak acids / bases determination of pH of strong acids/bases, salts	1	2	c1, c2, , d3, , d1, d2
3.	Preparation of buffers phosphate , citrate , acetate	1	2	c1, c2, , d3, , d1, d2
4.	Oxidation reactions using potassium permanganate & Decomposition reaction of sodium bicarbonate in water.	1	2	c1, c2, , d3, , d1, d2
5.	Acid/base reaction s e.g : HCl and NaOH	1	2	c1, c2, d3, , d1, d2
6.	Scheme Identification of cationic inorganic radicals	3	6	c1, c2, d3, , d1, d2
7.	Scheme Identification of anionic inorganic radicals	3	6	c1, c2, , d3, , d1, d2
PRACTICAL EXAM		1	2	a2, c1, c2,
<b>Total</b>		<b>12</b>	<b>24</b>	

## VI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classrd3m.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

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**Feed-back learning:** students are individually asked to do certain assignments such as summarizing, internet search, make charts or solve mathematical problems related to the courses topics. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical mad2er &for promoting team work skills

## VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Individual:</b> every student is assigned to solve problems presented by the teacher on chemical formula, electronic configuration , quantum (molecular weight, molarity, normality), pH, ionization constant and pKa	d2	4-13	3
2	<b>Group :</b> each group of students will be assigned to do a search-report about one type of chemical reactions	d1, d3	14	2

## VII.Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4, b5, b6, b7
		Assignments	7, 12	5	5	b2, a3, d1, d2
2	Mid-semester exam of theoretical part ( written exam		7	10	10	a1, a2, a5, b2, b3
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, b6, b7
TOTAL				70	70 %	70

## Practical part assessment

No.	Assessment Method		Week Due	Mar k	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	

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Final exam (practical)	12	20	20	c1, c2,d1, d2
Total		30	30 %	

### VIII. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

David W Ball and John W Hill. The Basics of General, Organic, and Biological Chemistry. 2011, Saylor Foundation, USA

#### 2- Essential References.

Bruce Averill and Patricia Eldredge. General Chemistry: Principles, Patterns, and Applications. 2011, Saylor Foundation, USA

#### 3- Electronic Materials and Web Sites etc.

- [https://mountainscholar.org/bitstream/handle/20.500.11785/249/OTL\\_BookId-40\\_BasicsGenOrgBioChemistry.pdf?sequence=1&isAllowed=y](https://mountainscholar.org/bitstream/handle/20.500.11785/249/OTL_BookId-40_BasicsGenOrgBioChemistry.pdf?sequence=1&isAllowed=y)
- <https://resources.saylor.org/wwwresources/archived/site/textbooks/General%20ChemistryPrinciples,%20Patterns,%20and%20Applications.pdf>

### VIII. Course Policies: (Based on the Uniform Students' By law (2007)

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b>

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The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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جامعة الرازي

كلية الطب والعلوم الصحية

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## Second Part of Course Specification

Faculty of Medical Science  
Department of Pharmacy  
Program of Pharmacy Bachelor

### Course Plan (Syllabus) of General Chemistry

Course Code No. (MSC117 )

#### III.- Information about Faculty Member Responsible for the Course:

Name of Faculty Member	Assoc. Dr. Sadeq Azzam	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

#### IV. Course Description:

The course provides the student basic knowledge of chemistry of matters including chemical structure theories, periodic table of elements, chemical bonds, electronegativity, polarity, acidity, basicity, ionization constant, Quantum in chemistry, types of Chemical reactions and equilibrium. The practical part of the course is designed to provide the student practical skills of how to safely and effectively perform tests of chemical reactions and identification. Such knowledge and skills will help the student in performing such practice while studying more specific related courses e.g. pharmaceutical analytical chemistry, pharmaceutical organic chemistry and medicinal chemistry.

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<b>IV. Intended learning outcomes of the course: (CILOs)</b>	
<b>3. Alignment CILOs</b>	
<b>Intended learning outcomes of the course (CILOs)</b>	
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Explain the roles of chemistry in modern sciences .	
a2. Explicit the chemical structures of matters and their chemical properties	
a3. Discuss the principles and types of chemical reactions	
<b>Intellectual skills :</b> Upon successful completion of the course, students will be able to:	
b1. Interpret the type of chemical compound based on bond formed between atoms	
b2 .Solve chemical problems related to chemical formula, electronic configuration , quantum (molecular weight, molarity, normality), pH, ionization constant and pKa.	
b3. Interpret the electronic configuration and transition in atoms	
b4. Compare between the different types of chemistry disciplines and also between inorganic and organic compounds.	
b5 .Express the chemical compounds and elements using abbreviate letters.	
b6. Relate the atom reactivity to electronic configuration to.	
b7. Predict the outcomes of a chemical reaction between two chemical entities.	
<b>Professional &amp; practical skills :</b> Upon successful completion of the course, students will be able to:	
c1. Handle efficiently and safely the chemical materials and tools used in the chemistry lab.	
c2. Operate the instruments and perform experiments successfully in the chemistry lab.	
<b>Transferable skills :</b> Upon successful completion of the course, students will be able to:	
d1. Communicate effectively and behave in discipline with colleagues and in teacher in the lab..	
d2. Demonstrate the ability of time management, self-learning and problem-solving skills.	
d3. Work successfully in team-work during performing experiments in chemistry lab.	

<b>4. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explain the roles of chemistry in modern sciences .	<b>Active Lecture</b>	<b>written exams</b>
a2. Explicit the chemical structures of matters and their chemical properties		
a3. Discuss the principles and types of chemical reactions		
<b>(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret the type of chemical compound based on bond formed between atoms <b>b2.</b> Solve chemical problems related to chemical formula, electronic configuration, quantum (molecular weight, molarity, normality), pH, ionization constant and pKa. <b>b3.</b> Interpret the electronic configuration and transition in atoms	<b>Active Lecture, feed-back learning</b>	<b>Written exams, assignment, quizzes</b>
<b>b5.</b> Express the chemical compounds and elements using abbreviate letters. <b>b6.</b> Relate the atom reactivity to electronic configuration to. <b>b7.</b> Predict the outcomes of a chemical reaction between two chemical entities.	<b>Active Lecture, feed-back learning</b>	<b>Written exams, assignment, quizzes</b>
<b>b4.</b> Compare between the different types of chemistry disciplines and also between inorganic and organic compounds.	<b>Active Lecture</b>	<b>Written exams</b>
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the chemistry lab. <b>c2.</b> Operate the instruments and perform experiments successfully in the chemistry lab.	<b>Lab. Practice</b>	<b>Lab. term works, final practical exam</b>
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues and in teacher in the lab..	<b>Lab. Practice</b>	<b>Lab. term works, final practical exam</b>

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d2. Demonstrate the ability of time management, self-learning and problem-solving skills.	<b>Lab. Practice, feed-back learning</b>	<b>Lab. practical works, individual assignment</b>
d3. Work successfully in team-work during performing experiments in chemistry lab.	<b>Lab. practice, group project</b>	<b>Lab. term works, group-assignment</b>

## VI. Course Content:

### A – Theoretical Aspect:

Order	Units/ Topics List	Aligned Course Learning Outcomes	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction</b>	a1, b4	<ul style="list-style-type: none"> <li>chemistry (definition, brief history)</li> <li>disciplines of chemistry : general, organic, inorganic, analytical, medicinal, physical, etc.)</li> <li>importance and allocations of chemistry in modern sciences.</li> <li>Matter, classifications, states, changes that matter undergoes, properties of matter.</li> </ul>	1	2
2	<b>Chemical structures</b>	a2, b1, b2, b3, b6	<ul style="list-style-type: none"> <li>SI- units measurements, conversion factor, S.F. accuracy and precision.</li> <li>atoms , atomic structure</li> <li>Mole, molecules and molecular formula, chemical formula, IUPAC nomenclature of molecules and ions, classifications.</li> <li>elements, periodic table of elements, compounds (types).</li> <li>chemical bonds (ionic, covalent, etc).</li> </ul>	3	6
3	<b>Quantum in chemistry</b>	a2, b2	<ul style="list-style-type: none"> <li>Quantum theories, Quantum numbers, electronic configuration.</li> <li>Modern periodic table, Its Properties , atomic radius, electronegativity, dipole moments, polar and non-polar molecules.</li> </ul>	2	4
<b>MID-TERM EXAM</b>				1	2
4	<b>Chemical properties</b>	b2	<ul style="list-style-type: none"> <li>Acidity, basicity. (pH), ionization constant , pKa</li> </ul>	2	4

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			<ul style="list-style-type: none"> <li>• buffer systems</li> <li>• atomic weight, molecular weight, equivalent weight, milliequivalent, moles.</li> <li>• molarity, molality, normality .</li> </ul>		
5	<b>Chemical reactions and equilibrium</b>	a3, b7, c2	<ul style="list-style-type: none"> <li>• Types of reactions: Precipitation, Neutralization Rxn acid-base reactions, Redox reactions, addition reaction, elimination reactions, substitution reactions, decomposition reactions etc.</li> <li>• Chemical reactivity, inertness, energy change and heat of reaction.</li> <li>• chemical equations types and balance.</li> </ul>	3	6
6	<b>Inorganic chemistry</b>	b4, c2	<ul style="list-style-type: none"> <li>○Comparison between inorganic and organic compounds.</li> <li>○Identification and reactions of common inorganic compounds                             <ul style="list-style-type: none"> <li>• Cationic radicals</li> <li>• Anionic radicals</li> </ul> </li> </ul>	3	6
<b>Course Review and discussion session</b>				1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 units

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<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Learning Outcomes
8.	Introduction to chemistry lab: safety, td3ls, instruments, scope of experiments and reporting assignments. Chemical structures (atoms, molecules, bonds) using models	1	2	c1, c2 a2
9.	pH- meter principle and standard operation procedure: determination of pH of water, weak acids / bases determination of pH of strong acids/bases, salts	1	2	c1, c2, , d3, , d1, d2
10.	Preparation of buffers phosphate , citrate , acetate	1	2	c1, c2, , d3, , d1, d2
11.	Oxidation reactions using potassium permanganate & Decomposition reaction of sodium bicarbonate in water.	1	2	c1, c2, , d3, , d1, d2
12.	Acid/base reaction s e.g : HCl and NaOH	1	2	c1, c2, d3, , d1, d2
13.	Scheme Identification of cationic inorganic radicals	3	6	c1, c2, d3, , d1, d2
14.	Scheme Identification of anionic inorganic radicals	3	6	c1, c2, , d3, , d1, d2
<b>PRACTICAL EXAM</b>		<b>1</b>	<b>2</b>	a2, c1, c2,
<b>Total</b>		<b>12</b>	<b>24</b>	

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## VII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classrd3m.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do certain assignments such as summarizing, internet search, make charts or solve mathematical problems related to the courses topics. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical mad2er &for promoting team work skills

## VIII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Individual</b> : every student is assigned to solve problems presented by the teacher on chemical formula, electronic configuration , quantum (molecular weight, molarity, normality), pH, ionization constant and pKa	d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to do a search-report about one type of chemical reactions	d1, d3	14	2

## VII.Schedule of Assessment Tasks for Students During the Semester

### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4, b5, b6, b7
		Assignments	7, 12	5	5	b2, a3, d1, d2
2	Mid-semester exam of theoretical part ( written exam		7	10	10	a1, a2, a5, b2, b3

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3	Final exam of theoretical part (written exam)	16	50	50	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, b6, b7
TOTAL			70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIL Os)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
Final exam (practical)			12	20	20	c1, c2, d1, d2
Total				30	30 %	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

David W Ball and John W Hill. The Basics of General, Organic, and Biological Chemistry. 2011, Saylor Foundation, USA

#### 2- Essential References.

Bruce Averill and Patricia Eldredge. General Chemistry: Principles, Patterns, and Applications. 2011, Saylor Foundation, USA

#### 3- Electronic Materials and Web Sites etc.

- [https://mountainscholar.org/bitstream/handle/20.500.11785/249/OTL\\_BookId-40\\_BasicsGenOrgBioChemistry.pdf?sequence=1&isAllowed=y](https://mountainscholar.org/bitstream/handle/20.500.11785/249/OTL_BookId-40_BasicsGenOrgBioChemistry.pdf?sequence=1&isAllowed=y)
- <https://resources.saylor.org/wwwresources/archived/site/textbooks/General%20ChemistryPrinciples,%20Patterns,%20and%20Applications.pdf>

### IX. Course Policies: (Based on the Uniform Students' By law (2007)

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

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<b>IX. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Assoc. Dr. Sadeq Azzam	Dr. Jamal Almahweeti	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

## السنة الأولى الفصل الثاني

FIRST level (2 <sup>nd</sup> semester)							
Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)	
			Th	Pr	Cr.hr		
English for medical purposes	الانجليزية للأغراض الطبية	MSC125	2	-	2	Pr: RAZ112	
Anatomy	تشريح	MSC127	2	2	3	Pr: MSC116	
Organic chemistry	الكيمياء العضوية	PHM126	3	2	4	Pr:MSC117	
Mathematics	رياضيات	PHT124	2	-	2	Co: PHT123	
Physics	فيزياء	MSC123	2	2	3	Co: PHT124	
Drug Discovery & Development	إكتشاف وتطوير الدواء	PHM128	2	-	2	-----	
Communication skills	مهارات اتصال	RAZ122	2	-	2	-----	
Arabic language II	لغة عربية 2	RAZ121	2	-	2	Pr: RAZ111	
Total			17	6	20		

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
 Co: Corequisite



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**ENGLISH FOR MEDICAL PURPOSES**

Course No. (MSC125)

**2022**



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**Course Specification " ENGLISH FOR MEDICAL PURPOSES"**

I. Course Identification and General Information:						
1	Course Title:	English for medical purposes				
2	Course Code &Number:	MSC125				
3	Credit hours: 4	C.H				TOTAL
		Th.	Tutorial	Pr	Tr.	
		2	2	-		4
4	Study level/ semester at which this course is offered:	First year/Second semester				
5	Pre –requisite:					
6	Co –requisite :	-				
7	Program (s) in which the course is offered:	Pharmacy				
8	Language of teaching the course:	English				
9	Location of teaching the course:	College of medical Science				
10	Prepared By:	Dr. Sharaf Shana				
11	Date of Approval	2022				

**II. Course Description:**

This course is designed to help the student acquire a good command and comprehension of the Medical English terminology through individual, papers and conferences. Students will practice their skills in verbal and written English during clinical and classroom experience.

**III. Intended learning outcomes (ILOs) of the course:**

1. Identifies basic structures and components of medical terms and names of health problems and how to deal with long Latin of Greek terms and their meanings.
2. Divides the English articles into paragraphs and ideas and memorize and recall information from English articles.
3. Writes properly an essay in English

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>1. Alignment CILOs to PILOs</b>		
	<b>PILOs</b>	<b>CILOs</b>
<b>Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Identifies basic structures and components of medical terms and names of health problems and how to deal with long Latin of Greek terms and their meanings.
<b>Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	b1. Divides the English articles into paragraphs and ideas and memorize and recall information from English articles.
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	c1. Writes properly an essay in English.
<b>Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D2</b>	Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d1- demonstrate self learning and time management skills.

**(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:**

<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Identifies basic structures and components of medical terms and names of health problems and how to deal with long Latin of Greek terms and their meanings.	Lecture Discussion Demonstrate use of dictionary grammar Class-room Conversation	Short Answers Essay type.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



	Exercise on use of terminology	
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Divides the English articles into paragraphs and ideas and memorize and recall information from English articles.	Lecture Discussion Exercise on articles	Short Answers Essay type.
<b>(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Writes properly an essay in English.	Lecture Discussion Demonstrate use of dictionary grammar Class-room Exercise on Writes properly an essay in English	Short Answers Essay type.
<b>(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1- demonstrate self learning and time management skills.	lecture, Tutorial	assignments

<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>Contact hours</b>	<b>Learning Outcomes</b>
1	Medical terminology	<ul style="list-style-type: none"> <li>▪ Origin of medical terms</li> <li>▪ Parts of a medical term: prefix, suffix, root</li> <li>▪ Prefixes related adjectives e.g. numeric (e.g.mono) , size" large and small" (e.g. micro, macro) , dimension "short (e.g. brachy) , speed" slow, fast (e.g. brady, tachy), location (intra, exter, per, ante, post) increased and decreased (e.g. hypo, hyper , mal, olig, a, an), different</li> </ul>	6	24	a1, b1, c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

IV. Course Content:					
		(e.g. dis, pseud, meta,) , colors (e.g. leuco, erytho) <ul style="list-style-type: none"> <li>▪ Suffixes related to science (e.g. -logy, -logist), tests (-scope, -scopy, -----</li> <li>▪ -graph, -graphy, , measurement (e.g. -meter), case (-ia, -iasis, -osis,), diseases (e.g.- pathy, -oma, -neoplsm), operations( e.g. -ectomy)</li> <li>▪ Roots related to body cells (e.g. cyte, cyto) tissues(hist) , organs (vaso, card), chemical names (glyc, hydr, chlor, proteo), <b>sciences</b> (patho, physio, bio)</li> <li>▪ Multi-roots terms e.g. hyperglycemia</li> <li>▪ Terms without suffix e.g. erythrocytes</li> <li>▪ Terms without prefix e.g. cardiology</li> </ul>			
2	Midterm exam		1	2	a1,b1, c1
3	Articles understanding	<ul style="list-style-type: none"> <li>▪ <b>Basic skills</b></li> <li>- Comprehensive reading</li> <li>- Overall topic of the article</li> <li>- Paragraphing</li> <li>- Memorizing</li> <li>- Recalling</li> <li>- Answering questions</li> <li>- Making questions</li> <li>▪ Experimentation of basic skills on a number of Medical articles</li> <li>- History of Medicine (1- in Muslims civilization, Greek civilization)</li> <li>- Human anatomy (skeletal system)</li> <li>- Disease (1.symptoms); ( 2- infectious diseases) ; (3- prevention of disease), ( 4- disease treatment),</li> </ul>	4	16	a1,b1, c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

IV. Course Content:					
		- current chronic Diseases (1.Hypertension); ( 2- Diabetes) ; (3- Depression), ( 4- Cancer),			
4	Essay	<ul style="list-style-type: none"> <li>▪ Basic skills</li> <li>- Making a correct sentence.</li> <li>- Flow and compatibility of ideas.</li> <li>- Topics (medical and nursing)</li> </ul>	3	12	a1,b1, c1
5	Final exam		1	3	a1,b1, c1
<b>Number of Weeks /and Units Per Semester</b>			<b>15</b>	<b>57</b>	

B - Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
	Not applicable	-	-	-
<b>Number of Weeks /and Units Per Semester</b>				

V. Teaching strategies of the course:	
1.	Lecture Discussion
2.	Demonstrate use of dictionary grammar
3.	Exercises

VI. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Community health terminology	a1,b1, c1	4-10	5

VII. Schedule of Assessment Tasks for Students During the Semester: Theoretical part					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1,b1, c1
2	Student assignments	5th and 12th week	5	5%	a1,b1, c1
3	Mid-term exam	7th or 8th week	20	20%	a1,b1, c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

4	Final-exam	16th-17th week	70	70 %	a1,b1, c1
<b>Total Theory Weight</b>			<b>100</b>	<b>100%</b>	

<b>VIII. Learning Resources:</b>	
<b>1- Required Textbook(s)</b>	
	1. Selva Rose. (1997), Career English for Nurses. Cheiu;ai: OientLongrnanLtd. 2. Quirk, Randolph and Jreenbaum Sidney(1987). A University Grammar of English, Hong Kong: Longman group (FE) Ltd.
<b>2- Essential References.</b>	
	1. Thomson A. J. and Maitüiet A. V. (1987). A licticl English Grammar, Delhi: Oxford University Press. 2. Gimson A. E. (1986). An Introduction to pronunciation of English. Hong kong: Wing King Tong Ca. Ltd. 3. O' Connor J. D, (1986). Better English h'onuwiation. Cambridge:University Press.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1. Http: // www.google. Com 2. Http:// www.yahoo.com

<b>IX. Course Policies:</b>	
1.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3.	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4.	<b>Assignments &amp;Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

**Second Part of Course Specification**  
**Faculty of Medical Science**  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

**Course Plan (Syllabus) of**  
**" ENGLISH FOR MEDICAL PURPOSES"**  
 Course Code No. (MSC125)

**Template for Course Plan (Syllabus) of**

<b>I. Information about Faculty Member Responsible for the Course:</b>							
<b>Name of Faculty Member</b>	Dr. Sharaf Shana	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>		x					

<b>X. Course Description:</b>
This course is designed to help the student acquire a good command and comprehension of the Medical English terminology through individual, papers and conferences. Students will practice their skills in verbal and written English during clinical and classroom experience.

<b>XI. Intended learning outcomes (ILOs) of the course:</b>
4. Identifies basic structures and components of medical terms and names of health problems and how to deal with long Latin of Greek terms and their meanings.
5. Divides the English articles into paragraphs and ideas and memorize and recall information from English articles.
6. Writes properly an essay in English

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Identifies basic structures and components of medical terms and names of health problems and how to deal with long Latin of Greek terms and their meanings.	Lecture Discussion Demonstrate use of dictionary grammar Class-room Conversation Exercise on use of terminology	Short Answers Essay type.
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Divides the English articles into paragraphs and ideas and memorize and recall information from English articles.	Lecture Discussion Exercise on articles	Short Answers Essay type.
<b>(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Writes properly an essay in English.	Lecture Discussion Demonstrate use of dictionary grammar Class-room Exercise on Writes properly an essay in English	Short Answers Essay type.
<b>(D) Alignment Course Intended Learning Outcomes of General and Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- demonstrate self learning and time management skills.	lecture, Tutorial	assignments

<b>XII. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/Topics List	Sub Topics List	No. of Weeks	Contact hours	Learning Outcomes
1	Medical terminology	<ul style="list-style-type: none"> <li>▪ Origin of medical terms</li> <li>▪ Parts of a medical term: prefix, suffix, root</li> <li>▪ Prefixes related adjectives e.g. numeric (e.g.mono) , size" large and small" (e.g. micro, macro) , dimension "short (e.g. brachy) ,</li> </ul>	6	24	a1, b1, c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>XII. Course Content:</b>					
		<p>speed" slow, fast (e.g. brady, tachy), location (intra, exter, per, ante, post) increased and decreased (e.g. hypo, hyper, mal, olig, a, an), different (e.g. dis, pseud, meta,) , colors (e.g. leuco, erytho)</p> <ul style="list-style-type: none"> <li>▪ Suffixes related to science (e.g. -logy, -logist), tests (-scope, -scopy, -----</li> <li>▪ -graph, -graphy, , measurement (e.g. -meter), case (-ia, -iasis, -osis,), diseases (e.g.- pathy, -oma, -neoplsm), operations( e.g. -ectomy)</li> <li>▪ Roots related to body cells (e.g. cyte, cyto) tissues(hist) , organs (vaso, card), chemical names (glyc, hydr, chlor, proteo), <b>sciences</b> (patho, physio, bio)</li> <li>▪ Multi-roots terms e.g. hyperglycemia</li> <li>▪ Terms without suffix e.g. erythrocytes</li> <li>▪ Terms without prefix e.g. cardiology</li> </ul>			
2	Midterm exam		1	2	a1,b1, c1
3	Articles understanding	<ul style="list-style-type: none"> <li>▪ <b>Basic skills</b></li> <li>- Comprehensive reading</li> <li>- Overall topic of the article</li> <li>- Paragraphing</li> <li>- Memorizing</li> <li>- Recalling</li> <li>- Answering questions</li> <li>- Making questions</li> <li>▪ Experimentation of basic skills on a number of Medical articles</li> <li>- History of Medicine (1- in Muslims civilization, Greek civilization)</li> </ul>	4	16	a1,b1, c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>XII. Course Content:</b>					
		<ul style="list-style-type: none"> <li>- Human anatomy (skeletal system)</li> <li>- Disease (1.symptoms); ( 2- infectious diseases) ; (3- prevention of disease), ( 4- disease treatment),</li> <li>- current chronic Diseases (1.Hypertension); ( 2- Diabetes) ; (3- Depression), ( 4- Cancer),</li> </ul>			
4	Essay	<ul style="list-style-type: none"> <li>▪ Basic skills</li> <li>- Making a correct sentence.</li> <li>- Flow and compatibility of ideas.</li> <li>- Topics (medical and nursing)</li> </ul>	3	12	a1,b1, c1
5	Final exam		1	3	a1,b1, c1
<b>Number of Weeks /and Units Per Semester</b>			<b>15</b>	<b>57</b>	

<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
	Not applicable	-	-	-
<b>Number of Weeks /and Units Per Semester</b>				

<b>XIII. Teaching strategies of the course:</b>	
4.	Lecture Discussion
5.	Demonstrate use of dictionary grammar
6.	Exercises

<b>XIV. Assignments:</b>				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Community health terminology	a1,b1, c1	4-10	5

<b>XV. Schedule of Assessment Tasks for Students During the Semester:</b>					
<b>Theoretical part</b>					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1,b1, c1
2	Student assignments	5th and 12th week	5	5%	a1,b1, c1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>XV. Schedule of Assessment Tasks for Students During the Semester:</b>					
<b>Theoretical part</b>					
3	Mid-term exam	7th or 8th week	20	20%	a1,b1, c1
4	Final-exam	16th-17th week	70	70 %	a1,b1, c1
<b>Total Theory Weight</b>			<b>100</b>	<b>100%</b>	

<b>XVI. Learning Resources:</b>	
<b>1- Required Textbook(s)</b>	
	3. Selva Rose. (1997), Career English for Nurses. Cheiu;ai: OientLongrnanLtd. 4. Quirk, Randolph and Jreenbaum Sidney(1987). A University Grammar of English, Hong Kong: Longman group (FE) Ltd.
<b>2- Essential References.</b>	
	4. Thomson A. J. and Maitüiet A. V. (1987). A licticl English Grammar, Delhi: Oxford University Press. 5. Gimson A. E. (1986). An Introduction to pronunciation of English. Hong kong: Wing King Tong Ca. Ltd. 6. O' Connor J. D, (1986). Better English h'onuwiation. Cambridge:University Press.
<b>3- Electronic Materials and Web Sites etc.</b>	
	3. Http: // www.google. Com 4. Http:// www.yahoo.com

<b>XVII. Course Policies:</b>	
7.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
8.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
9.	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
10.	<b>Assignments &amp;Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
11.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
12.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Hamed Almogarry	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

## Faculty of Medicine and Health Science

**All Department**

**Faculty Requirements**  
Course Specification of

# Anatomy

Course No. (MSC127)

2022



2017.

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I. Course Identification and General Information:					
1	Course Title:	Anatomy			
2	Course Code & Number:	MSC127			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	1 <sup>st</sup> Level / 2 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	All Department			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Science			
12	Prepared by:	Dr. Jamal alshehari			
13	Date of Approval:	2022			

II. Course Description:	
<p>Anatomy is one of the most important courses that requires the student to learn Medicine and Health Science, which enables him to know a number of concepts and issues, the most important of which are: The history of morphological sciences, the structures of human body. This course is designed to provide the students with the needed knowledge in human anatomy needed to be applied at a later stage during their clinical training. The lecture topics include introduction to anatomy with study systems consisting human body and some applied comparative clinical anatomy in addition to all related structures of each region and its surface anatomy</p>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Jamal alshehari	Dr. Khaled Ghouth	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs Learning out of program	
<b>A. Knowledge and Understanding:</b>			
A1	A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1	Name all structures, components, systems, Regions, parts, organs, cavities of human body.
		a2	Must know all and the enough knowledge and information of human anatomy about human body which needed to other clinical and paraclinical sciences as pathology
		a 3	Complete all the basic information which prepare them as dentist in the future, and enable them for postgraduate study.
		a 4	Establish Medical Specialists with excellent information and skills of human anatomy able to compete others worldwide.
<b>B. Intellectual Skills:</b>			
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	b1	Categorize structures and organs of different regions of human body.
		b2	Analyze the basic, surface and applied anatomy to solve clinical problems
		b 3	Distiguish position, relation, blood supply and drainage, lymphatics and nerve supply of different organs and structures
		b 4	Integrate with clinical problem according to site of injury
<b>C. Professional and Practical Skills:</b>			
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the	c1	Demonstrate relationship between the different structures and organs.
		c2	Interpret the relationship between form and structures by applying comparative human anatomy in understanding the origin of blood and nerve supply

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Jamal alshehari	Dr. Khaled Ghouth	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:		Referenced PILOs Learning out of program	
	patient in compliance with GPP and ethical manner.	c3	Prescribe relevance of bones, muscles, regions, contents, arteries, veins, nerves and lymphatics of organs and structures and human body.
<b>D. Transferable Skills:</b>			
D2	Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d 1	Inspect anatomical basis which requires to understand its physiology.
		d 2	Evaluate the paraclinical points as operative, anesthesia and surgery.
		d 3	Estimate the clinical& preclinical problems.

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Name all structures, components, systems, Regions, parts, organs, cavities of human body.	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations
a2	Must know all and the enough knowledge and information of human anatomy about human body which needed to other clinical and paraclinical sciences as pathology	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations
a 3	Complete all the basic information which prepare them as Medical Specialists in the future, and enable them for postgraduate study.	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations
a 4	Establish Medical Specialists with excellent information and skills of human anatomy able to	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations

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	compete others worldwide.		
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Categorize structures and organs of different regions of human body.	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations
b2	Analyze the basic, surface and applied anatomy to solve clinical & paraclinical problems	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations
b3	Distiguish position, relation, blood supply and drainage, lymphatics and nerve supply of different organs and structures	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations
b4	Integrate with clinical problem according to site of injury	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Demonstrate relationship between the different structures and organs.	Lectures exercise Debate	Exam Homework
c2	Interprete the relationship between form and structures by applying comparative human anatomy in understanding the origin of blood and nerve supply	Lectures exercise Debate	Exam Homework
c3	Prescribe relevance of bones, muscles, regions, contents, arteries, veins, nerves and lymphatics of organs and structures and human body.	Lectures exercise Debate	Exam Homework



<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d 1	Inspect anatomical basis which requires to understand its physiology.	Lectures Exercise Dialogue and discussion Brainstorming Debate	Exam Homework
d 2	Evaluate the paraclinical points as operative, anesthesia and surgery.	Lectures Exercise Dialogue and discussion Brainstorming Debate	Exam Homework
d 3	Estimate the clinical & prarclinical problems.	Lectures Exercise Dialogue and discussion Brainstorming Debate	Exam Homework

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
<b>No</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CIOs)</b>
1	Introduction to anatomy	Definitions, Anatomical positions, Planes of anatomy	1 <sup>ST</sup>	2	a1, b1
2	Terminology of movement	Definitions of movements, anatomical terminology	2 <sup>nd</sup>	2	a1, b1
3	Osteology	Types of bones Ossification	3 <sup>rd</sup>	2	a1, a2,a4, b2,b3,b4, d1
4	Skeleton	Axial Skeleton	4 <sup>th</sup>	2	a2, a3,b2, b3, d2
5	Skeleton	Appendicular Skeleton	5 <sup>th</sup>	2	a1, a2, b2,b3, d3
6	Joints	Classification Examples (Fibrous, Cartilaginous)	6 <sup>th</sup>	2	a1, a2, b2,b4, d1
7	Joints	Synovial ch.ch, classification	7 <sup>th</sup>	2	a1, a2,a4, b2,b3,b4, d2

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8	<b>Midterm exam</b>		8 <sup>th</sup>	2	a1-a4, b2-b4, d1-d3
9	Muscles	Classification Examples	9 <sup>th</sup>	2	a3, a4, b3,b4, d1
10	Fascia	Types Sites.	10 <sup>th</sup>	2	a2,a4, b2,b4, d2
11	Cardiovascular system	Heart (external & internal configuration).	11 <sup>th</sup>	2	a2,a4, b2,b3,b4, d1
12	Cardiovascular system	Circulation Blood Vessels (Arteries& Veins	12 <sup>th</sup>	2	a2,a4, b2,b3,b4, d1
13	Respiratory system	Nose Larynx, trachea, Bronchi, bronchioles, alveoli Lungs, pleura.	13 <sup>th</sup>	2	a2,a3, b2,b3, d3
14	Digestive system	Mouth, pharynx, esophagus, stomach, small intestine, large intestine, liver, pancreas, spleen.	14 <sup>th</sup>	2	a1, a2,a4, b2,b3,b4, d1
15	Nervous system	CNS, ANS, PNS	15 <sup>th</sup>	2	a2,a4, ,b3,b4, d1
16	<b>Final Theoretical Exam.</b>		16 <sup>th</sup>	2	a1-a4, b1-b4, d1-d3
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

<b>B. Case Studies and Practical Aspect:</b>				
No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
1	Introduction& positions	1 <sup>st</sup>	2	c1-c3
2	Movements	2 <sup>nd</sup>	2	c1-c3
3	Bones	3 <sup>rd</sup>	2	c1-c3
4	Axial skeleton (skull)	4 <sup>th</sup>	2	c1-c3
5	Axial skeleton Vertebrae, thorax	5 <sup>th</sup>	2	c1-c3
6	Appendicular skeleton(upper limb)	6 <sup>th</sup>	2	c1-c3
7	Appendicular skeleton(lower limb)	7 <sup>th</sup>	2	c1-c3
8	Joints	8 <sup>th</sup>	2	c1-c3
9	Joints	9 <sup>th</sup>	2	c1-c3
10	Muscles	10 <sup>th</sup>	2	c1-c3
11	Cardiovascular	11 <sup>th</sup>	2	c1-c3
12	Respiratory	12 <sup>th</sup>	2	c1-c3
13	Digestive	13 <sup>th</sup>	2	c1-c3
14	Nervous	14 <sup>th</sup>	2	c1-c3

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15	Practical exam	15 <sup>th</sup>	2	c1-c3
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

#### V. Teaching Strategies of the Course:

Lectures using power point presentation.  
 Discussion-oriented and interactive teaching (such as brainstorming)  
 Group discussions and seminars  
 Self-study modules  
 Laboratory demonstrations and practice

#### VI. Assessment Methods of the Course:

Quizzes  
 Midterm Exam  
 Final Written Exam  
 Oral Exam  
 Final Practical Exam  
 Research - Group work

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CIOs (symbols)
1	Research and Group work	14 <sup>th</sup>	5	b1-b4, c1-c3
<b>Total</b>			<b>5</b>	

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	14 <sup>th</sup>	5	5%	b1-b4, c1-c3
2	Quizzes 1	4 <sup>th</sup>	5	5%	a1-a2
3	Mid-Term Theoretical Exam	8 <sup>th</sup>	20	20%	a1-a4, b2-b4, d1-d3
4	Final Practical Exam	15 <sup>th</sup>	20	20%	c1-c3

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<b>5</b>	<b>Oral Exam</b>	15 <sup>th</sup>	10	10%	a1-a4, b2-b4, d1-d3
<b>6</b>	<b>Final Theoretical Exam</b>	16 <sup>th</sup>	40	40%	a1-a4, b2-b4, d1-d3
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ):

- 1- Standring, S., Borley, N. R., & Gray, H. (2008). Gray's anatomy: the anatomical basis of clinical practice. 40th ed., anniversary ed. [Edinburgh]: Churchill Livingstone/Elsevier

#### 2- Essential References:

- 1- Hamilton, W. J. (et al.). 2001, Hamilton`s textbook of basic anatomy, 6th edition.

#### 3- Electronic Materials and Web Sites etc.:

<https://onlinelibrary.wiley.com> > journal of Anatomy

### X. Course Policies: (Based on the Uniform Students'

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



جامعة الرازي  
AL- RAZI UNIVERSITY

وزارة التعليم العالي والبحث العلمي

جامعة الرازي  
كلية الطب والعلوم الصحية  
قسم الصيدلة



Faculty of Medicine and Health Science  
**Faculty Requirements**

**All department**

Course Plan (Syllabus) of:

**Anatomy**

Course No. (MSC127)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Jamal alshehari	Office Hours					
Location & Telephone No.:	777216798						
E-mail:		SA T	SU N	M O N	T U E	W E D	T H U

2022

II. Course Description:
Anatomy is one of the most important courses that requires the student to learn Medicine and Health Science, which enables him to know a number of concepts and issues, the most important of which are: The history of morphological sciences, the structures of human body. This course is designed to provide the students with the needed knowledge in human anatomy needed to be applied at a later stage during their clinical training. The lecture topics include introduction to anatomy with study systems consisting human body and some applied comparative clinical anatomy in addition to all related structures of each region and its surface anatomy

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<b>III. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:</b>		<b>Referenced PILOs Learning out of program</b>
<b>A. Knowledge and Understanding:</b>		
a1	Name all structures, components, systems, Regions, parts, organs, cavities of human body.	A1
a2	Must know all and the enough knowledge and information of human anatomy about human body which needed to other clinical and paraclinical sciences as pathology	A2
a 3	Complete all the basic information which prepare them as dentist in the future, and enable them for postgraduate study.	A2
a 4	Establish Medical Specialists with excellent information and skills of human anatomy able to compete others worldwide.	A1
<b>B. Intellectual Skills:</b>		
b1	Categorize structures and organs of different regions of human body.	B1
b2	Analyze the basic, surface and applied anatomy to solve clinical problems	B1
b 3	Distiguish position, relation, blood supply and drainage, lymphatics and nerve supply of different organs and structures	B1
b 4	Integrate with clinical problem according to site of injury	B2
<b>C. Professional and Practical Skills:</b>		
c1	Demonstrate relationship between the different structures and organs.	C1
c2	Interpret the relationship between form and structures by applying comparative human anatomy in understanding the origin of blood and nerve supply	C1
c3	Prescribe relevance of bones, muscles, regions, contents, arteries, veins, nerves	C1,C2

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	and lymphatics of organs and structures and human body.	
<b>D. Transferable Skills:</b>		
d 1	Inspect anatomical basis which requires to understand its physiology.	D8
d 2	Evaluate the paraclinical points as operative, anesthesia and surgery.	D2
d 3	Estimate the clinical & preclinical problems.	D8

**(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Name all structures, components, systems, Regions, parts, organs, cavities of human body.	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations
a2	Must know all and the enough knowledge and information of human anatomy about human body which needed to other clinical and paraclinical sciences as pathology	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations
a 3	Complete all the basic information which prepare them as Medical Specialists in the future, and enable them for postgraduate study.	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations
a 4	Establish Medical Specialists with excellent information and skills of human anatomy able to compete others worldwide.	Interactive lecture ▪ Demonstration ▪ Discussion ▪ Presentation	Assignments ▪ Examinations

**(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Categorize structures and organs of different regions of human body.	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations
b2	Analyze the basic, surface and applied anatomy to solve clinical & paraclinical problems	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations

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b3	Distiguish position, relation, blood supply and drainage, lymphatics and nerve supply of different organs and structures	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations
b4	Integrate with clinical problem according to site of injury	Diagrams, models, plastinated cadavers.	Assignments ▪ Examinations

**(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Demonstrate relationship between the different structures and organs.	Lectures exercise Debate	Exam Homework
c2	Interprete the relationship between form and structures by applying comparative human anatomy in understanding the origin of blood and nerve supply	Lectures exercise Debate	Exam Homework
c3	Prescribe relevance of bones, muscles, regions, contents, arteries, veins, nerves and lymphatics of organs and structures and human body.	Lectures exercise Debate	Exam Homework

**(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d 1	Inspect anatomical basis which requires to understand its physiology.	Lectures Exercise Dialogue and discussion Brainstorming Debate	Exam Homework
d 2	Evaluate the paraclinical points as operative, anesthesia and surgery.	Lectures Exercise Dialogue and discussion Brainstorming Debate	Exam Homework
d 3	Estimate the clinical& prarclinical problems.	Lectures Exercise Dialogue and discussion	Exam Homework

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	Brainstorming Debate	
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IV. Course Contents:					
A. Theoretical Aspect:					
No	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction to anatomy	Definitions, Anatomical positions, Planes of anatomy	1 <sup>ST</sup>	2	a1, b1
2	Terminology of movement	Definitions of movements, anatomical terminology	2 <sup>nd</sup>	2	a1, b1
3	Osteology	Types of bones Ossification	3 <sup>rd</sup>	2	a1, a2,a4, b2,b3,b4, d1
4	Skeleton	Axial Skeleton	4 <sup>th</sup>	2	a2, a3,b2, b3, d2
5	Skeleton	Appendicular Skeleton	5 <sup>th</sup>	2	a1, a2, b2,b3, d3
6	Joints	Classification Examples (Fibrous, Cartilaginous)	6 <sup>th</sup>	2	a1, a2, b2,b4, d1
7	Joints	Synovial ch.ch, classification	7 <sup>th</sup>	2	a1, a2,a4, b2,b3,b4, d2
8	<b>Midterm exam</b>		8 <sup>th</sup>	2	a1-a4, b2- b4, d1-d3
9	Muscles	Classification Examples	9 <sup>th</sup>	2	a3, a4, b3,b4, d1
10	Fascia	Types Sites.	10 <sup>th</sup>	2	a2,a4, b2,b4, d2
11	Cardiovascular system	Heart (external & internal configuration).	11 <sup>th</sup>	2	a2,a4, b2,b3,b4, d1
12	Cardiovascular system	Circulation Blood Vessels (Arteries & Veins)	12 <sup>th</sup>	2	a2,a4, b2,b3,b4, d1
13	Respiratory system	Nose Larynx, trachea, Bronchi, bronchioles, alveoli Lungs, pleura.	13 <sup>th</sup>	2	a2,a3, b2,b3, d3
14	Digestive system	Mouth, pharynx, esophagus, stomach, small intestine, large intestine, liver, pancreas, spleen.	14 <sup>th</sup>	2	a1, a2,a4, b2,b3,b4, d1
15	Nervous system	CNS, ANS, PNS	15 <sup>th</sup>	2	a2,a4, b3,b4, d1
16	<b>Final Theoretical Exam.</b>		16 <sup>th</sup>	2	a1-a4, b1- b4, d1-d3
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

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<b>B. Case Studies and Practical Aspect:</b>				
No.	Tasks/ Experiments	Week Due	Contact Hours	Learning Outcomes (CILOs)
1	Introduction & positions	1 <sup>st</sup>	2	c1-c3
2	Movements	2 <sup>nd</sup>	2	c1-c3
3	Bones	3 <sup>rd</sup>	2	c1-c3
4	Axial skeleton (skull)	4 <sup>th</sup>	2	c1-c3
5	Axial skeleton Vertebrae, thorax	5 <sup>th</sup>	2	c1-c3
6	Appendicular skeleton (upper limb)	6 <sup>th</sup>	2	c1-c3
7	Appendicular skeleton (lower limb)	7 <sup>th</sup>	2	c1-c3
8	Joints	8 <sup>th</sup>	2	c1-c3
9	Joints	9 <sup>th</sup>	2	c1-c3
10	Muscles	10 <sup>th</sup>	2	c1-c3
11	Cardiovascular	11 <sup>th</sup>	2	c1-c3
12	Respiratory	12 <sup>th</sup>	2	c1-c3
13	Digestive	13 <sup>th</sup>	2	c1-c3
14	Nervous	14 <sup>th</sup>	2	c1-c3
15	Practical exam	15 <sup>th</sup>	2	c1-c3
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

<b>V. Teaching Strategies of the Course:</b>
<p>Lectures using power point presentation.</p> <p>Discussion-oriented and interactive teaching (such as brainstorming)</p> <p>Group discussions and seminars</p> <p>Self-study modules</p> <p>Laboratory demonstrations and practice</p>

<b>VI. Assessment Methods of the Course:</b>
<p>Quizzes</p> <p>Midterm Exam</p> <p>Final Written Exam</p> <p>Oral Exam</p> <p>Final Practical Exam</p> <p>Research</p> <p>Group work</p>

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<b>VII. Assignments:</b>				
No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Research and Group work	14 <sup>th</sup>	5	b1-b4, c1-c3
<b>Total</b>			<b>5</b>	

<b>VIII. Schedule of Assessment Tasks for Students During the Semester:</b>					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	14 <sup>th</sup>	5	5%	b1-b4, c1-c3
2	Quizzes 1	4 <sup>th</sup>	5	5%	a1-a2
3	Mid-Term Theoretical Exam	8 <sup>th</sup>	20	20%	a1-a4, b2-b4, d1-d3
4	Final Practical Exam	15 <sup>th</sup>	20	20%	<b>c1-c3</b>
5	Oral Exam	15 <sup>th</sup>	10	10%	a1-a4, b2-b4, d1-d3
6	Final Theoretical Exam	16 <sup>th</sup>	40	40%	a1-a4, b2-b4, d1-d3
<b>Total</b>			<b>100</b>	<b>100%</b>	

<b>IX. Learning Resources:</b>
<b>1- Required Textbook(s) ( maximum two ):</b>
2- Standing, S., Borley, N. R., & Gray, H. (2008). Gray's anatomy: the anatomical basis of clinical practice. 40th ed., anniversary ed. [Edinburgh]: Churchill Livingstone/Elsevier
<b>2- Essential References:</b>
3- Hamilton, W. J. (et al.). 2001, Hamilton`s textbook of basic anatomy, 6th edition.
<b>3- Electronic Materials and Web Sites etc.:</b>
<a href="https://onlinelibrary.wiley.com">https://onlinelibrary.wiley.com</a> > journal of Anatomy

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<b>X. Course Policies: (Based on the Uniform Students'</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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Dr. Jamal alshehari	Dr. Khaled Ghouth	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



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قسم الصيدلة

## Faculty of Medicine and Health Sciences

Department of Pharmacy

Bachelor of Pharmacy

Course Specification of  
**ORGANIC CHEMISTRY**  
Course No. (PHM126)

2022



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I. Course Identification and General Information:					
1	Course Title:	Organic Chemistry			
2	Course Code & Number:	PHM126			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		4	3	--	1
4	Study Level/ Semester at which this Course is offered:	1 <sup>st</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Prs: Pr:MSC117			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

II. Course Description:
<p>The course is an introduction to specialized pharmacy courses (Pharmaceutical organic chemistry and Medicinal chemistry), as it provides the student with basic knowledge of carbon chemistry from which all organic compounds, including drugs, are derived. The course focuses on uncomplicated organic compounds in terms of their functional chemical groups, chemical composition, physical and chemical properties and their interactions. And methods of preparation and common examples of them, and these compounds include: hydrocarbons. haloalkanes, alcohols, ethers. The practical part also provides the student with the skills necessary to deal with these compounds and perform tests to identify their reactions in the chemistry lab.</p>

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<b>III. Intended learning outcomes of the course: (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>5. Alignment of CILOs to PILOs</b>		
PILOs		CILOs
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b> Explain the significance of organic chemistry in modern sciences. <b>a2.</b> Discuss the properties of Carbon atom, models of structural formula, specific properties, mechanisms of reactions and synthesis of uncomplicated organic compounds.
<b>Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<b>b1.</b> Differentiate, name and draw the chemical structure of organic compounds. <b>b2.</b> Relate functional group in organic compounds to the physical and chemical properties of the compounds. <b>b3.</b> Predict the catalysts required and the outcomes of a reaction between an organic compound and other chemicals.
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b4.</b> Design a sequence to synthesize an organic compound from a parent compound.
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory <b>c2.</b> Identify organic compounds from their physical and chemical properties

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C2	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	c3. Operate the instruments and perform experiments successfully in the laboratory
C4	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	c4. Search efficiently for information using documented and electronic sources of information.
<b>Transferable skills:</b> Upon successful completion of the course, students will be able to:		
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	d1. Communicate effectively and behave in discipline with colleagues.
		d2. Demonstrate the skills of time management and self-learning.
		d3. Participate efficiently with his colleagues in a team work.
D3	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d4. Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.

2. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the significance of organic chemistry in modern sciences.	Active Lecture	Written exams
a2. Discuss the properties of Carbon atom, models of structural formula, specific properties, mechanisms of reactions and synthesis of uncomplicated organic compounds.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Differentiate, name and draw the chemical structure of organic compounds.		Written exams, quizzes, lab. term

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<b>b4.</b> Design a sequence to synthesize an organic compound from a parent compound.	Active Lecture, laboratory practice, Feed-back learning	work, practical final exam
<b>b2.</b> Relate functional group in organic compounds to the physical and chemical properties of the compounds.	Lecture-discussion Feed-back learning	Written exams, quizzes
<b>b3.</b> Predict the catalysts required and the outcomes of a reaction between an organic compound and other chemicals.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c3.</b> Operate the instruments and perform experiments successfully in the laboratory		
<b>c2.</b> Identify organic compounds from their physical and chemical properties	feed-back learning, Group-project	Assignments
<b>c4.</b> Search efficiently for information using documented and electronic sources of information.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d3.</b> Participate efficiently with his colleagues in a team work.		
<b>d2.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group- project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.		

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VII. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	Aligned Course Learning Outcomes	Sub Topics List	No. of Weeks	contact hours
1	<b>Introductio n to organic chemistry</b>	a1, a2	<ul style="list-style-type: none"> <li>definition, brief history</li> <li>significance of organic chemistry in modern sciences</li> <li>Carbon chemistry: carbon atomic structure, chemical bonds, atomic Orbitals and electron configuration; <math>sp^3</math>, <math>sp^2</math> <math>sp</math> hybridization</li> <li>Physical state</li> <li>Stereochemistry of organic compounds</li> <li>isomerism</li> <li>Resonance</li> <li>dipole moment</li> <li>structural theory</li> <li>Models of Structural formula (all-stick formula, dot formula, dash formula, condensed formula, bond-line formula)</li> </ul>	2	6
2	<b>Functional groups &amp; Classificati on of organic compounds</b>	b1,b3, b4	<ul style="list-style-type: none"> <li>Definition and types of functional groups</li> <li>classification into categories based on functional groups.</li> <li>Role of functional group in physical &amp; chemical properties of organic compounds.</li> <li>Common names Origin</li> <li>IUPAC Nomenclature priority (which functional group is more important)</li> <li>Differences between aliphatic &amp; aromatic organic compounds</li> </ul>	1	3
3	<b>Hydrocarb ons</b>	b1,b3, b4	<ul style="list-style-type: none"> <li><b>Aliphatic (Alkanes, Alkenes, Alkynes, cycloalkanes, cycloalkenes):</b> definitions, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis and</li> </ul>	1	3

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			<p>reactions (including mechanisms of reactions).</p> <ul style="list-style-type: none"> <li>• <b>Aromatic hydrocarbon</b> (definitions, types, general formula, structural models, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis and reactions (including mechanisms of reactions).</li> </ul>		
4	<b>Haloalkanes</b>	b1, b3, b4	<ul style="list-style-type: none"> <li>• <b>Aliphatic and aromatic Alkyl halides (Haloalkanes)</b> and organometallic compounds: (definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions (including mechanisms of reactions).</li> </ul>	1	3
<b>MID-TERM EXAM</b>				1	2
5	<b>Aliphatic and aromatic Alcohols, ethers and thioethers</b>	b1, b3, b4	<ul style="list-style-type: none"> <li>• Definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis reactions including mechanisms of reactions.</li> </ul>	2	6
6	<b>Aliphatic and aromatic Amines</b>	b1, b3, b4	<ul style="list-style-type: none"> <li>• Definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis and reactions</li> </ul>	1	3
7	<b>Aliphatic and aromatic Nitro compounds</b>	b1, b3, b4	<ul style="list-style-type: none"> <li>• definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
8	<b>Aliphatic and aromatic aldehydes and ketones</b>	b1, b3, b4	<ul style="list-style-type: none"> <li>• definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions</li> </ul>	1	3

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9	Aliphatic and aromatic carboxylic acids	b1,b3, b4	<ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
10	Aliphatic and aromatic derivatives of carboxylic acids	b1,b3, b4	<b>Esters, amides, acyl halides, acid anhydrides:</b> <ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
11	Serial synthesis	b2	Synthesis of an organic compound starting from simple parent organic compound.	1	3
<b>Course Review and discussion session</b>				1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>17</b>	<b>46</b>
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	11 Units

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Learning Outcomes	Number of Weeks	contact hours
1.	<b>Physical properties &amp; Chemical identification of compounds belonging to the following aliphatic and aromatic organic groups:</b>			
2.	<b>Hydrocarbons / Haloalkanes.</b>	c1, c2, c3, c4, d1, d2, d3	2	4
3.	<b>Alcohols</b>	c1, c2, c3, c4, d1, d2, d3	1	2
4.	<b>Ethers</b>	c1, c2, c3, c4, d1, d2, d3	1	2
5.	<b>Amines</b>	c1, c2, c3, c4, d1, d2, d3	1	2
6.	<b>Aldehydes</b>	c1, c2, c3, c4, d1, d2, d3	1	2
7.	<b>Ketones</b>	c1, c2, c3, c4, d1, d2, d3	1	2
8.	<b>Carboxylic acids</b>	c1, c2, c3, c4, d1, d2, d3	1	2
9.	<b>Esters</b>	c1, c2, c3, c4, d1, d2, d3	1	2
10.	<b>Acyl anhydride / Amides</b>	c1, c2, c3, c4, d1, d2, d3	1	2
11.	<b>Scheme of identification of organic compounds</b>	c1, c2, c3, c4, d1, d2, d3	2	2

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PRACTICAL EXAM	a2, c1, c2, c3, c4, d2	1	2
<b>Total</b>		<b>12</b>	<b>24</b>
Number of Weeks		12	

### VIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do certain assignments such as sud1arizing, internet search, make charts or solve mathematical problems related to the course's topics. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### IX. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due
1	<b>Individual</b> : every student is assigned to solve problems at home. The problems are provided by the teacher at the end of each unit. Problems are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others. The student should deliver his/her work every second week in a specific homework booklet. The teacher may ask the student, either personally, or at the class to make sure that the student work belongs to his/her lonely effort.	d1, d2, c2, c4	7
2	<b>Group</b> : each group of students will be assigned to do a search-report about one type the mechanism of a reaction.	d1, d2, d3, d4, c2, c4,	12

### X. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	d1, d2, d3, c3, c4

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2	Mid-semester exam of theoretical part (written exam)	7	10	10	a1, a2, b1, b2, b3, b4, d2
3	Final exam of theoretical part (written exam)	16	50	50	a1, a2, b1, b2, b3, b4, d2
TOTAL			70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, c4, d1, d2, d3, d4, b1, b4
2		Accomplishments		5	5	
	Final exam (practical)		12	20	20	a2, c1, c2, c3, c4, d2
Total				30	30 %	

#### X. Learning Resources:

##### 1- Required Textbook(s) (maximum two ).

Xin Liu. Organic chemistry I, 2022, Kwantlen Polytechnic University, Canada

##### 2- Essential References.

McMurry J.E. Fundamentals of Organic Chemistry. 2012, Cengage Learning

##### 3- Electronic Materials and Web Sites etc.

<https://kpu.pressbooks.pub/organicchemistry/open/download?type=pdf>

<http://www.cnm.manchester.ac.uk/people/jonathan/CH0001081100.pdf>

#### XI. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b>

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	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Program: Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**Organic Chemistry**

Course Code No. (PHM126 )

I. - Information about Faculty Member Responsible for the Course:						
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>				
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>
<b>E-mail</b>						

<b>XII. Course Description:</b>
The course is an introduction to specialized pharmacy courses (Pharmaceutical organic chemistry and Medicinal chemistry), as it provides the student with basic knowledge of carbon chemistry from which all organic compounds, including drugs, are derived. The course focuses on uncomplicated organic compounds in terms of their functional chemical groups, chemical composition, physical and chemical properties and their interactions. And methods of preparation and common examples of them, and these compounds include: hydrocarbons, haloalkanes, alcohols, ethers. The practical part also provides the student with the skills necessary to deal with these compounds and perform tests to identify their reactions in the chemistry lab.

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<b>XIII. Intended learning outcomes of the course: (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>1. Alignment of CILOs</b>		
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
a1. Explain the significance of organic chemistry in modern sciences.		
a2. Discuss the properties of Carbon atom, models of structural formula, specific properties, mechanisms of reactions and synthesis of uncomplicated organic compounds.		
<b>Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
b1. Differentiate, name and draw the chemical structure of organic compounds.		
b2. Relate functional group in organic compounds to the physical and chemical properties of the compounds.		
b3. Predict the catalysts required and the outcomes of a reaction between an organic compound and other chemicals.		
b4. Design a sequence to synthesize an organic compound from a parent compound.		
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory		
c2. Identify organic compounds from their physical and chemical properties		
c3. Operate the instruments and perform experiments successfully in the laboratory		
c4. Search efficiently for information using documented and electronic sources of information.		
<b>Transferable skills:</b> Upon successful completion of the course, students will be able to:		
d1. Communicate effectively and behave in discipline with colleagues.		
d2. Demonstrate the skills of time management and self-learning.		
d3. Participate efficiently with his colleagues in a team work.		
d4. Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.		

<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explain the significance of organic chemistry in modern sciences.	Active Lecture	Written exams

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a2. Discuss the properties of Carbon atom, models of structural formula, specific properties, mechanisms of reactions and synthesis of uncomplicated organic compounds.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Differentiate, name and draw the chemical structure of organic compounds.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
b4. Design a sequence to synthesize an organic compound from a parent compound.		
b2. Relate functional group in organic compounds to the physical and chemical properties of the compounds.	Lecture-discussion Feed-back learning	Written exams, quizzes
b3. Predict the catalysts required and the outcomes of a reaction between an organic compound and other chemicals.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c3. Operate the instruments and perform experiments successfully in the laboratory		
c2. Identify organic compounds from their physical and chemical properties	feed-back learning, Group-project	Assignments
c4. Search efficiently for information using documented and electronic sources of information.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d3. Participate efficiently with his colleagues in a team work.		

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<b>d2.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.		

#### XIV. Course Content:

##### A – Theoretical Aspect:

Order	Units/ Topics List	Aligned Course Learning Outcomes	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction to organic chemistry</b>	a1, a2	<ul style="list-style-type: none"> <li>definition, brief history</li> <li>significance of organic chemistry in modern sciences</li> <li>Carbon chemistry: carbon atomic structure, chemical bonds, atomic Orbitals and electron configuration; <math>sp^3</math>, <math>sp^2</math> sphybridization</li> <li>Physical state</li> <li>stereochemistry of organic compounds</li> <li>isomerism</li> <li>Resonance</li> <li>dipole moment</li> <li>structural theory</li> <li>Models of Structural formula (all-stick formula, dot formula, dash formula, condensed formula, bond-line formula)</li> </ul>	2	6
2	<b>Functional groups &amp; Classification of organic compounds</b>	b1,b2, b3	<ul style="list-style-type: none"> <li>Definition and types of functional groups</li> <li>classification into categories based on functional groups.</li> <li>Role of functional group in physical &amp; chemical properties of organic compounds.</li> <li>Common names Origin</li> <li>IUPAC Nomenclature priority ( which functional group is more important ?)</li> <li>Differences between aliphatic &amp; aromatic organic compounds</li> </ul>	1	3

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3	<b>Hydrocarbons</b>	b1,b3, b4	<ul style="list-style-type: none"> <li><b>Aliphatic (Alkanes, Alkenes, Alkynes, cycloalkanes, cycloalkenes):</b> definitions, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis and reactions including mechanisms of reactions.</li> <li><b>Aromatic hydrocarbon</b> (definitions, types, general formula, structural models, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, , synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
4	<b>Haloalkanes</b>	b1,b3, b4	<ul style="list-style-type: none"> <li><b>Aliphatic and aromatic Alkyl halides (Haloalkanes and organometallic compounds:</b> definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
<b>MID-TERM EXAM</b>				1	2
5	<b>Aliphatic and aromatic Alcohols , ethers and thioethers</b>	b1,b3,b 4	<ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis reactions including mechanisms of reactions.</li> </ul>	2	6
6	<b>Aliphatic and aromatic Amines</b>	b1,b3, b4	<ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, synthesis and reactions</li> </ul>	1	3
7	<b>Aliphatic and aromatic Nitro compounds</b>	b1,b3, b4	<ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3

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8	Aliphatic and aromatic aldehydes and ketones	b1,b3, b4	<ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions</li> </ul>	1	3
9	Aliphatic and aromatic carboxylic acids	b1,b3, b4	<ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
10	Aliphatic and aromatic derivatives of carboxylic acids	b1,b3, b4	<p><b>Esters, amides, acyl halides, acid anhydrides:</b></p> <ul style="list-style-type: none"> <li>definitions, types, general formula, nomenclature, influence of functional group on physical and chemical properties, radical groups nomenclature, physical properties, synthesis and reactions including mechanisms of reactions.</li> </ul>	1	3
11	Serial synthesis	b2	Synthesis of an organic compound starting from simple parent organic compound.	1	3
<b>Course Review and discussion session</b>				1	3
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>46</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b> Weeks	<b>11</b> Units

### B - Practical Aspect:

Order	Tasks/ Experiments	Aligned Course Learning Outcomes	Number of Weeks	contact hours
1.	<b>Physical properties &amp; Chemical identification of compounds belonging to the following aliphatic and aromatic organic groups:</b>			
2.	Hydrocarbons / Haloalkanes.	c1, c2, c3, c4, d1, d2, d3	2	4
3.	Alcohols	c1, c2, c3, c4, d1, d2, d3	1	2
4.	Ethers	c1, c2, c3, c4, d1, d2, d3	1	2
5.	Amines	c1, c2, c3, c4, d1, d2, d3	1	2
6.	Aldehydes	c1, c2, c3, c4, d1, d2, d3	1	2
7.	Ketones	c1, c2, c3, c4, d1, d2, d3	1	2

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8.	Carboxylic acids	c1, c2, c3, c4, d1, d2, d3	1	2
9.	Esters	c1, c2, c3, c4, d1, d2, d3	1	2
10.	Acyl anhydride / Amides	c1, c2, c3, c4, d1, d2, d3	1	2
11.	Scheme of identification of organic compounds	c1, c2, c3, c4, d1, d2, d3	2	2
PRACTICAL EXAM		a2, c1, c2, c3, c4, d2	1	2
Total			12	24
Number of Weeks			12	

### XV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do certain assignments such as sudlarizing, internet search, make charts or solve mathematical problems related to the course's topics. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

### XVI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due
1	<b>Individual</b> : every student is assigned to solve problems at home. The problems are provided by the teacher at the end of each unit. Problems are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others. The student should deliver his/her work every second week in a specific homework booklet. The teacher may ask the student, either personally, or at the class to make sure that the student work belongs to his/her lonely effort.	d1, d2, c2, c4	7
2	<b>Group</b> : each group of students will be assigned to do a search-report about one type the mechanism of a reaction.	d1, d2, d3, d4, c2, c4	12

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## XVII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	d1, d2, d3, c3, c4
2	Mid-semester exam of theoretical part (written exam)		7	10	10	a1, a2, b1, b2, b3, b4, d2
3	Final exam of theoretical part (written exam)		16	50	50	a1, a2, b1, b2, b3, b4, d2
TOTAL				70	70 %	70

## Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3, d4, b1, b4	
2		Accomplishments		5	5		
Final exam (practical)				12	20	20	a2, c1, c2, c3, c4, d2
Total				30	30 %		

## XVIII. Learning Resources:

<b>1- Required Textbook(s) (maximum two ).</b>
Xin Liu. Organic chemistry I, 2022, Kwantlen Polytechnic University, Canada
<b>2- Essential References.</b>
McMurry J.E. Fundamentals of Organic Chemistry. 2012, Cengage Learning
<b>3- Electronic Materials and Web Sites etc.</b>
<a href="https://kpu.pressbooks.pub/organicchemistry/open/download?type=pdf">https://kpu.pressbooks.pub/organicchemistry/open/download?type=pdf</a>
<a href="http://www.cnm.manchester.ac.uk/people/jonathan/CH0001081100.pdf">http://www.cnm.manchester.ac.uk/people/jonathan/CH0001081100.pdf</a>
<a href="https://gtu.ge/Agro-Lib/McMurry%20J.E.%20-%20Fundamentals%20of%20Organic%20Chemistry,%207th%20ed.%20-%202010.pdf">https://gtu.ge/Agro-Lib/McMurry%20J.E.%20-%20Fundamentals%20of%20Organic%20Chemistry,%207th%20ed.%20-%202010.pdf</a>
<a href="http://kgut.ac.ir/useruploads/1615027155168dde.pdf">http://kgut.ac.ir/useruploads/1615027155168dde.pdf</a>

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<b>XIX. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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المجلس الأعلى للتعليم والبحث العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

**MATHEMATICS**

Course No. (PHT124)

Course Code No. (PHT124)

2022



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Course Specification

**MATHEMATICS**

<b>I. Course Identification and General Information:</b>					
1	Course Title:	MATHEMATICS			
2	Course Code & Number:	PHT124			
3	Credit Hours:	Credi t Hours	Theory Hours		Lab. Hours
			Lectur e	Exercis e	
		2	2	--	---
4	Study Level/ Semester at which this Course is offered:	1 <sup>st</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	-----			
6	Co –Requisite (if any):	.....			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Pharmacy			
12	Prepared by:	Dr. Turki Alqabbani			
13	Date of Approval:	2022			

<b>II. Course Description:</b>
<p>The course of “Mathematics” is designed to provide the student with basic mathematical knowledge and skills including rectangular Co-ordinates, curve fitting using first-degree equation in both variables, determination of slope and intercept and point of intersection, equation of first degree in both x and y , exponential and logarithmic curves, graphical solution of equation, graphical solution of simultaneous equations, arithmetic progression, geometric progression, permutation-combination, binomial theorem, exponential theorem. These knowledge and skills will help the student to solve mathematical problems encountered in during pharmaceutical, analytical and pharmacokinetics. The course is co-requested with “Medical Physics” course as both concern with skills of solving mathematical problems and skills.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
2. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b> Discuss the basic mathematical principles commonly encountered during his/her pharmacy study and at practicing the profession.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Interpret the linearity and other graphical parameters.
		<b>b2.</b> Solve graphically, calculus and matrices mathematical problems.
		<b>b3.</b> Extract related equations from graphs.
		<b>b4.</b> Use the serial thinking to find the solution of mathematical problems.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Operate and use scientific calculator correctly.
		<b>c2.</b> Apply equations and rules to solve mathematical problems
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Share successfully in team-work.
		<b>d2.</b> Demonstrate time management during solving mathematical problems

3. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies

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a1. Discuss the basic mathematical principles commonly encountered during his/her pharmacy study and at practicing the profession.	Active lecture	Written exams
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret the linearity and other graphical parameters.	Active lecture	Written exams
b2. Solve graphically, calculus and matrices mathematical problems.		
b3. Extract related equations from graphs.		
b4. Use the serial thinking to find the solution of mathematical problems.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Operate and use scientific calculator correctly.	feed-back learning	assignment
c2. Apply equations and rules to solve mathematical problems		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Feed-back learning	Assignments
d2. Demonstrate time management during solving mathematical problems		

<b>IV. Course Content:</b>					
Order	Units/ Topics List	Sub Topics List	CILOS	No. of Weeks	contact hours
1	<b>Graphs and Gradients</b>	<ul style="list-style-type: none"> <li>Rectangular Co-ordinates. Curve fitting using first-degree equation in both variables.</li> <li>Determination of slope and intercept and point of intersection</li> <li>Equation of first degree in both x and y (circle, ellipse, rectangular hyperbola etc.</li> <li>Exponential and logarithmic curves, graphical solution of equation, graphical solution of</li> <li>Simultaneous equations</li> </ul>	a1, b1, b2, b3, b4, c1, c2	6	12

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		<ul style="list-style-type: none"> <li>Arithmetic progression, geometric progression, permutation-combination, binomial theorem, exponential theorem</li> <li>Application of curve fitting method in expressing degradation of drugs</li> </ul>			
<b>MID-TERM EXAM</b>			a1, b1, b2, b3, b4, c1, c2	1	2
2	<b>Calculus</b>	<ul style="list-style-type: none"> <li>Rate process, rules of differentiation, successive and partial differentiation, differentiation of a function, relation between the derivatives of inverse functions</li> <li>Rules of integration, integration as a summation, area under curve, integration by partial fraction, graphical integration, indefinite and definite integrals.</li> </ul>	b1,b2, b4, c1, c2,d1,d2	3	6
3	<b>Matrices</b>	<ul style="list-style-type: none"> <li>Addition. Subtraction and multiplication of matrices</li> <li>Unit matrix, row transformation, determinants, inverse of matrix and solution of equations by matrix</li> </ul>	b2, b4, c1, c2	4	8
<b>Course Review</b>		Review of the course topics by discussion session.	a1, b2, b3,b4, c1,c2,d1,d2	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	3 Units

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### VIII. Teaching strategies of the course:

#### Active Lecture:

It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**:

which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

#### Feed-back learning:

students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

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IX. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to solve mathematical problems during Tutorial at the class .	a1, b2, b4, c1, d2	4-13	6
2	<b>Group :</b> each group of students will be assigned to solve mathematical problems during as homework	a1, b2, b4, c1, d1,d2	14	4

VIII.Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, b2, b4, c1,c2, d1, d2
2	Assignments (1 + 2)	4-13, 14	10	10	a1, b2, b4, c1, d1, d2
3	Quiz 1 + Quiz 2	7, 12	5	5	c1, b4
4	Mid-semester exam of theoretical part (written exam)	7	20	20	a1, b1, b2, b3, b4, c1, d2
25	Final exam of theoretical part ( written exam)	17	60	60	a1, b2, b3, b4, c1, c2, d2
TOTAL			100	100 %	

XII.Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. Rao. A text book of mathematics, BS Publications; 3rd ed. (April 1, 2018), ISBN-10 : 9387593118	
<b>2- Essential References.</b>	
2. Indra K. Reddy Mansoor a. khan, Essential Math and calculations for pharmacy, CRC Press	
3. Shahidulla, Bhattacharjee: A text book on Coordinate Geometry and Vector Analysis	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://www.en.wikipedia.org/">www.en.wikipedia.org/</a>	

XIII. Course Policies: (Based on the Uniform Students'	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.

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2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification

Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**MATHEMATICS**  
Course No. (PHT124)

V. - Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Turki Alqabbani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>	770841011	<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

V. Course Description:
The course of "Mathematics" is designed to provide the student with basic mathematical knowledge and skills including rectangular Co-ordinates, curve fitting using first-degree equation in both variables, determination of slope and intercept and point of intersection, equation of first degree in both x and y, exponential and logarithmic curves, graphical solution of equation, graphical solution of simultaneous equations, arithmetic progression, geometric progression, permutation-combination, binomial theorem, exponential theorem. These knowledge and skills will help the student to solve mathematical problems encountered in during pharmaceutical, analytical and pharmacokinetics. The course is co-requested with "Medical Physics" course as both concern with skills of solving mathematical problems and skills.

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VI. Intended learning outcomes of the course (CILOs)	
4. Alignment CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Discuss the basic mathematical principles commonly encountered during his/her pharmacy study and at practicing the profession.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
b1. Interpret the linearity and other graphical parameters.	
b2. Solve graphically, calculus and matrices mathematical problems.	
b3. Extract related equations from graphs.	
b4. Use the serial thinking to find the solution of mathematical problems.	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
c1. Operate and use scientific calculator correctly.	
c2. Apply equations and rules to solve mathematical problems	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
d1. Share successfully in team-work.	
d2. Demonstrate time management during solving mathematical problems	

5. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Discuss the basic mathematical principles commonly encountered during his/her pharmacy study and at practicing the profession.	Active lecture	Written exams
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Interpret the linearity and other graphical parameters.	Active lecture	Written exams
b2. Solve graphically, calculus and matrices mathematical problems.		
b3. Extract related equations from graphs.		

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b4. Use the serial thinking to find the solution of mathematical problems.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Operate and use scientific calculator correctly.	feed-back learning	assignment
c2. Apply equations and rules to solve mathematical problems		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Feed-back learning	Assignments
d2. Demonstrate time management during solving mathematical problems		

<b>VII. Course Content:</b>					
Order	Units/ Topics List	Sub Topics List	CILOS	No. of Weeks	contact hours
1	<b>Graphs and Gradients</b>	<ul style="list-style-type: none"> <li>Rectangular Co-ordinates. Curve fitting using first-degree equation in both variables.</li> <li>Determination of slope and intercept and point of intersection</li> <li>Equation of first degree in both x and y (circle, ellipse, rectangular hyperbola etc.</li> <li>Exponential and logarithmic curves, graphical solution of equation, graphical solution of</li> <li>Simultaneous equations</li> <li>Arithmetic progression, geometric progression, permutation-combination, binomial theorem, exponential theorem</li> <li>Application of curve fitting method in expressing degradation of drugs</li> </ul>	a1, b1, b2, b3, b4, c1, c2	6	12
MID-TERM EXAM			a1, b1, b2, b3, b4, c1, c2	1	2

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VII. Course Content:					
2	<b>Calculus</b>	<ul style="list-style-type: none"> <li>Rate process, rules of differentiation, successive and partial differentiation, differentiation of a function, relation between the derivatives of inverse functions</li> <li>Rules of integration, integration as a summation, area under curve, integration by partial fraction, graphical integration, indefinite and definite integrals.</li> </ul>	b1,b2, b4, c1, c2,d1,d2	3	6
3	<b>Matrices</b>	<ul style="list-style-type: none"> <li>Addition. Subtraction and multiplication of matrices</li> <li>Unit matrix, row transformation, determinants, inverse of matrix and solution of equations by matrix</li> </ul>	b2, b4, c1, c2	4	8
	<b>Course Review</b>	Review of the course topics by discussion session.	a1, b2, b3,b4, c1,c2,d1,d 2	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	3 Units

### IX. Teaching strategies of the course:

#### Active Lecture:

It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**:

It depends on stimulation of the student's brain through a group of questions &/or

#### Concepts map:

which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

#### Feed-back learning:

students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

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X. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to solve mathematical problems during Tutorial at the class .	a1, b2, b4, c1, d2	4-13	6
2	<b>Group :</b> each group of students will be assigned to solve mathematical problems during as homework	a1, b2, b4, c1, d1,d2	14	4

IX. Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, b2, b4, c1,c2, d1, d2
2	Assignments (1 + 2)	4-13, 14	10	10	a1, b2, b4, c1, d1, d2
3	Quiz 1 + Quiz 2	7, 12	5	5	c1, b4
4	Mid-semester exam of theoretical part (written exam)	7	20	20	a1, b1, b2, b3, b4, c1, d2
25	Final exam of theoretical part ( written exam)	17	60	60	a1, b2, b3, b4, c1, c2, d2
TOTAL			100	100 %	

XIV. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
2. Rao. A text book of mathematics, BS Publications; 3rd ed. (April 1, 2018), ISBN-10 : 9387593118	
<b>2- Essential References.</b>	
4. Indra K. Reddy Mansoor a. khan, Essential Math and calculations for pharmacy, CRC Press	
5. Shahidulla, Bhattacharjee: A text book on Coordinate Geometry and Vector Analysis	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://www.en.wikipedia.org/">www.en.wikipedia.org/</a>	

XV. Course Policies: (Based on the Uniform Students'	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.

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XV. Course Policies: (Based on the Uniform Students')	
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Science

**Department of Pharmacy**

**Faculty Requirements**

Course Specification of

**Physics**

Course No. (MSC123)

2022



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I. Course Identification and General Information:					
1	Course Title:	Physics			
2	Course Code & Number:	MSC123			
3	Credit Hours:3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	first Level / 1 <sup>st</sup> and 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Faculty Requirement			
8	Language of Teaching the Course:	English			
9	Study System:	Credit Hour System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Sadiq Khoreem			
13	Date of Approval:	2022			

II. Course Description:
<p>The objective of this course is learning of concepts physics for the first-year undergraduate students in the medical sciences. Topics covered in this course include: Units, Biomechanics forces effects on our bodies, Energy and Work, Properties of Fluid and gases, Pressure, Heat, Sound, Light Electricity within the body, Electromagnetic, X-Ray, Radiation therapy and application in medical sciences for diagnostic or treatment. The principal objective of the course is for students to acquire knowledge and understanding of current theoretical concepts in the subject of the course and to develop practical thinking skills.</p>

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III. Course Intended Learning Outcomes (CILOs) :		Referenced PILOs
<b>A: Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1: Determine the significance and its significant in modern sciences in particular medical sciences.
		a2: Define basic physical parameters including those related to kinematics objects, work, energy, pressure, light, electricity, sound, and temperature
		a3: Discuss the concepts and principles of physical phenomena related to movement, forces, electricity, radiation and light.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	b1: Interpret physical phenomena presented in the topics such as electromagnetic fields, light refraction
		b2: Solve physical problems related to the course topics.
		b3: Compare between related physical parameters such as energy force and power, and between temperature and heat, infra sound and ultra sound
		b4: Relate basic physical parameters including those related to kinematics of objects, work, energy, pressure, light, electricity, sound, and temperature to their affecting factors and governing laws.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		

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C4	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	c1: Handle efficiently the tools and chemicals used in physics Lab.
		c2: Operate successfully the instruments and chemicals used in physics Lab.
		c3: Apply physical laws to solve physical problems.
		c4: Perform effectively the experiments he/she is assigned to do in physical lab and report his/her work correctly.
		c5: Take the required safety criteria during performing experiments in physics lab.

**D. Transferable Skills:** Upon successful completion of the course, students will be able to:

D2	Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d1: Share successfully in team-work.
		d2: Communicate effectively with his/her colleagues during performing experiments in physics lab
		d3: Behave in discipline during performing experiments in physics lab.
		d4: Demonstrate time management during performing experiments in physics lab.

**(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:**

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Determine the significance and its significant in modern		Written exams , Quiz, Essay type,

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	sciences in particular medical sciences.		
a2	Define basic physical parameters including those related to kinematics objects, work, energy, pressure, light, electricity, sound, and temperature	Lectures, lecture-discussion brain storming,	
a3	Discuss the concepts and principles of physical phenomena related to movement, forces, electricity, radiation and light.	<ul style="list-style-type: none"> <li>Lectures, lecture-discussion feed-back learning, group-project.</li> </ul>	Written exams , Quiz, assignment.
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Interpret physical phenomena presented in the topics such as electromagnetic fields, light refraction	<ul style="list-style-type: none"> <li>Lecture, lab practice</li> </ul>	Written exams , practice assessment (lab. accomplishment, practical exam)
b2	Solve physical problems related to the course topics.		
b3	Compare between related physical parameters such as energy force and power, and between temperature and heat, infra sound and ultra sound	Lectures, lecture-discussion feed-back learning.	Written exams , quizzes assignment
b4	Relate basic physical parameters including those related to kinematics of objects, work, energy, pressure, light, electricity, sound, and temperature to their affecting factors and governing laws.	<ul style="list-style-type: none"> <li>Lecture , laboratory practice</li> </ul>	Written exams , practice assessment (practical exam)

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<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Handle efficiently the tools and chemicals used in physics Lab.	<ul style="list-style-type: none"> <li>▪ Lab. Practice</li> </ul>	Practical assessment (lab. Accomplishment + practical exam)
c2	Operate successfully the instruments and chemicals used in physics Lab.		
c3	Apply physical laws to solve physical problems.		
c4	Perform effectively the experiments he/she is assigned to do in physical lab and report his/her work correctly.	Lab Practice	Practical assessment (lab. Accomplishment + practical exam)
c5	Take the required safety criteria during performing experiments in physics lab.	Lab Practice	Practical assessment (lab. Activity + practical exam)
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Share successfully in team-work.	Lab. Practice, group-project, feed-back learning.	Practical assessment (lab. Attitude)
d2	Communicate effectively with his/her colleagues during performing experiments in physics lab	<ul style="list-style-type: none"> <li>▪ Lab. Practice,</li> </ul>	Practical assessment (lab. Attitude)
d3	Behave in discipline during performing experiments in physics lab.	Lab. Practice	Practical assessment (lab. Attitude)
d4	Demonstrate time management during performing experiments in physics lab.	Lab. Practice	Practical assessment (lab. Attitude)

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction	<ul style="list-style-type: none"> <li>Definition, brief history, relation &amp; application of physics in sciences especially medical sciences.</li> </ul>	1	2	a1,a2,
2	Measurements	<ul style="list-style-type: none"> <li>Measurements, Unit systems</li> <li>Fundamental and derived units.</li> <li>Units common &amp; measurement in the medical. Exercise</li> </ul>	1	2	a1,a2,b 2
3	Fluids	<ul style="list-style-type: none"> <li>Properties of fluid &amp; flow in the human body</li> <li>Type of fluid motion</li> <li>Blood flow, Viscosity of blood</li> <li>Reynolds Number (Re)</li> <li>Application in medical sciences</li> </ul>	1	2	a1,a2,a 3b1,b2
4	Forces on and in the Body	<ul style="list-style-type: none"> <li>Definition &amp; types of force in &amp; on the body</li> <li>Factor affecting, including force, gravity, friction, electrical. dynamic</li> <li>Applications in medical sciences</li> </ul>	1	2	a1,a2,a 3,b1,b3
5	Forces on and in the Body	<ul style="list-style-type: none"> <li>Definition acceleration and effects on the human body.</li> <li>Centrifuge Force and its medical applications</li> </ul>	1	2	a2,a3, b1,b2

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		– Levers systems, examples and problems on human body			
<b>6</b>	<b>Energy, Work and Power of the Body</b>	– Definition, using & change of energy in the body – Forms and source of energy – Differences between energy, work and power & laws. – Application in medical sciences	1	2	a2,a3, b2,b3
<b>7</b>	<b>Heat and cold in medicine</b>	– Definition and differences between heat and temperature – Types temperature scales, – Transport temperature (conductive, radiation,....) – Difference between Specific heat and specific heat capacity, – Heat therapy methods – Application in medical sciences – Definition and applications cold in medicine,	1	2	a1,b2, b3,b4
<b>8</b>	<b>Mid-Term</b>	– Theoretical Exam			
<b>9</b>	<b>Pressure</b>	– Definition, units, and types pressure – Effects of pressure on various body parts and organs. – Measurement of pressure in body	1	2	a1,a2,a 3b2,b3
<b>10</b>	<b>Physics of light in medicine</b>	– Definition and physical properties of light – Light spectrum (UV, IR, Visible)	1	2	a1,a2,a 3b1,b4

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		<ul style="list-style-type: none"> <li>– Applications of light in medical sciences .</li> <li>– Principle of using laser in medical sciences.</li> </ul>			
11	<b>Physics of eyes and vision</b>	<ul style="list-style-type: none"> <li>– Components of vision in eye.</li> <li>– Defective vision, short and long sight, Astigmatism and their correction.</li> <li>– Lenses, glasses and application in medical sciences</li> </ul>	1	2	a1,a2,a3 b1,b3
12	<b>Sound in medicine</b>	<ul style="list-style-type: none"> <li>– Definition and properties of sound</li> <li>– –sound waves (ultra sound, infra sound, audible sound ). Echo. Doppler. Applications in medical sciences</li> <li>– Hearing aids, stethoscope</li> </ul>	1	2	a2,a3, b2,b3
13	<b>Electricity and electromagnetism</b>	<ul style="list-style-type: none"> <li>– Definitions', types,</li> <li>– Electricity of human body</li> <li>– ECG, MRI, EMG, Electromagnetism and application in medical sciences</li> </ul>	1	2	a1,a3, b2,b4
14	<b>Radiation therapy</b>	<ul style="list-style-type: none"> <li>– Source of radiations and medical applications. Dose units.</li> <li>– Treatment of tumors with Radiotherapy,</li> </ul>	1	2	a2,a3, b1,b3
15	<b>Physics of diagnostic X-ray</b>	<ul style="list-style-type: none"> <li>– Definition of x-ray, parts of X-ray.</li> <li>– Biological effects of radiation,</li> <li>– Application of X-ray in medicine</li> </ul>	1	2	a1,a2, b3,b4

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<b>16</b>	<b>Final Theoretical Exam</b>		1	2	
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

<b>B. Case Studies and Practical Aspect:</b>				
No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Graphics analysis	1	2	c1,c2,,d1
2	Simple measurements: Micrometers, Vernier	1	2	c1,c2,c3.d1,d2
3	Density and Specific density	1	2	c1,c2.c4,d3
4	Surface Tension of water	1	2	c1,c2,c3.c4,d1
5	Simple pendulum	1	2	c1,c2,c3.c4,d3
6	Hook's low	1	2	c2,c3.c4,d2
7	Viscosity coefficient - Stock's law	1	2	c2,c3.d1
8	Specific heat	1	2	c1,c3.c4,d2,d3
9	Boyle's law	1	2	c3.c4,d1,d3
10	Archimedes' principle	1	2	c1,c2,c4, ,d2,d3
11	Focal length and Power of Lens	1	2	c3.c4,d1,d4
12	Speed of sound	1	2	c3.c4,d2,d4
13	Ohms' law	1	2	c1,c2,c4,d3
14	Half-life of some drugs'	1	2	c2,c3.c4,d2,d4
15	<b>Final exam</b>	1	2	
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

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#### V. Teaching Strategies of the Course:

- Lecture  
lecture – Discussion
- Laboratory practice
  - Feed-back learning
  - Brain-storming
  - Group project

#### VI. Assessment Methods of the Course:

- Written exam
- Quizzes
- Mid-term exam
- Assess with check list Lab practical
- Practical exam
- Theoretical exam

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Presentation	5-10 <sup>th</sup>	3%	b1
2	Group: each group of students will be assigned to do a search-based report on one of physical phenomena in the course topics.	13 <sup>th</sup>	2%	a3
<b>Total</b>				

#### VIII. Schedule of Assessment Tasks for Students During the Semester: Practical part

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Lab. Attendance	1 <sup>st</sup> - 15 <sup>th</sup> week	5	5%	c1, c2, c3, c4,c5 d1,d2, d3,d4

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2	Lab. Attitude	5 <sup>th</sup> - 12 <sup>th</sup> week	2	2%	d1,d2, d3,d4
3	Lab. Accomplishments	4 <sup>th</sup> & 12 <sup>th</sup> Weeks	3	3%	c1, c2, c3, c4,c5
4	Lab. Reporting	7 <sup>th</sup> or 8 <sup>th</sup> week	5	5%	c4
5	Exam pf practice theory (written exam)	14 <sup>th</sup> Week	5	5%	c1, c2, c3, c4,c5 d1,d2, d3,d4
6	Practical exam (practical)	15 <sup>th</sup>	20	20%	c1, c2, c3, c4,c5
<b>Total theoretical Weight</b>			<b>40</b>	<b>40%</b>	

#### IX. Learning Resources:

##### 1- Required Textbook(s) ( maximum two ): مثال example

1-John R. Cameron, James G.Skofronick and Roderick M.Grant. 1999, **Physics of the Body (Medical Physics Series):** Medical Physics Pub.Corp, ISBN: 094483891X.

2-Rodney Cotterill. 2002, **Biophysics: An Introduction,** 2002)ASIN:B000VHVMDG.

##### 2- Essential References:

3- ASHOUR, Hassan; AL-DAHOUDI, Naji; KAHLOUT, Amal. PHYSICS FOR MEDICAL SCIENCES. 2009.

##### 3- Electronic Materials and Web Sites etc.:

1 <https://www.nortbeastern.edu/physic/undereradugte./introductorvphysicslab/abstractsofexoeiments/>

2-<https://www.class-central.com/report/physics-free-online-courses/>

3- <http://physics.usask.ca/~bzulkosk/phys117/>

#### X. Course Policies:

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b>

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	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other Policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science

**Department Pharmacy**

**Faculty Requirements**

Course Plan (Syllabus) of  
**Physics**  
Course No. (MSC123)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Sadiq Khoreem						
Location & Telephone No.:	777622087	SA T	SU N	M ON	TU E	WE D	TH U
E-mail:							

2022

II. Course Description:
The objective of this course is learning of concepts physics for the first-year undergraduate students in the medical sciences. Topics covered in this course include: Units, Biomechanics forces effects on our bodies, Energy and Work, Properties of Fluid and gases, Pressure, Heat, Sound, Light Electricity within the body, Electromagnetic, X-Ray, Radiation therapy and application in medical sciences for diagnostic or treatment. The principal objective of the course is for students to acquire knowledge and understanding of current theoretical concepts in the subject of the course and to develop practical thinking skills.

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III. Course Intended Learning Outcomes (CILOs) :		Referenced PILOs
<b>A: Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
a1	Determine the significance and its significant in modern sciences in particular medical sciences.	
a2	Define basic physical parameters including those related to kinematics objects, work, energy, pressure, light, electricity, sound, and temperature	
a3	Discuss the concepts and principles of physical phenomena related to movement, forces, electricity, radiation and light.	
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
b1	Interpret physical phenomena presented in the topics such as electromagnetic fields, light refraction.	
b2	Solve physical problems related to the course topics.	
b3	Compare between related physical parameters such as energy force and power, and between temperature and heat, infra sound and ultra sound.	
b4	Relate basic physical parameters including those related to kinematics of objects, work, energy, pressure, light, electricity, sound, and temperature to their affecting factors and governing laws.	
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
c1	Handle efficiently the tools and chemicals used in physics Lab.	
c2	Operate successfully the instruments and chemicals used in physics Lab.	
c3	Apply physical laws to solve physical problems.	
c4	Perform effectively the experiments he/she is assigned to do in physical lab and report his/her work correctly.	
c5	Take the required safety criteria during performing experiments in physics lab.	
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
d1	Share successfully in team-work.	

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d2	Communicate effectively with his/her colleagues during performing experiments in physics lab.
d3	Behave in discipline during performing experiments in physics lab.
d4	Demonstrate time management during performing experiments in physics lab.

**(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:**

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Determine the significance and its significant in modern sciences in particular medical sciences.	Lectures, lecture-discussion brain storming,	Written exams , Quiz, Essay type,
a2	Define basic physical parameters including those related to kinematics objects, work, energy, pressure, light, electricity, sound, and temperature		
a3	Discuss the concepts and principles of physical phenomena related to movement, forces, electricity, radiation and light.	<ul style="list-style-type: none"> <li>Lectures, lecture-discussion feed-back learning, group-project.</li> </ul>	Written exams , Quiz, assignment.

**(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:**

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1	Interpret physical phenomena presented in the topics such as electromagnetic fields, light refraction	<ul style="list-style-type: none"> <li>Lecture, lab practice</li> </ul>	Written exams , practice assessment (lab. accomplishment, practical exam)
b2	Solve physical problems related to the course topics.		Written exams , quizzes assignment

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b3	Compare between related physical parameters such as energy force and power, and between temperature and heat, infra sound and ultra sound	Lectures, lecture-discussion feed-back learning.	
b4	Relate basic physical parameters including those related to kinematics of objects, work, energy, pressure, light, electricity, sound, and temperature to their affecting factors and governing laws.	<ul style="list-style-type: none"> <li>Lecture , laboratory practice</li> </ul>	Written exams , practice assessment (practical exam)

**(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Handle efficiently the tools and chemicals used in physics Lab.	<ul style="list-style-type: none"> <li>Lab. Practice</li> </ul>	Practical assessment (lab. Accomplishment + practical exam)
c2	Operate successfully the instruments and chemicals used in physics Lab.		
c3	Apply physical laws to solve physical problems.		
c4	Perform effectively the experiments he/she is assigned to do in physical lab and report his/her work correctly.	Lab Practice	Practical assessment (lab. Accomplishment + practical exam)
c5	Take the required safety criteria during performing experiments in physics lab.	Lab Practice	Practical assessment (lab. Activity + practical exam)

**(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
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d1	Share successfully in team-work.	Lab. Practice, group-project, feed-back learning.	Practical assessment (lab. Attitude)
d2	Communicate effectively with his/her colleagues during performing experiments in physics lab	<ul style="list-style-type: none"> <li>▪ Lab. Practice,</li> </ul>	Practical assessment (lab. Attitude)
d3	Behave in discipline during performing experiments in physics lab.	Lab. Practice	Practical assessment (lab. Attitude)
d4	Demonstrate time management during performing experiments in physics lab.	Lab. Practice	Practical assessment (lab. Attitude)

IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CLOs)
1	Introduction	<ul style="list-style-type: none"> <li>– Definition, brief history, relation &amp; application of physics in sciences especially medical sciences.</li> </ul>	1	2	a1,a2,
2	Measurements	<ul style="list-style-type: none"> <li>– Measurements, Unit systems</li> <li>– Fundamental and derived units.</li> <li>– Units common &amp; measurement in the medical. Exercise</li> </ul>	1	2	a1,a2,b 2
3	Fluids	<ul style="list-style-type: none"> <li>– Properties of fluid &amp; flow in the human body</li> <li>– Type of fluid motion</li> <li>– Blood flow, Viscosity of blood</li> <li>– Reynolds Number (Re)</li> </ul>	1	2	a1,a2,a 3b1,b2

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IV. Course Contents:					
		– Application in medical sciences			
4	<b>Forces on and in the Body</b>	– Definition & types of force in & on the body – Factor affecting, including force, gravity, friction, electrical. dynamic – Applications in medical sciences	1	2	a1,a2,a3,b1,b3
5	<b>Forces on and in the Body</b>	– Definition acceleration and effects on the human body. – Centrifuge Force and its medical applications – Levers systems, examples and problems on human body	1	2	a2,a3,b1,b2
6	<b>Energy, Work and Power of the Body</b>	– Definition, using & change of energy in the body – Forms and source of energy – Differences between energy, work and power & laws. – Application in medical sciences	1	2	a2,a3,b2,b3
7	<b>Heat and cold in medicine</b>	– Definition and differences between heat and temperature – Types temperature scales, – Transport temperature (conductive, radiation,....) – Difference between Specific heat and specific heat capacity, – Heat therapy methods – Application in medical sciences	1	2	a1,b2,b3,b4

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IV. Course Contents:					
		– Definition and applications cold in medicine,			
8	Mid-Term	– Theoretical Exam			
9	Pressure	– Definition, units, and types pressure – Effects of pressure on various body parts and organs. – Measurement of pressure in body	1	2	a1,a2,a3 b2,b3
10	Physics of light in medicine	– Definition and physical properties of light – Light spectrum (UV, IR, Visible) – Applications of light in medical sciences . – Principle of using laser in medical sciences.	1	2	a1,a2,a3 b1,b4
11	Physics of eyes and vision	– Components of vision in eye. – Defective vision, short and long sight, Astigmatism and their correction. – Lenses, glasses and application in medical sciences	1	2	a1,a2,a3 b1,b3
12	Sound in medicine	– Definition and properties of sound – –sound waves (ultra sound, infra sound, audible sound ). Echo. Doppler. Applications in medical sciences – Hearing aids, stethoscope	1	2	a2,a3, b2,b3

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IV. Course Contents:					
13	<b>Electricity and electromagnetism</b>	<ul style="list-style-type: none"> <li>Definitions', types,</li> <li>Electricity of human body</li> <li>ECG, MRI, EMG, Electromagnetism and application in medical sciences</li> </ul>	1	2	a1,a3, b2,b4
14	<b>Radiation therapy</b>	<ul style="list-style-type: none"> <li>Source of radiations and medical applications. Dose units.</li> <li>Treatment of tumors with Radiotherapy,</li> </ul>	1	2	a2,a3, b1,b3
15	<b>Physics of diagnostic X-ray</b>	<ul style="list-style-type: none"> <li>Definition of x-ray, parts of X-ray.</li> <li>Biological effects of radiation,</li> <li>Application of X-ray in medicine</li> </ul>	1	2	a1,a2, b3,b4
16	<b>Final Theoretical Exam</b>		1	2	
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

B. Case Studies and Practical Aspect:				
No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Graphics analysis	1	2	c1,c2,,d1
2	Simple measurements: Micrometers, Vernier	1	2	c1,c2,c3.d1,d2
3	Density and Specific density	1	2	c1,c2.c4,d3
4	Surface Tension of water	1	2	c1,c2,c3.c4,d1

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<b>B. Case Studies and Practical Aspect:</b>				
No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
5	Simple pendulum	1	2	c1,c2,c3.c4,d3
6	Hook's low	1	2	c2,c3.c4,d2
7	Viscosity coefficient - Stock's law	1	2	c2,c3.d1
8	Specific heat	1	2	c1,c3.c4,d2,d3
9	Boyle's law	1	2	c3.c4,d1,d3
10	Archimedes' principle	1	2	c1,c2,c4, ,d2,d3
11	Focal length and Power of Lens	1	2	c3.c4,d1,d4
12	Speed of sound	1	2	c3.c4,d2,d4
13	Ohms' law	1	2	c1,c2,c4,d3
14	Half-life of some drugs'	1	2	c2,c3.c4,d2,d4
15	<b>Final exam</b>	1	2	
<b>Number of Weeks /and Units Per Semester</b>		<b>15</b>	<b>30</b>	

<b>V. Teaching Strategies of the Course:</b>
Lecture lecture – Discussion <ul style="list-style-type: none"> <li>– Laboratory practice</li> <li>– Feed-back learning</li> <li>– Brain-storming</li> <li>– Group project</li> </ul>

<b>VI. Assessment Methods of the Course:</b>
<ul style="list-style-type: none"> <li>– Written exam</li> <li>– Quizzes</li> <li>– Mid-term exam</li> </ul>

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- Assess with check list Lab practical
- Practical exam
- Theoretical exam

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Presentation	5-10 <sup>th</sup>	3%	b1
2	Group: each group of students will be assigned to do a search-based report on one of physical phenomena in the course topics.	13 <sup>th</sup>	2%	a3
<b>Total</b>				

#### VIII. Schedule of Assessment Tasks for Students During the Semester: Theoretical part

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance	1 <sup>st</sup> - 15 <sup>th</sup> week	2	2%	a1, a2, a3, a4, b1,b2, b3,b4
	Quizzes	5 <sup>th</sup> - 12 <sup>th</sup> week	3	3%	b2
2	Assignment	4 <sup>th</sup> & 12 <sup>th</sup> Weeks	5	5%	a1, a2, a3, a4, b1,b2, b3,b4
3	Mid-term exam	7 <sup>th</sup> or 8 <sup>th</sup> week	10	10%	a1, a2, a3, a4, b1,b2, b3,b4
4	Final Theoretical Exam	16th Week	40	40%	a1, a2, a3, a4, b1,b2, b3,b4
<b>Total theoretical Weight</b>			<b>60</b>	<b>60%</b>	

#### IX. Learning Resources:

1- Required Textbook(s) ( maximum two ): مثال example

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1-John R. Cameron, James G.Skofronick and Roderick M.Grant. 1999, **Physics of the Body (Medical Physics Series)**: Medical Physics Pub.Corp, ISBN: 094483891X.

2-Rodney Cotterill. 2002, **Biophysics: An Introduction**, 2002)ASIN:B000VHVMDG.

### 2- Essential References:

1- ASHOUR, Hassan; AL-DAHOUDI, Naji; KAHLOUT, Amal. PHYSICS FOR MEDICAL SCIENCES. 2009.

### 3- Electronic Materials and Web Sites etc.:

<https://www.nortbeastern.edu/physic/undereradugte./introductorvphysicslab/abstractsofexperiments/>

<https://www.class-central.com/report/physics-free-online-courses/>

<http://physics.usask.ca/~bzulkosk/phys117/>

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<b>X. Course Policies:</b>	
<b>1</b>	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

# **DRUG DISCOVERY & DEVELOPMENT**

Course Code No. (PHM128)

2022



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Course Specification  
**DRUG DISCOVERY & DEVELOPMENT**

I. Course Identification and General Information:							
1.	Course Title:	Drug discovery and development					
2.	Course Code & Number:	PHM128					
3.	Credit hours:	C.H					
		Theoretical			P	Tr.	TOTAL
		L.	Tut.	S.			
2	-	-	-	-	2		
4.	Study level/ semester at which this course is offered:	1 <sup>st</sup> Level– 2 <sup>nd</sup> Semester					
5.	Pre –requisite (if any):	--					
6.	Co –requisite (if any):	--					
7.	Program (s) in which the course is offered:	Pharmacy Bachelor					
8.	Study System:	Semester based System					
9.	Mode of delivery:	Full Time					
10.	Language of teaching the course:	ENGLISH					
11.	Location of teaching the course:	AT THE UNIVERSITY FACILITY					
12.	Prepared By:	Dr. Ahmed Al-Ghani					
13.	Date of Approval:	2022					

II. Course Description:
The course is designed to provide students basic knowledge of sources of drugs, history of drug discovery (older and modern history) and modern phases and approaches of drug discovery & development from disease identify to approved and marketing of drug.

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
PILOs		CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Define drug discovery & drug development and recognize their nowadays requirements. <b>a2.</b> Determine the main sources of drugs.
<b>A3</b>	. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Discuss the purposes, phases and modern approaches of drug discovery and development
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Recognize his/her role as drug discoverer and developer.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Compare between various approaches employed in drug discovery and development. <b>b2.</b> Predict the future progress in drug discovery and development approaches.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C6</b>	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	<b>c1.</b> Participates in the adoption of policies and laws for the process of drug discovery and development

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		c2. Report his/her work efficiently.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Share successfully in team-work. d2. Comply to pharmacy laws and ethics.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d3. Demonstrate self-learning and time management.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice	d4. Properly search for information related drug discovery and development using books and suitable media technologies.

<b>6. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Define drug discovery & drug development and recognize their nowadays requirements.	Active Lecture	written exam, Practical assessment (Lab accomplishments, Lab. Reporting, practical exam)
a2. Determine the main sources of drugs.		
a3. Discuss the purposes, phases and modern approaches of drug discovery and development		
a4. Recognize his/her role as drug discoverer and developer.	Active Lectures	written exam, assignment
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret abbreviations and terms such as HIT, lead, HTS commonly used in drug discovery and development	Active Lecture	Written exam, quiz

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b2. Compare between various approaches employed in drug discovery and development.	Active Lecture	written exam, quiz
b3. Predict the future progress in drug discovery and development approaches.	Active Lecture	written exam
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Participates in the adoption of policies and laws for the process of drug discovery and development	Feed-back learning, Group-project.	Written- exam, assignments
c2. Report his/her work efficiently.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Group-project, feed-back learning	Assignment
d2. Comply to pharmacy laws and ethics.	Active Lecture	Written exam
d3. Demonstrate self-learning and time management.	Group-project	assignment
d4. Properly search for information related drug discovery and development using books and suitable media technologies.	Group-project	assignment

## XX. Course Content:

### A – Theoretical Aspect:

Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction</b>	a1,a3,a4,b1,b2,d1 d2	<ul style="list-style-type: none"> <li>definitions: drug discovery, drug development</li> <li>History of drug discovery and development</li> <li>Requirements of modern drug discovery &amp; development</li> </ul>	2	4

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Dr. Ahmed Al-Ghani	Dr. Nabil Albaseer	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



2	Sources of drugs	a2,d1,d 2	<ul style="list-style-type: none"> <li>Natural sources (plant, animals, minerals/earth)</li> <li>Synthetic sources</li> <li>Semisynthetic sources</li> <li>Newer sources: biotechnology including -DNA</li> </ul> With Examples of drugs for each source	3	6
3	Approaches of drug discovery	a3, a4, b1,b2,c 1,c2	<ul style="list-style-type: none"> <li>Drug targets: definition and types</li> <li>Definition of Hit</li> <li>Types of Hits</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2
3	Approaches of drug discovery	a3, a4, b1, b2,c1,c 2	<ul style="list-style-type: none"> <li>Hit identification methods               <ul style="list-style-type: none"> <li>High throughput screening (HTS)</li> <li>Natural substrate</li> <li>Pharmacophore: Patent burst; Structure-based technology (Fragments)</li> </ul> </li> </ul>	4	8
4	Phases of drug development	a3, a4, b1, b2,c1, c2,d1, d2,d3	<ul style="list-style-type: none"> <li>Lead identification</li> <li>Lead optimization</li> <li>Animal testing</li> <li>Clinical trials on human</li> <li>Registration &amp; approval of the drug</li> <li>Formulation as dosage forms</li> <li>Clinical trials of the drug product</li> <li>Registration &amp; approval of the drug product</li> </ul>	3	6
<b>Course Review</b>		all	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>4 Units</b>

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X. Teaching strategies of the course:
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.</p> <p>The efficiency of lecturing can be enhanced by using techniques such as <b>Brainstorming</b>: It depends on stimulation of the student`s brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home-works, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>
<p><b>Group projects</b>: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &amp;for promoting team work skills</p>

XI. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search-based report on source of one drug	c2, d3, d4	4	6
2	<b>Group</b> : each group of students will be assigned to do a search-based report on one of drug discovery approaches or drug development phases.	c2, d1, d4	14	4

X. Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, a3, a4, b1, b2, b3, d1, d2, d3
2	Assignments (1 + 2)	4, 14	10	10	c2, d1, d3, d4
3	Quiz 1 + Quiz 2	7, 12	5	5	b1, b2
4	Mid-semester exam of theoretical part (written exam)	7	20	20	a1, a2, a3, a4, b1, b2, b3, d2, d3
5	Final exam of theoretical part (written exam)	17	60	60	a1, a2, a3, a4, b1, b2, b3, d2, d3
<b>TOTAL</b>			100	100 %	100

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XVI. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. Donald J Abraham, Burger's, Medicinal Chemistry, Drug Discovery and Development, Volumes1-8, 8 <sup>th</sup> Edition- ISBN: 978-1-119-53030-5, Copyright © 2022 John Wiley & Sons, Inc. 2. Wermuth, Essentials medicinal chemistry	
<b>2- Essential References.</b>	
1. Edward R. Zartler, fragment-based drug discovery a practical approach, 2008 John Wiley & sons, ltd 2. Purcell. A strategy of drug: a guide to biological activity	
<b>3- Electronic Materials and Web Sites etc.</b>	
1. <a href="https://www.slideshare.net/prashantshukla927/drug-discovery-and-development-44024616">https://www.slideshare.net/prashantshukla927/drug-discovery-and-development-44024616</a> 2. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6155886/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6155886/</a>	

XVII. Course Policies: (Based on the Uniform Students'	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية

قسم الصيدلة  
Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
Department of Pharmacy  
Program of Pharmacy Bachelor

Course Plan (Syllabus) of  
**DRUG DISCOVERY AND DEVELOPMENT**

Course No. (16)  
Course Code No. (PHM128)

I. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member		Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

IV. Course Description:
The course is designed to provide students basic knowledge of sources of drugs, history of drug discovery (older and modern history) and modern phases and approaches of drug discovery & development from disease identify to approved and marketing of drug.





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<b>V. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>Alignment CILOs to PILOs</b>		
PILOs	CILOs	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Define drug discovery & drug development and recognize their nowadays requirements. <b>a2.</b> Determine the main sources of drugs.
<b>A3</b>	. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Discuss the purposes, phases and modern approaches of drug discovery and development
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Recognize his/her role as drug discoverer and developer.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Compare between various approaches employed in drug discovery and development. <b>b2.</b> Predict the future progress in drug discovery and development approaches.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C6</b>	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	<b>c1.</b> Participates in the adoption of policies and laws for the process of drug discovery and development

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		c2. Report his/her work efficiently.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Share successfully in team-work. d2. Comply to pharmacy laws and ethics.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d3. Demonstrate self-learning and time management.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice	d4. Properly search for information related drug discovery and development using books and suitable media technologies.

7. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Define drug discovery & drug development and recognize their nowadays requirements.	Active Lecture	written exam, Practical assessment (Lab accomplishments, Lab. Reporting, practical exam)
a2. Determine the main sources of drugs.		
a3. Discuss the purposes, phases and modern approaches of drug discovery and development		
a4. Recognize his/her role as drug discoverer and developer.	Active Lectures	written exam, assignment
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Interpret abbreviations and terms such as HIT, lead, HTS commonly used in drug discovery and development	Active Lecture	Written exam, quiz

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b2. Compare between various approaches employed in drug discovery and development.	Active Lecture	written exam, quiz
b3. Predict the future progress in drug discovery and development approaches.	Active Lecture	written exam
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Participates in the adoption of policies and laws for the process of drug discovery and development	Feed-back learning, Group-project.	Written- exam, assignments
c2. Report his/her work efficiently.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Group-project, feed-back learning	Assignment
d2. Comply to pharmacy laws and ethics.	Active Lecture	Written exam
d3. Demonstrate self-learning and time management.	Group-project	assignment
d4. Properly search for information related drug discovery and development using books and suitable media technologies.	Group-project	assignment

<b>XXI. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction</b>	a1,a3,a4,b1,b2,d1 d2	<ul style="list-style-type: none"> <li>definitions: drug discovery, drug development</li> <li>History of drug discovery and development</li> <li>Requirements of modern drug discovery &amp; development</li> </ul>	2	4

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2	Sources of drugs	a2,d1,d 2	<ul style="list-style-type: none"> <li>Natural sources (plant, animals, minerals/earth)</li> <li>Synthetic sources</li> <li>Semisynthetic sources</li> <li>Newer sources: biotechnology including -DNA</li> </ul> With Examples of drugs for each source	3	6
3	Approaches of drug discovery	a3, a4, b1,b2,c 1,c2	<ul style="list-style-type: none"> <li>Drug targets: definition and types</li> <li>Definition of Hit</li> <li>Types of Hits</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2
3	Approaches of drug discovery	a3, a4, b1, b2,c1,c 2	<ul style="list-style-type: none"> <li>Hit identification methods               <ul style="list-style-type: none"> <li>High throughput screening (HTS)</li> <li>Natural substrate</li> <li>Pharmacophore: Patent burst; Structure-based technology (Fragments)</li> </ul> </li> </ul>	4	8
4	Phases of drug development	a3, a4, b1, b2,c1, c2,d1, d2,d3	<ul style="list-style-type: none"> <li>Lead identification</li> <li>Lead optimization</li> <li>Animal testing</li> <li>Clinical trials on human</li> <li>Registration &amp; approval of the drug</li> <li>Formulation as dosage forms</li> <li>Clinical trials of the drug product</li> <li>Registration &amp; approval of the drug product</li> </ul>	3	6
<b>Course Review</b>		all	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>4 Units</b>

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XI. Teaching strategies of the course:
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.</p> <p>The efficiency of lecturing can be enhanced by using techniques such as <b>Brainstorming</b>: It depends on stimulation of the student`s brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home-works, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>
<p><b>Group projects</b>: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &amp;for promoting team work skills</p>

XII. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search-based report on source of one drug	c2, d3, d4	4	6
2	<b>Group</b> : each group of students will be assigned to do a search-based report on one of drug discovery approaches or drug development phases.	c2, d1, d4	14	4

XI. Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, a3, a4, b1, b2, b3, d1, d2, d3
2	Assignments (1 + 2)	4, 14	10	10	c2, d1, d3, d4
3	Quiz 1 + Quiz 2	7, 12	5	5	b1, b2
4	Mid-semester exam of theoretical part (written exam)	7	20	20	a1, a2, a3, a4, b1, b2, b3, d2, d3
5	Final exam of theoretical part (written exam)	17	60	60	a1, a2, a3, a4, b1, b2, b3, d2, d3
<b>TOTAL</b>			100	100 %	100

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XVIII. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
3.	Donald J Abraham, Burger's, Medicinal Chemistry, Drug Discovery and Development, Volumes1-8, 8 <sup>th</sup> Edition- ISBN: 978-1-119-53030-5, Copyright © 2022 John Wiley & Sons, Inc.
4.	Wermuth, Essentials medicinal chemistry
<b>2- Essential References.</b>	
3.	Edward R. Zartler, fragment-based drug discovery a practical approach, 2008 John Wiley & sons, ltd
4.	Purcell. A strategy of drug: a guide to biological activity
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3.	<a href="https://www.slideshare.net/prashantshukla927/drug-discovery-and-development-44024616">https://www.slideshare.net/prashantshukla927/drug-discovery-and-development-44024616</a>
4.	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6155886/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6155886/</a>

XIX. Course Policies: (Based on the Uniform Students'	
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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قسم الصيدلة

## **Al-Razi University**

All Faculties

### University Requirements **Course Specification of** Communication Skills **Course No. (RAZ122)**

2022



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I. Course Identification and General Information:				
1	Course Title:	Communication Skills		
2	Course Code & Number:	RAZ122		
3	Credit Hours:	Credit Hours	Theory Hours	Lab. Hours
			Lecture	Exercise
		2	1.5	0.5
4	Study Level/ Semester at which this Course is offered:	Depending on the program schedule		
5	Pre –Requisite (if any):	None		
6	Co –Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Bachelor of all programs		
8	Language of Teaching the Course:	English and Arabic		
9	Study System:	Credit Hour System		
10	Mode of Delivery:	Full Time		
11	Location of Teaching the Course:	Al-Razi University		
12	Prepared by:	Dr. Sharaf Shana		
13	Date of Approval:			

II. Course Description:
<p>The course aims to train the students to communicate effectively using different strategies by improving their verbal and non-verbal communication style, as well as enhancing academic and employability skills. The course also aims to eliminate communication roadblocks and build self-confidence in students through performing presentations and discussions in class. This course provides students with skills for their future careers and how to get jobs effectively.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Abdulwahab Alkuhlani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



### III. Course Intended Learning Outcomes (CILOs) :

**Knowledge and Understanding:** Upon successful completion of the course, students will be able to:

a1 Show understanding of the communication skills and their strategies.

**B. Intellectual Skills:** Upon successful completion of the course, students will be able to:

b1 Explain skills of communication such as problem solving, oral presentation, and employability skills.

**C. Professional and Practical Skills:** Upon successful completion of the course, students will be able to:

c1 Demonstrate the ability to make effective presentation using ICT skills.

c2 Use appropriate tactics to handle tasks such as solving problems, team work, answering job interview questions.

c3 Write professional texts such as CV, cover letter ....etc.

**D. Transferable Skills:** Upon successful completion of the course, students will be able to:

d1 Communicate effectively orally or in writing using effective strategies.

d2 Show real adherence of communication skills.

#### (A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1 Show understanding of the communication process.	Interactive lectures - Presentation – group discussion and tutorials	Oral presentation

#### (B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
-----------------------------------	---------------------	-----------------------

Prepared by: Dr. Sharaf Shana	Reviewed by: Dr. Abdulwahab Alkuhlani	Head of the Department: Dr. Ahmed Al-Ghani	Dean Prof. Nabil Al-Rabeei	Quality Assurance head Dr. Turki Alqabbani
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b1	Explain skills of communication such as problem solving, oral presentation, and employability skills.	Integrative strategy – oral presentation – pair work – critical thinking activities	Oral informative assessment tasks for each skill
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**(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:**

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1	Demonstrate the ability to make effective oral presentation using ICT skills.	Interactive lecture Group work	Individual presentation assignment.
c2	Use appropriate tactics to handle tasks such as solving problems, team work, answering job interview questions.	Pair group activities Group discussion	Project assignments
c3	Write professional texts such as CV, cover letter ....etc.	Interactive lecture Group work discussion	Written assignments Quiz

**(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:**

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1	Communicate effectively orally or in writing using authentic topics from their study fields.	Communicative approach Authentic situation activities	Oral presentation Group projects
d2	Show adherence of communication skills in real contexts.	Pair work – group work – debates – seminars	Free group discussion assessment

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CLOs)
1	Introduction	The concept of communication skills. Components of communication skills.	1	2	a1,b1
2	Types of communication skills	Verbal and non-verbal communication skills Examples of each type. Effective listening and speaking skills. Principles and Barriers.	2	4	a1, b1
3	Oral presentation skills	Audience Analysis Preparing effective PowerPoint presentation Delivering of presentation Body language Handling questions	3	6	c2, d1, d2
4	Mid term Exam		1	2	
4	Academic communication skills	Note taking skills Researching skills Summarizing skills Reporting skills Questioning skills	2	4	a1, c2, c3
5	Interpersonal skills	Time management skill problem solving skills Team work skills Negotiation skills	1	2	a1, c1, b1, d1, d2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Sharaf Shana	Dr. Abdulwahab Alkuhlani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>IV. Course Contents:</b>					
6	<b>Employability skills</b>	Self-preparing for a job Looking for a job SWOT analysis for the job Preparing CV and cover letter for the job Preparing for attending job interview Work ethics	3	6	b1, c3
7	<b>Final Theoretical Exam</b>		1	2	all ILOs
<b>Number of Weeks /and Units Per Semester</b>			<b>14</b>	<b>28</b>	

<b>V. Teaching Strategies of the Course:</b>	
<ul style="list-style-type: none"> <li>- Interactive lectures</li> <li>- Presentation – group discussion and tutorials</li> <li>- Group work</li> <li>– Role play activities</li> <li>- Small group activities, De-briefing</li> <li>- Interactive discussion</li> <li>- Small group activities</li> <li>- Critical thinking activities</li> <li>- An integrative approach to teaching all language skills – group work – role play dialogues</li> <li>- Communicative approach</li> <li>- Authentic situation activities</li> <li>- Demonstration of smart phone applications</li> <li>- Research projects</li> <li>- Debates – seminars</li> </ul>	

<b>VI. Assessment Methods of the Course:</b>	
<ul style="list-style-type: none"> <li>- Oral presentation</li> <li>- Assignments</li> <li>- Formative and summative assessment</li> <li>- Oral assessment and feedback</li> <li>- informative assessment tasks for each skill</li> <li>- OPE (Observed Performance Evaluation) during the sessions</li> </ul>	

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- Individual presentation assignment.
- Project assignments
- Group projects
- Continuous assessment of students' improvement
- Free group discussion assessment
- Written exams

VII. Assignments:				
No.	Assignments	Week Due	Mark	Aligned CIOs (symbols)
1	Oral presentations	3-10	3	a1, c1, c2, d1
2	Written assignments	7,8,9,10	3	b1, c1, c3,
3	Project assignments	6, 8, 9, 10, 11, 12, 13	4	c3, d1, d2
4	Quizzes	4, 12	10	a1, c3
<b>Total</b>			<b>10</b>	

VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Oral presentations	3-10	3	3%	a1, c1, c2, d1
2	Written assignments	7,8,9, 10	3	3%	a1, b1, c1, c3,
3	Project assignments	6, 8, 9, 10, 11, 12, 13	4	4%	c3, d1, d2
4	Quiz 1	6	5	5%	a1

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5	Midterm Theoretical Exam	8	20	20%	a1, b1, , c2, d1, d2
6	Quiz 2	12	5	5%	c3
7	Final Theoretical Exam	16	60	60%	all
<b>Total</b>		<b>100</b>	<b>100%</b>		

## IX. Learning Resources:

Written in the following order: Author, Year of publication, Title, Edition, Place of publication, Publisher.

### 1- Required Textbook(s) ( maximum two ) : مثال example

Santhi, V. & Selvam, R. (2015) *Advanced Skills for Communication in English: Book 1*. New Century Book House.  
Communication Skills, (2nd ed.). (2004) New York: Ferguson.

### 2- Essential References:

J McKay, M. & Davis, M., (2009) *Messages: the communication Skills Book 3rd ed.*, New Harbinger: Oakland CA.

### 3- Electronic Materials and Web Sites etc.:

#### Websites:

- <https://www.google.com/search?q=Communication+skills+for+university+students>
- <https://www.oxbridgeediting.co.uk/blog/essential-university-student-skills-communication/>
- [https://www.researchgate.net/publication/344487866\\_EFFECTIVE\\_ORAL\\_PRESENTATION\\_AMONG\\_UNDERGRADUATES](https://www.researchgate.net/publication/344487866_EFFECTIVE_ORAL_PRESENTATION_AMONG_UNDERGRADUATES)
- <https://www.teachhub.com/teaching-strategies/2022/09/why-communication-skills-are-essential-in-college/>
- <https://collegepuzzle.stanford.edu/7-communication-skills-students-need-to-succeed-later-in-life/>
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<b>X. Course Policies: (Based on the Uniform Students' :</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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Al-Razi University

All Faculties

University Requirements  
Course Specification of  
**Communication Skills**  
Course No. (RAZ122)  
2022

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Sharaf Shana	Office Hours					
Location & Telephone No.:	+967 777643494	SA T	SU N	M ON	TU E	WE D	TH U
E-mail:							



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## II. Course Description:

The course aims to train the students to communicate effectively using different strategies by improving their verbal and non-verbal communication style, as well as enhancing academic and employability skills. The course also aims to eliminate communication roadblocks and build self-confidence in students through performing presentations and discussions in class. This course provides students with skills for their future careers and how to get jobs effectively.

## III. Course Intended Learning Outcomes (CILOs) :

**Knowledge and Understanding:** Upon successful completion of the course, students will be able to:

a1 Show understanding of the communication skills and their strategies.

**B. Intellectual Skills:** Upon successful completion of the course, students will be able to:

b1 Explain skills of communication such as problem solving, oral presentation, and employability skills.

**C. Professional and Practical Skills:** Upon successful completion of the course, students will be able to:

c1 Demonstrate the ability to make effective presentation using ICT skills.

c2 Use appropriate tactics to handle tasks such as solving problems, team work, answering job interview questions.

c3 Write professional texts such as CV, cover letter ....etc.

**D. Transferable Skills:** Upon successful completion of the course, students will be able to:

d1 Communicate effectively orally or in writing using effective strategies.

d2 Show real adherence of communication skills.

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<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1	Show understanding of the communication process.	Interactive lectures - Presentation – group discussion and tutorials	Oral presentation
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Explain skills of communication such as problem solving, oral presentation, and employability skills.	Integrative strategy – oral presentation – pair work – critical thinking activities	Oral informative assessment tasks for each skill
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Demonstrate the ability to make effective oral presentation using ICT skills.	Interactive lecture Group work	Individual presentation assignment.
c2	Use appropriate tactics to handle tasks such as solving problems, team work, answering job interview questions.	Pair group activities Group discussion	Project assignments
c3	Write professional texts such as CV, cover letter ....etc.	Interactive lecture Group work discussion	Written assignments Quiz
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>

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d1	Communicate effectively orally or in writing using authentic topics from their study fields.	Communicative approach Authentic situation activities	Oral presentation Group projects
d2	Show adherence of communication skills in real contexts.	Pair work – group work – debates – seminars	Free group discussion assessment

#### IV. Course Contents:

##### A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CLOs)
1	Introduction	The concept of communication skills. Components of communication skills.	1	2	a1,b1
2	Types of communication skills	Verbal and non-verbal communication skills Examples of each type. Effective listening and speaking skills. Principles and Barriers.	2	4	a1, b1
3	Oral presentation skills	Audience Analysis Preparing effective PowerPoint presentation Delivering of presentation Body language Handling questions	3	6	c2, d1, d2
4	Mid term Exam		1	2	

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4	<b>Academic communication skills</b>	Note taking skills Researching skills Summarizing skills Reporting skills Questioning skills	2	4	a1, c2, c3
5	<b>Interpersonal skills</b>	Time management skill problem solving skills Team work skills Negotiation skills	1	2	a1, c1, b1, d1, d2
6	<b>Employability skills</b>	Self-preparing for a job Looking for a job SWOT analysis for the job Preparing CV and cover letter for the job Preparing for attending job interview Work ethics	3	6	b1, c3
7	<b>Final Theoretical Exam</b>		1	2	all ILOs
<b>Number of Weeks /and Units Per Semester</b>			<b>14</b>	<b>28</b>	

## V. Teaching Strategies of the Course:

- Interactive lectures
- Presentation – group discussion and tutorials
- Group work
- Role play activities
- Small group activities, De-briefing
- Interactive discussion
- Small group activities
- Critical thinking activities
- An integrative approach to teaching all language skills – group work – role play dialogues
- Communicative approach
- Authentic situation activities
- Demonstration of smart phone applications
- Research projects

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- Debates – seminars

## VI. Assessment Methods of the Course:

- Oral presentation
- Assignments
- Formative and summative assessment
- Oral assessment and feedback
- informative assessment tasks for each skill
- OPE (Observed Performance Evaluation) during the sessions
- Individual presentation assignment.
- Project assignments
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## VII. Assignments:

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<b>Total</b>			<b>10</b>	

## VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
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2	Written assignments	7,8,9, 10	3	3%	a1, b1, c1, c3,
3	Project assignments	6, 8, 9, 10, 11, 12, 13	4	4%	c3, d1, d2
4	Quiz 1	6	5	5%	a1
5	Midterm Theoretical Exam	8	20	20%	a1, b1, , c2, d1, d2
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3. [https://www.researchgate.net/publication/344487866\\_EFFECTIVE\\_ORAL\\_PRESENTATION\\_AMONG\\_UNDERGRADUATES](https://www.researchgate.net/publication/344487866_EFFECTIVE_ORAL_PRESENTATION_AMONG_UNDERGRADUATES)
4. <https://www.teachhub.com/teaching-strategies/2022/09/why-communication-skills-are-essential-in-college/>
5. <https://collegepuzzle.stanford.edu/7-communication-skills-students-need-to-succeed-later-in-life/>
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of pharmacy**

**Bachelor of Pharmacy**

Course Specification of

**اللغة العربية 2**

Course No. (RAZ121)

الكلية : جميع الكليات  
القسم: جميع الأقسام  
البرنامج : جميع البرامج

**2022**



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X. معلومات عامة عن المقرر:				
1	اسم المقرر Course Title:	اللغة العربية (2)		
2	رمز المقرر ورقمه:	RAZ121		
3	الساعات المعتمدة:	محاضرة	سمنار/تمارين	عملي
		2		
4	المستوى والفصل الدراسي:	المستوى الأول – الفصل الثاني		
5	المتطلبات السابقة لدراسة المقرر (إن وجدت):	اللغة العربية (1).		
6	المتطلبات المصاحبة (إن وجدت):	لا يوجد		
7	البرنامج الذي يدرس له:	جميع برامج كليات الجامعة		
8	لغة تدريس المقرر:	اللغة العربية		
9	نظام الدراسة:	انتظام – فصلي		
10	معد توصيف المقرر:	أ.د. صالح علي النهاري		
11	تاريخ اعتماد توصيف:	2022م		
12	الجهة التي اعتمدت التوصيف:	جامعة الرازي		

XVII. وصف المقرر:	
<p>يعد هذا المقرر من المقررات المهمة في الجامعة . ويهدف إلى تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات الجملة الفعلية ومكملاتها والتوابع والقواعد الكتابية المتعلقة بالألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية وتوظيف تلك القواعد لتحسين الأداء نطقاً وكتابة من خلال القيام بتطبيقات لغوية (شعرية ونثرية ) وسيستخدم استراتيجيات التعليم والتعلم والتقويم المناسبة لربط الجانب النظري بالجانب التطبيقي. .</p>	
XVIII. أهداف المقرر:	
<p>يهدف المقرر إلى:</p> <p>7. تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات الجملة الفعلية ومكملاتها وتوظيفها.</p> <p>8. تزويد الطلبة بالقواعد الكتابية المتعلقة بكتابة الألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية وتوظيفها .</p> <p>9. استخدام مصادر التعلم المختلفة بهدف الإلمام بأشهر أبواب النحو واستيعاب القواعد الكتابية والكتابة الوظيفية..</p>	

XI. مخرجات التعلم المقصودة للمقرر (CILOs):	
المعرفة والفهم:	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات البرنامج (معرفة وفهم)	مخرجات المقرر (معرفة وفهم)
بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
أ.د/ صالح النهاري	أ.د/ هادي شمسان	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



a1 - يوضح القواعد النحوية المتعلقة بأساسيات الجملة الفعلية ومكملاتها.	A يظهر المعرفة والفهم بمفاهيم اللغة العربية والمواد الثقافية ويوظفها.
a2 - يوضح القواعد الأساسية المتعلقة بكتابة الألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية ويوظفها.	
<b>المهارات الذهنية Intellectual Skills:</b>	
مخرجات المقرر (مهارات ذهنية)	مخرجات البرنامج (مهارات ذهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
b1 - يوظف المفاهيم النحوية المتعلقة بأساسيات الجملة الفعلية ومكملاتها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية) ..	B يحلل المفاهيم المتعلقة باللغة العربية والمواد الثقافية
<b>المهارات العملية والمهنية Professional and Practical Skills:</b>	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات عملية ومهنية)	مخرجات البرنامج (مهارات عملية ومهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بأساسيات الجملة الفعلية ومكملاتها.	C يستخدم الموارد التعليمية ومصادر التعلم بشكل فعال.
<b>المهارات الانتقالية (العامة) Transferable (General) Skills:</b>	
يتم ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات انتقالية (عامة))	مخرجات البرنامج (مهارات انتقالية (عامة))
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على:
d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية..	D يتواصل بفاعلية ويمارس العمل في فريق في المواقف المختلفة..

<b>ربط مخرجات التعلم بإستراتيجيات التدريس والتقييم</b>		
أولاً: ربط مخرجات تعلم المقرر/المعرفة والفهم بإستراتيجية التدريس والتقييم:		
إستراتيجية التقييم	إستراتيجية التدريس	مخرجات المقرر / المعرفة والفهم
- اختبارات شفوية - تقويم التكليف - تقويم مشاركات الدارس في المناقشة	- الإلقاء الفاعل (المحاضرات) - الحوار والمناقشة - العروض الإيضاحية - مجموعات العمل - خرائط المفاهيم. - العصف الذهني - التكاليف	a1 - يوضح القواعد النحوية المتعلقة بأساسيات الجملة الفعلية ومكملاتها.  a2 - يوضح القواعد الأساسية المتعلقة بكتابة الألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية وتوظيفها.
ثانياً: ربط مخرجات تعلم المقرر/المهارات الذهنية بإستراتيجية التدريس والتقييم:		
إستراتيجية التقييم	إستراتيجية التدريس	مخرجات المقرر / المهارات الذهنية



اختبارات تحريرية قصيرة	-	الحوار والمناقشة	-	b1- يوظف المفاهيم النحوية المتعلقة
تقويم عمل تطبيقات على النصوص	-	عمل تطبيقات على النصوص	-	بأساسيات الجملة الفعلية ومكملاتها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..
تقويم مشاركات الدارس في المناقشة	-			
ثالثا: ربط مخرجات تعلم المقرر/المهارات المهنية والعملية بإستراتيجية التدريس والتقييم:				
إستراتيجية التقييم		إستراتيجية التدريس		مخرجات المقرر/ المهارات المهنية والعملية
تقويم التكاليف	-	التكاليف	-	c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بأساسيات الجملة الفعلية ومكملاتها.
تقويم البحوث	-	البحوث العلمية	-	
تقويم التطبيق	-	حل المشكلات	-	
رابعا: ربط مخرجات تعلم المقرر/المهارات الانتقالية (العامة) بإستراتيجية التدريس والتقييم:				
إستراتيجية التقييم		إستراتيجية التدريس		مخرجات المقرر/ المهارات الانتقالية (العامة)
تقويم البحوث	-	البحوث العلمية	-	d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية.
تقويم التكاليف	-	التكاليف	-	
تقويم التطبيق	-	تطبيقات عملية	-	

XX. كتابة مواضيع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.					
وحدات /مواضيع محتوى المقرر					
أولا: الجانب النظري:					
الرقم No.	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر CIOS
1	أساسيات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	- الفاعل	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات(نثرية وشعرية) .	1	2	
		- نائب الفاعل	1	2	
		- تطبيقات(نثرية وشعرية) .	1	2	
		- المفعول به	1	2	
		- تطبيقات(نثرية وشعرية) ..	1	2	
2	القواعد الكتابية	- 3 الألف اللينة.	1	2	a 1+a 2 +b 1+ c 1+d 1
3	مكملات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	- المفعول المطلق	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات(نثرية وشعرية) .	1	2	
		- المفعول لأجله	1	2	
		- تطبيقات(نثرية وشعرية) .	1	2	

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a 1+a 2 +b 1+ c 1+d 1	2	1	- تحريري	اختبار نصفي	4
a 1+a 2 +b 1+ c 1+d 1	2	1	- الحروف التي تزداد وتحذف في الكتابة	تابع / القواعد الكتابية	5
a 1+a 2 +b 1+ c 1+d 1	2	1	المفعول معه - تطبيقات(نثرية وشعرية) .	تابع / مكملات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	6
	2	1	- النداء تطبيقات(نثرية وشعرية) .		
a 1+a 2 +b 1+ c 1+d 1	2	1	- الأخطاء الكتابية الشائعة	تابع / القواعد الكتابية	
a 1+a 2 +b 1+ c 1+d 1	2	1	- تمييز العدد - تطبيقات(نثرية وشعرية) .	تابع / مكملات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	
	2	1	- التوابع - تطبيقات(نثرية وشعرية) .		
a 1+a 2 +b 1+ c 1+d 1	2	1	- التأخييص	الكتابة الوظيفية	7
	2	1	- السيرة الذاتية		
a 1+a 2 +b 1+ c 1+d 1	2	1	تحريري	اختبار نهاية الفصل	9
	32 ساعة	16	إجمالي عدد الأسابيع والساعات		

### XXI. استراتيجيات التدريس:

21-الإلقاء الفاعل (المحاضرات)
22-الحوار والمناقشة
23-العصف الذهني
24-العروض الايضاحية
25- خرائط المفاهيم.
26-التكاليف
27- عمل تطبيقات على النصوص
28-البحوث العلمية
29- حل المشكلات
30-التعلم التعاوني

### 5-الأنشطة:

الرقم	النشاط / التكاليف	مخرجات التعلم	الأسبوع	الدرجة
1	قيام الطالب بعمل التكاليف والأبحاث حول الموضوعات المقررة عليهم.	d1،c2، b1،b2	كل محاضرة	10

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10	كل محاضرة	d1,c2, b1,b2	قيام الطالب بحل التطبيقات والتدريبات المتعلقة بالمقرر بطريقة فردية أو جماعية.	2
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6- تقييم التعلم:					
الرقم No.	أنشطة التقييم	الأسبوع	الدرجة	نسبة الدرجة إلى درجة التقويم النهائي	المخرجات التي يحققها
1	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة	ابتداء من المحاضرة الرابعة	20	%20	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة
2	اختبار نصفي	بعد المحاضرة السادسة	20	%20	اختبار نصفي
3	الاختبار النهائي	بعد آخر أسبوع	60	%60	الاختبار النهائي
	المجموع		100	%100	

XXII. مصادر التعلم Learning Resources:	
المراجع الرئيسية:	
1. اللغة العربية (2) :أ.د. صالح علي النهاري : الناشر : جامعة الرازي الطبعة الأولى 2020م.	
المراجع المساعدة:	
2- النحو الشافي، محمود حسني مغالسة ( 1418 هـ). الطبعة الثالثة، مؤسسة الرسالة، بيروت، لبنان.	
3- الإملاء و الترقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م..	
4- فن التحرير العربي، د. محمد صالح الشنطي، دار النفائس، بيروت، 2004 م.	
5- الإملاء و الترقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م.	
6- تقديم وعناية عبد الفتاح أبو غدة، الترقيم وعلاماته في اللغة العربية، أحمد زكي باشا، مكتب المطبوعات الإسلامية، حلب، ط. الثالثة، 1416 هـ / 1995م.	
7- فن الكتابة الصحيحة، دار المعرفة الجامعية، محمود سليمان ياقوت، الإسكندرية، 2003م.	
8- في أساسيات اللغة العربية، الكتابة الإملائية والوظيفية، عبد العزيز نبوي، مؤسسة المختار، القاهرة 2003م.	
9- الخلاصة في قواعد الإملاء وعلامات الترقيم، نبيل مسعد السيد غزي، دار غريب، القاهرة 2000م.	
مواد إلكترونية وإنترنت: (إن وجدت) Electronic Materials and Web Sites	
عرض باوربوينت. سيديهاات .	
مكتبة المصطفى	<a href="http://www.al-mostafa.com/index.htm">http://www.al-mostafa.com/index.htm</a>
موقع الوراق	<a href="http://www.alwaraq.net/index">http://www.alwaraq.net/index</a>
مكتبة مشكاة الإسلام	<a href="http://www.almeshkat.net/books/index.php">http://www.almeshkat.net/books/index.php</a>
الألوكة	<a href="http://www.alukah.net">/http://www.alukah.net</a>

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الإيوان	<a href="http://www.iwan.fajjal.com">/http://www.iwan.fajjal.com</a>
صوت العربية	<a href="http://www.alarabiyah.ws">/http://www.alarabiyah.ws</a>
شبكة الفصيح	<a href="http://www.alfaseeh.com/vb/index.php">http://www.alfaseeh.com/vb/index.php</a>

### III. Course Policies:

1	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.





## Second Part of Course Specification

Faculty of Medical Science  
Department of Pharmacy  
Program of Pharmacy Bachelor

Course Plan (Syllabus) of  
اللغة العربية 2  
Course Code No. (RAZ121)

Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	أ.د/ صالح النهاري	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

XXIII. وصف المقرر:
يعد هذا المقرر من المقررات المهمة في الجامعة . ويهدف إلى تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات الجملة الفعلية ومكملاتها والتوابع والقواعد الكتابية المتعلقة بالألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية وتوظيف تلك القواعد لتحسين الأداء نطقاً وكتابة من خلال القيام بتطبيقات لغوية (شعرية ونثرية ) وسيستخدم استراتيجيات التعليم والتعلم والتقويم المناسبة لربط الجانب النظري بالجانب التطبيقي. .

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XXIV. أهداف المقرر:
<p>يهدف المقرر إلى:</p> <p>10. تزويد الطلبة بالمعارف والمهارات المتعلقة بأساسيات الجملة الفعلية ومكملاتها وتوظيفها.</p> <p>11. تزويد الطلبة بالقواعد الكتابية المتعلقة بكتابة الألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية وتوظيفها .</p> <p>12. استخدام مصادر التعلم المختلفة بهدف الإلمام بأشهر أبواب النحو واستيعاب القواعد الكتابية والكتابة الوظيفية..</p>

XV. مخرجات التعلم المقصودة للمقرر (CILOs):
المعرفة والفهم:
مخرجات المقرر (معرفة وفهم): بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:
a1 - يوضح القواعد النحوية المتعلقة بأساسيات الجملة الفعلية ومكملاتها.
a2 - يوضح القواعد الأساسية المتعلقة بكتابة الألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية ويوظفها.
المهارات الذهنية Intellectual Skills:
مخرجات المقرر (مهارات ذهنية) : بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:
b1 - يوظف المفاهيم النحوية المتعلقة بأساسيات الجملة الفعلية ومكملاتها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..
المهارات العملية والمهنية Professional and Practical Skills:
مخرجات المقرر (مهارات عملية ومهنية) : بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:
c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بأساسيات الجملة الفعلية ومكملاتها.
المهارات الانتقالية (العامة) Transferable (General) Skills:
مخرجات المقرر (مهارات انتقالية (عامة): بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على:
d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية..

ربط مخرجات التعلم بإستراتيجيات التدريس والتقييم		
أولاً: ربط مخرجات تعلم المقرر/المعرفة والفهم بإستراتيجية التدريس والتقييم:		
مخرجات المقرر / المعرفة والفهم	إستراتيجية التدريس	إستراتيجية التقييم
a1 - يوضح القواعد النحوية المتعلقة بأساسيات الجملة الفعلية ومكملاتها.	- الإلقاء الفاعل) (المحاضرات)	- اختبارات شفوية
a2 - يوضح القواعد الأساسية المتعلقة بكتابة الألف اللينة والحروف التي تزداد وتحذف في الكتابة والأخطاء الكتابية الشائعة وقواعد التلخيص وكتابة السيرة الذاتية وتوظيفها.	- الحوار والمناقشة - العروض الايضاحية - مجموعات العمل - خرائط المفاهيم. - العصف الذهني - التكاليف	- تقويم التكليف - تقويم مشاركات الدارس في المناقشة
ثانياً: ربط مخرجات تعلم المقرر/المهارات الذهنية بإستراتيجية التدريس والتقييم:		
مخرجات المقرر / المهارات الذهنية	إستراتيجية التدريس	إستراتيجية التقييم



اختبارات تحريرية قصيرة	-	الحوار والمناقشة	-	b1- يوظف المفاهيم النحوية المتعلقة
تقويم عمل تطبيقات على النصوص	-	عمل تطبيقات على النصوص	-	بأساسيات الجملة الفعلية ومكملاتها من خلال الاطلاع على أشهر النصوص الأدبية (النثرية والشعرية)..
تقويم مشاركات الدارس في المناقشة	-			
ثالثا: ربط مخرجات تعلم المقرر/المهارات المهنية والعملية بإستراتيجية التدريس والتقييم:				
إستراتيجية التقييم		إستراتيجية التدريس		مخرجات المقرر/ المهارات المهنية والعملية
تقويم التكاليف	-	التكاليف	-	c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بأساسيات الجملة الفعلية ومكملاتها.
تقويم البحوث	-	البحوث العلمية	-	
تقويم التطبيق	-	حل المشكلات	-	
رابعا: ربط مخرجات تعلم المقرر/المهارات الانتقالية (العامة) بإستراتيجية التدريس والتقييم:				
إستراتيجية التقييم		إستراتيجية التدريس		مخرجات المقرر/ المهارات الانتقالية (العامة)
تقويم البحوث	-	البحوث العلمية	-	d1 - يطبق مهارات التواصل بوضوح وبدون أخطاء نحوية وكتابية.
تقويم التكاليف	-	التكاليف	-	
تقويم التطبيق	-	تطبيقات عملية	-	

XX. كتابة مواضيع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.					
وحدات /مواضيع محتوى المقرر					
أولا: الجانب النظري:					
الرقم No.	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر CIOS
1	أساسيات الجملة الفعلية وتطبيقات (نثرية وشعرية) عليها	- الفاعل	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات(نثرية وشعرية) .	1	2	
		- نائب الفاعل	1	2	
		- تطبيقات(نثرية وشعرية) .	1	2	
		- المفعول به	1	2	
		- تطبيقات(نثرية وشعرية) ..	1	2	
2	القواعد الكتابية	- 3 الألف اللينة.	1	2	a 1+a 2 +b 1+ c 1+d 1
3	مكملات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	- المفعول المطلق	1	2	a 1+a 2 +b 1+ c 1+d 1
		- تطبيقات(نثرية وشعرية) .	1	2	
		- المفعول لأجله	1	2	
		- تطبيقات(نثرية وشعرية) .	1	2	

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a 1+a 2 +b 1+ c 1+d 1	2	1	- تحريري	اختبار نصفي	4
a 1+a 2 +b 1+ c 1+d 1	2	1	- الحروف التي تزداد وتحذف في الكتابة	تابع / القواعد الكتابية	5
a 1+a 2 +b 1+ c 1+d 1	2	1	المفعول معه - تطبيقات(نثرية وشعرية) .	تابع / مكملات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	6
	2	1	- النداء تطبيقات(نثرية وشعرية) .		
a 1+a 2 +b 1+ c 1+d 1	2	1	- الأخطاء الكتابية الشائعة	تابع / القواعد الكتابية	
a 1+a 2 +b 1+ c 1+d 1	2	1	- تمييز العدد - تطبيقات(نثرية وشعرية) .	تابع / مكملات الجملة الفعلية وتطبيقات(نثرية وشعرية) عليها	
	2	1	- التوابع - تطبيقات(نثرية وشعرية) .		
a 1+a 2 +b 1+ c 1+d 1	2	1	- التأخييص	الكتابة الوظيفية	7
	2	1	- السيرة الذاتية		
a 1+a 2 +b 1+ c 1+d 1	2	1	تحريري	اختبار نهاية الفصل	9
		32 ساعة	16	إجمالي عدد الأسابيع والساعات	

<b>.XX</b> استراتيجيات التدريس:	
31-الإلقاء الفاعل (المحاضرات)	
32-الحوار والمناقشة	
33-العصف الذهني	
34-العروض الايضاحية	
35- خرائط المفاهيم.	
36-التكاليف	
37- عمل تطبيقات على النصوص	
38-البحوث العلمية	
39- حل المشكلات	
40-التعلم التعاوني	

<b>7-الأنشطة :</b>				
الرقم	النشاط / التكاليف	مخرجات التعلم	الأسبوع	الدرجة
1	قيام الطالب بعمل التكاليف والأبحاث حول الموضوعات المقررة عليهم.	d1،c2، b1،b2	كل محاضرة	10

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10	كل محاضرة	d1,c2, b1,b2	قيام الطالب بحل التطبيقات والتدريبات المتعلقة بالمقرر بطريقة فردية أو جماعية.	2
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8- تقييم التعلم:					
الرقم No.	أنشطة التقييم	الأسبوع	الدرجة	نسبة الدرجة إلى درجة التقييم النهائي	المخرجات التي يحققها
1	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة	ابتداء من المحاضرة الرابعة	20	%20	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة
2	اختبار نصفي	بعد المحاضرة السادسة	20	%20	اختبار نصفي
3	الاختبار النهائي	بعد آخر أسبوع	60	%60	الاختبار النهائي
	المجموع		100	%100	

XXVI. مصادر التعلم Learning Resources:	
المراجع الرئيسية:	
1. اللغة العربية (2) :أ.د. صالح علي النهاري : الناشر : جامعة الرازي الطبعة الأولى 2020م.	
المراجع المساعدة:	
2- النحو الشافي، محمود حسني مغالسة ( 1418 هـ). الطبعة الثالثة، مؤسسة الرسالة، بيروت، لبنان.	
10- الإملاء و التزقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م..	
11- فن التحرير العربي، د. محمد صالح الشنطي، دار النفائس، بيروت، 2004 م.	
12- الإملاء و التزقيم في الكتابة العربية، عبد العليم إبراهيم، مكتبة غريب، القاهرة، 1995م.	
13- تقديم وعناية عبد الفتاح أبو غدة، التزقيم وعلاماته في اللغة العربية، أحمد زكي باشا، مكتب المطبوعات الإسلامية، حلب، ط. الثالثة، 1416 هـ / 1995م.	
14- فن الكتابة الصحيحة، دار المعرفة الجامعية، محمود سليمان ياقوت، الإسكندرية، 2003م.	
15- في أساسيات اللغة العربية، الكتابة الإملائية والوظيفية، عبد العزيز نبوي، مؤسسة المختار، القاهرة 2003م.	
16- الخلاصة في قواعد الإملاء وعلامات التزقيم، نبيل مسعد السيد غزي، دار غريب، القاهرة 2000م.	
مواد إلكترونية وإنترنت: (إن وجدت) Electronic Materials and Web Sites	
عرض باوربوينت. سيديهاات .	
مكتبة المصطفى	<a href="http://www.al-mostafa.com/index.htm">http://www.al-mostafa.com/index.htm</a>
موقع الوراق	<a href="http://www.alwaraq.net/index">http://www.alwaraq.net/index</a>
مكتبة مشكاة الإسلام	<a href="http://www.almeshkat.net/books/index.php">http://www.almeshkat.net/books/index.php</a>
الألوكة	<a href="http://www.alukah.net">/http://www.alukah.net</a>

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الإيوان	<a href="http://www.iwan.fajjal.com">/http://www.iwan.fajjal.com</a>
صوت العربية	<a href="http://www.alarabiyah.ws">/http://www.alarabiyah.ws</a>
شبكة الفصيح	<a href="http://www.alfaseeh.com/vb/index.php">http://www.alfaseeh.com/vb/index.php</a>

IV. Course Policies:	
1	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	<b>Exam Attendance/Punctuality:</b> Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.

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السنة الثانية  
الفصل الأول

SECOND level ( 1 <sup>st</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr.	Cr.hr	
17.	Pharmaceutical Organic chemistry	كيمياء عضوية صيدلانية	PHM214	3	2	4	Pre: PHM126
18.	Physiology I	علم وظائف الأعضاء 1	MSC213	2	-	2	Pre: PHC127
19.	Physical Pharmacy	صيدلة فيزيائية	PHT211	2	2	3	Pre: PHT123
20.	Psychology	علم نفس	MSC212	2	-	2	-----
21.	Botany	علم النبات	PHG216	2	2	3	Pre: MSC116
22.	Pharmaceutical Calculations	مهارات الحسابات الصيدلانية	PHT217	2	-	2	Pre: PHT124
23.	Medical Biochemistry	كيمياء حيوية طبية	MSC215	2	2	3	Pre: PHM126
24.	National culture2	ثقافة وطنية2	RAZ218	2	-	2	-----
Total				17	8	21	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisite



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

## Faculty of Medicine and Health Sciences

### Department of **Pharmacy**

#### Bachelor of Pharmacy

Course Specification of  
**PHARMACEUTICAL ORGANIC CHEMISTRY**  
Course No. (PHM214)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Organic Chemistry			
2	Course Code & Number:	PHM214			
3	Credit Hours: 4	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		4	3	--	2
4	Study Level/ Semester at which this Course is offered:	Second Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHM126			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

II. Course Description:
<p>The course is the course (Phar. Organic chemistry) which provide the student with knowledge and skills of organic chemistry. This course focuses on the functional chemical groups, chemical composition, physical and chemical properties, synthesis, reactions of complicated organic compounds (monocyclic, polycyclic, homocyclic and heterocyclic). The practical part also provides the student with the skills necessary to deal with these compounds and perform tests to identify their reactions in the chemistry lab.</p>

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IV. Intended learning outcomes of the course: (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
6. Alignment CILOs to PILOs		
	PILOs	(CILOs)
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Discuss the physicochemical properties of monocyclic, polycyclic, homocyclic and heterocyclic organic compounds.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body	<b>b1.</b> Differentiate, name and draw the chemical structure of monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compounds. <b>b2.</b> Relate structures of monocyclic, polycyclic, homocyclic and heterocyclic compounds to their physical and chemical properties. . <b>b3.</b> Predict the outcomes of a reaction of monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compound and other chemicals.
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b4.</b> Design a scheme to synthesize monocyclic, polycyclic, homocyclic and heterocyclic organic compounds from a parent compound.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory

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	according to GLP, GSP, GDP and cGMP guidelines.	
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c3.</b> Search efficiently for information using documented and electronic sources of information.
		<b>c4.</b> Perform synthesis of some monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compound and other chemicals.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
		<b>d2.</b> Demonstrate the skills of time management and self-learning.
		<b>d3.</b> Participate efficiently with his colleagues in a team work.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.

### 7. Alignment CILOs to teaching strategies and assessment strategies

#### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Discuss the physicochemical properties of monocyclic, polycyclic, homocyclic and heterocyclic organic compounds.	Active Lecture	Written exams

#### (b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Differentiate, name and draw the chemical structure of organic compounds.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b4.</b> Design a sequence to synthesize an organic compound from a parent compound.		





b2. Relate functional group in organic compounds to the physical and chemical properties of the compounds.	Lecture-discussion Feed-back learning	Written exams, quizzes
b3. Predict the catalysts required and the outcomes of a reaction between an organic compound and other chemicals.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3. Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments
c4. Perform synthesis of some monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compound and other chemicals.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d3. Participate efficiently with his colleagues in a team work.		
d2. Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d4. Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.		



IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	Monocyclic Alicyclic compounds	a1, b1, b2,d1	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
2	Benzyl and Benzhydryl derivatives	a1, b1, b2, b4,d2	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
3	Phenethyl and Phenylpropyl- amines	a1, b2, b4, d3	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	2	6
4	Aryl acetic and Aryl propionic Acids	a1, b1, b2, b3,d1	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	2	6
5	Mid-Term Exam	a1, b1, b2, b3, d3		1	2
6	Aryl ethylene's compounds	a1, b2, b3, b4, d4	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
7	Polycyclic Aromatic compounds	a1, b2, b2, b3, b4, d3	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	2	6
8	Steroids	a1, b1, b2, b3, b4, d2	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
9	Heterocyclic compounds: 5, 6, 7 – fused to one ring and two rings	a1, b2, b3, b4, d1	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	3	9

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No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
10	Course Review	a1, b1, b2, b3, b4	Review of the course topics by discussion session.	1	3
11	Final Exam			1	2
<b>Total</b>				<b>16</b>	<b>46</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>10 units</b>

<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
15.	Monocyclic Alicyclic compounds e.g., Hyoscine	c1, c2, d1, d2	1	2
16.	Benzyl and Benzhydryl derivatives e.g., Orphenadrine	c2, c3, c4, d2, d3	1	2
17.	Phenethyl and Phenylpropyl amines e.g., adrenaline	c1, c2, c3, d1, d3	1	2
18.	Phenethyl and Phenylpropyl amines e.g. methyl dopa	c1, c2, c4, d2, d3	1	2
19.	Aryl acetic and Aryl propionic Acids e.g., Ibuprofen, Sod. Diclofenac	c1, c2, c3, d1, d4	2	4
20.	Polycyclic Aromatic compounds e.g., Tetracycline	c2, c3, c4, d1, d4	1	2
21.	Heterocyclic compounds e.g., Mebendazole, Metronidazole	c3, c4, d1, d2	1	2
22.	Heterocyclic compounds e.g. indomethacin	c1, c2, c3, d1, d2, d3	1	2
23.	Heterocyclic compounds e.g. aminophylline	c2, c4, d1, d4	1	2
24.	Heterocyclic compounds e.g. ascorbic acid	c1, c4, d2, d3	1	2
<b>PRACTICAL EXAM</b>		c1, c2, c3, c4, d1, d2, d3, d4	1	2
<b>Total</b>			<b>12</b>	<b>24</b>
<b>Number of Weeks /and Units Per Semester</b>			<b>12 weeks</b>	<b>10 units</b>



## XII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

## XIII. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : the teacher provides the students with chemical problems related to the studied topics. Every student is assigned to solve some of those problems individually.	d1, d2, c3, c4	7
2	<b>Group</b> : each group of students will be assigned to do a search-report supported by illustrating figures for all drugs belonging to one of the studied homocyclic/hetrocyclic organic compounds.	d1, d2, d3, d4, c3, c4	12

## VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	d1, d2, d3, c3, c4
2	Mid-term exam (written exam)		7	10	10	a1, b1, b2, b3, b4, d2
3	Final exam (written exam)		16	50	50	a1, b1, b2, b3, b4, d2
TOTAL				70	70 %	70



Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b1,b4,c1,c2,d1,d2, d3, d4
2		Accomplishments		5	5	
	Final exam (practical)		12	20	20	c1,c2, c3,c4, d1, d2
Total				30	30 %	

XX. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
6. Daniel Ledincer: Organic chemistry of drug synthesis, Vol. 7, 2007, John Wiley & Sons
<b>2- Essential References.</b>
1. John A. Joule and Keith Mills Heterocyclic Chemistry. 2013, John Wiley & Sons
1. United states pharmacopeia USP, 2018
<b>3- Electronic Materials and Web Sites etc.</b>
1. <a href="https://uomustansiriyah.edu.iq/media/lectures/4/4_2017_09_29!08_20_51_PM.ppt">https://uomustansiriyah.edu.iq/media/lectures/4/4_2017_09_29!08_20_51_PM.ppt</a>
2. <a href="http://www.chem.gla.ac.uk/staff/stephenc/teaching/HeterocycleLectures2011_2C12.pdf">http://www.chem.gla.ac.uk/staff/stephenc/teaching/HeterocycleLectures2011_2C12.pdf</a>

XXI. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
E 7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة







Second Part of Course Specification  
Faculty of Medicine and Health Science  
Department of **Pharmacy**  
**Bachelor of Pharmacy**  
Course Plan (Syllabus) of  
**Pharmaceutical Organic Chemistry**

Course Code No. (PHM214)

VI. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ahmed Al-Ghani	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
The course is course (Phar. Organic chemistry) which provide the student with knowledge and skills of organic chemistry. This course focuses on the functional chemical groups, chemical composition, physical and chemical properties, synthesis, reactions of complicated organic compounds (monocyclic, polycyclic, homocyclic and heterocyclic). The practical part also provides the student with the skills necessary to deal with these compounds and perform tests to identify their reactions in the chemistry lab.

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III. Intended learning outcomes of the course: (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
1. Alignment CILOs to PILOs		
PILOs	(CILOs)	
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Discuss the physicochemical properties of monocyclic, polycyclic, homocyclic and heterocyclic organic compounds.
<b>Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body	<b>b1.</b> Differentiate, name and draw the chemical structure of monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compounds.
		<b>b2.</b> Relate structures of monocyclic, polycyclic, homocyclic and heterocyclic compounds to their physical and chemical properties. .
		<b>b3.</b> Predict the outcomes of a reaction of monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compound and other chemicals.
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b4.</b> Design a scheme to synthesize monocyclic, polycyclic, homocyclic and heterocyclic organic compounds from a parent compound.
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory

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	assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c3.</b> Search efficiently for information using documented and electronic sources of information.
		<b>c4.</b> Perform synthesis of some monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compound and other chemicals.
<b>Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
		<b>d2.</b> Demonstrate the skills of time management and self-learning.
		<b>d3.</b> Participate efficiently with his colleagues in a team work.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.

## 2. Alignment CILOs to teaching strategies and assessment strategies

### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Discuss the physicochemical properties of monocyclic, polycyclic, homocyclic and heterocyclic organic compounds.	Active Lecture	Written exams

### (b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Differentiate, name and draw the chemical structure of organic compounds.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b4.</b> Design a sequence to synthesize an organic compound from a parent compound.		

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<b>b2.</b> Relate functional group in organic compounds to the physical and chemical properties of the compounds.	Lecture-discussion Feed-back learning	Written exams, quizzes
<b>b3.</b> Predict the catalysts required and the outcomes of a reaction between an organic compound and other chemicals.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory		
<b>c3.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments
<b>c4.</b> Perform synthesis of some monocyclic, polycyclic, homocyclic and heterocyclic compounds. organic compound and other chemicals.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d3.</b> Participate efficiently with his colleagues in a team work.		
<b>d2.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems that are related to completion of a chemical reaction, nomenclature, draw structures, mechanisms of reactions and others.		



IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	Monocyclic Alicyclic compounds	a1, b1, b2, d1	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
2	Benzyl and Benzhydryl derivatives	a1, b1, b2, b4, d2	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
3	Phenethyl and Phenylpropylamines	a1, b2, b4, d3	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	2	6
4	Arylacetic and Arylpropionic Acids	a1, b1, b2, b3, d1	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	2	6
5	Mid-Term Theoretical Exam	a1, b1, b2, b3, d3		1	2
6	Arylethylenes compounds	a1, b2, b3, b4, d4	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
7	Polycyclic Aromatic compounds	a1, b2, b2, b3, b4, d3	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	2	6
8	Steroids	a1, b1, b2, b3, b4, d2	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	1	3
9	Heterocyclic compounds: 5, 6, 7 – fused to one	a1, b2, b3, b4, d1	Classification, physicochemical properties, preparation, reactions, examples of drugs and their medical uses.	3	9

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10	Course Review	a1, b1, b2, b3, b4	Review of the course topics by discussion session.	1	3
11	Final Exam			1	2
Total				16	46
Number of Weeks /and Units Per Semester				16 weeks	10 units

B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1.	Monocyclic Alicyclic compounds e.g., Hyoscine	c1, c2, d1, d2	1	2
2.	Benzyl and Benzhydryl derivatives e.g., Orphenadrine	c2, c3, c4, d2, d3	1	2
3.	Phenethyl and Phenylpropyl amines e.g., adrenaline	c1, c2, c3, d1, d3	1	2
4.	Phenethyl and Phenylpropyl amines e.g. methyl dopa	c1, c2, c4, d2, d3	1	2
5.	Aryl acetic and Aryl propionic Acids e.g., Ibuprofen, Sod. diclofenac	c1, c2, c3, d1, d4	2	4
6.	Polycyclic Aromatic compounds e.g., Tetracycline	c2, c3, c4, d1, d4	1	2
7.	Heterocyclic compounds e.g., Mebendazole, Metronidazole	c3, c4, d1, d2	1	2
8.	Heterocyclic compounds e.g. indomethacin	c1, c2, c3, d1, d2, d3	1	2
9.	Heterocyclic compounds e.g. aminophylline	c2, c4, d1, d4	1	2
10.	Heterocyclic compounds e.g. ascorbic acid	c1, c4, d2, d3	1	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2, d3, d4	1	2
Total			12	24
Number of Weeks			12 weeks	10 units

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### V. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : the teacher provides the students with chemical problems related to the studied topics. Every student is assigned to solve some of those problems individually.	d1, d2, c3, c4	7
2	<b>Group</b> : each group of students will be assigned to do a search-report supported by illustrating figures for all drugs belonging to one of the studied homocyclic/heterocyclic organic compounds.	d1, d2, d3, d4, c3, c4	12

### VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	d1, d2, d3, c3, c4
2	Mid-term exam (written exam)		7	10	10	a1, b1, b2, b3, b4
3	Final exam (written exam)		16	50	50	a1, b1, b2, b3, b4
TOTAL				70	70 %	70

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Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1,c2,d1,d2,d3,d4,b1, b4
2		Accomplishments		5	5	
	Final exam (practical)		12	20	20	c1,c2,c3,c4,d2,b1,b4
Total				30	30 %	

VIII. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
1. Daniel Ledincer: Organic chemistry of drug synthesis, Vol. 7, 2007, John Wiley & Sons
<b>2- Essential References.</b>
1. John A. Joule and Keith Mills Heterocyclic Chemistry. 2013, John Wiley & Sons
2. United states pharmacopeia USP, 2018
<b>3- Electronic Materials and Web Sites etc.</b>
1. <a href="https://uomustansiriyah.edu.iq/media/lectures/4/4_2017_09_29!08_20_51_PM.ppt">https://uomustansiriyah.edu.iq/media/lectures/4/4_2017_09_29!08_20_51_PM.ppt</a>
2. <a href="http://www.chem.gla.ac.uk/staff/stephenc/teaching/HeterocycleLectures2011_2C12.pdf">http://www.chem.gla.ac.uk/staff/stephenc/teaching/HeterocycleLectures2011_2C12.pdf</a>

IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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قسم الصيدلة

## Faculty of Medicine and Health Science

All Department

Faculty Requirements  
Course Specification of

# Physiology I

Course No. (MSC213)

2022



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## Course Specification

### PHYSIOLOGY I

VI. Course Identification and General Information:							
14.	Course Title:	PHYSIOLOGY I					
15.	Course Code & Number:	MSC213					
16.	Credit hours:	C.H				TOTAL	
		Theoretical			P		Tr.
		L.	Tut.	S.			
2	-	-	-	-	2		
17.	Study level/ semester at which this course is offered:	2 <sup>nd</sup> Level / 1 <sup>st</sup> Semester					
18.	Pre –requisite (if any):	<ul style="list-style-type: none"> <li>• General biology</li> <li>• Anatomy &amp; histology</li> </ul>					
19.	Co –requisite (if any):	-----					
20.	Program (s) in which the course is offered:	All BC programs offered by the university					
21.	Language of teaching the course:	ENGLISH					
22.	Location of teaching the course:	IN THE UNIVERSITY					
23.	Prepared By:	Dr. Hussein Gumaih					
24.	Date of Approval	2022					

L: lecturing ; Tut: Tutorial , S: seminar ; P: practical ; Tr.: training

### VII. Course Description:

The course concerns with study of cell repair mechanism, transport mechanism through cell membrane, body fluids , acid-base balance as well as with functions and regulation of organs o the nervous system, endocrine and skeletal system.

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
8. Alignment CILOs to PILOs		
No.	PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<p><b>a1.</b> Discuss the concept of homeostasis and feedback mechanisms observed in normal functions of human body organs.</p> <p><b>a2.</b> . Identify the mechanisms of transport of material into and out of human cells.</p> <p><b>a3.</b> Determine the normal functions and regulation of nervous system, endocrine glands and muscles.</p>
A3	A3. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a4.</b> Explain the biological role of certain endogenous substances in regulation the normal functions of nervous system, endocrine glands and muscles.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
B1	Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.	<p><b>b1.</b>Identify the signs of normal functions of nervous system, endocrine glands and muscles.</p> <p><b>b2.</b> Interpret the outcomes of normal functions of nervous system, endocrine glands and muscles.</p>
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	<p><b>b3.</b> Classify neurotransmitters and hormones physiologically.</p> <p><b>b4.</b> Compare physiologically between different types of nervous system, endocrine glands and muscles.</p> <p><b>b5.</b> .Relate the normal functions in nervous system, endocrine glands and muscles to their affecting factors.</p> <p><b>b6.</b> . Assess the normal functions of nervous system, endocrine glands and muscles</p>

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<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C3</b>	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	<b>c1.</b> Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Share successfully in team-work.
<b>D2</b>	Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d2.</b> Show respect to life.

<b>9. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Discuss the concept of homeostasis and feedback mechanisms observed in normal functions of human body organs.	<b>Lecture feed-back learning</b>	<b>written exam , , assignment</b>
<b>a2.</b> . Identify the mechanisms of transport of material into and out of human cells.		
<b>a3.</b> Determine the normal functions and regulation of nervous system, endocrine glands and muscles.		
<b>a4.</b> Explain the biological role of certain endogenous substances in regulation the normal functions of nervous system, endocrine glands and muscles.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

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<b>b1.</b> Identify the signs of normal functions of nervous system, endocrine glands and muscles.	Lecture Feed-back learning, Group- project.	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Interpret the outcomes of normal functions of nervous system, endocrine glands and muscles.		
<b>b3.</b> Classify neurotransmitters and hormones physiologically.		
<b>b4.</b> Compare physiologically between different types of nervous system, endocrine glands and muscles.		
<b>b5.</b> Relate the normal functions in nervous system, endocrine glands and muscles to their affecting factors.		
<b>b6.</b> Assess the normal functions of nervous system, endocrine glands and muscles		

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media.	Feed-back learning ,Group-project.	quizzes

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Share successfully in team-work.	Group-project ,, feed-back learning	Assignment Written exam
<b>d2.</b> Show respect to life.		

**XXII. Course Content:**

Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction</b>	a1, a4, b4, b5	physiology definition, the concept of homeostasis. Negative feedback.	1	2
2	<b>The Cell and body fluids physiology</b>	a2, a4, b1,b2, b4, b4, b5, d1, d2	<ul style="list-style-type: none"> <li>structure, functions, membrane transport mechanisms: (passive diffusion , mediated transport, osmosis)</li> <li>membrane potential(resting, action)</li> <li>Cell repair : mechanisms.</li> <li>Composition and regulations of Body</li> </ul>	2	4

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			fluids, electrolytes and acid-base balance		
3	<b>The Nervous system</b>	a3, a4, b4, b5, b6, d1, d2	<ul style="list-style-type: none"> <li>• Classification of nervous system</li> <li>• classes of neurons</li> <li>• Synaptic transmission ( chemical synapsis, summation, interconnection between neurons, factors affecting the transmission)</li> </ul>	1	2
4	<b>Central nervous system (CNS) Part (1)</b>	a3, a4, b4, b5, b6, c1, d1, d2	<ul style="list-style-type: none"> <li>• Components of CNS</li> <li>• level of CNS functions</li> <li>• functions of brain composition (cerebrum, cerebral cortex, etc. ),</li> <li>• blood brain barrier</li> <li>• spinal cord (function, composition, spinal reflex, cerebrospinal fluid)</li> </ul>	2	4
<b>MID-TERM EXAM</b>				1	2
4	<b>Central nervous system (CNS) Part (2)</b>	a3, a4, b4, b5, b6, d1, d2	<ul style="list-style-type: none"> <li>• Sensation: nociception, hyperalgesia, pain pathway, neurotransmitters of pain, types of pain (cutaneous, visceral, deep, , referred , phantom) , endogenous analgesic system</li> <li>• Regulating areas in brain (function, neurotransmitters) : nociceptionarea, psychic area, heat regulating center, area controlling muscles relaxation and contraction vasomotor center, Chemoreceptor trigger zone and other areas involved in diseases.</li> </ul>	2	4

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5	<b>Autonomic nervous system</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>definition and composition &amp; regulation</li> <li>sympathetic system (functions, neurotransmitters, receptors), adrenal medulla ,</li> <li>parasympathetic system (functions, neurotransmitters, receptors)</li> </ul>	2	4
6	<b>Endocrine system</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>hormones (biochemical classification, transport, mechanism of actions)</li> <li>functions and regulation of</li> <li>hormones of (pituitary gland, thyroid gland, parathyroid gland, pancreas, sex organs)</li> </ul>	2	4
7	<b>Muscles</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>types , functions</li> <li>factors affecting contraction and relaxation</li> </ul>	1	2
<b>Course Review</b>		a3, a4, b4, b5, b6,d1, d2	Review of the course topics by discussion session.	1	2
FINAL - EXAM				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>7 Units</b>

### XIII. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.  
The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

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**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

#### XIV. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to do a search on one endogenous mediator that is involved in one of the physiological studied and provide a summary report on it.	a3, c1, d1	4-13	6
2	<b>Group :</b> each group of students will be assigned todo a search on one of the physiological processes studied and make a summary report.	a4, c1	14	4

#### XII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, a3, a4, b4, b5, b6,c1, d1, d2
2	Assignments (1 + 2)	4, 14	10	10	a3, a4, c1, d1
3	Quiz 1 + Quiz 2	7, 12	5	5	b3, b4, b5
4	Mid-semester exam of theoretical part ( written exam)	7	20	20	a1, a2, a3, a4, b4, b5, b6,c1, d1, d2
5	Final exam of theoretical part ( written exam)	17	60	60	a1, a2, a3, a4, b4, b5, b6,c1, d1, d2
<b>TOTAL</b>			100	100 %	100

#### XXII. Learning Resources:

##### 1- Required Textbook(s) ( maximum two ).

- C.C.Chatterjee. Human physiology
- Laurie kelly . Essential of human physiology for pharmacy, 2004, CRC press

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## 2- Essential References.

1. Hassan Hamdi, Fundamentals of human physiology
2. Salah Abu-Sitta , Synopsis of medical physiology
3. W. F. Ganong. Review of medical physiology

## 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

## IX. Course Policies:

5.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
6.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
7.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
8.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism.</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.



جامعة الرازي  
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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة



Second Part of Course Specification  
Faculty of Medicine and Health Science  
Department of **Pharmacy**  
**Bachelor of Pharmacy**  
Course Plan (Syllabus) of  
**PHYSIOLOGY I**

Course Code No. (MSC213)

VII.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Hussein Gumaih	Office Hours					
Location & Telephone No.	Pharmacy department ; 77064784	SAT	SUN	MON	TUE	WED	THU
E-mail	<a href="mailto:halimosama123@yahoo.com">halimosama123@yahoo.com</a>						

II. Course Description:
The course concerns with study of cell repair mechanism, transport mechanism through cell membrane, body fluids , acid-base balance as well as with functions and regulation of organs o the nervous system, endocrine and skeletal system.

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III. Intended learning outcomes of the course (CILOs)	
<b>10. Alignment CILOs</b>	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
<b>a1.</b> Discuss the concept of homeostasis and feedback mechanisms observed in normal functions of human body organs.	
<b>a2.</b> . Identify the mechanisms of transport of material into and out of human cells.	
<b>a3.</b> Determine the normal functions and regulation of nervous system, endocrine glands and muscles.	
<b>a4.</b> Explain the biological role of certain endogenous substances in regulation the normal functions of nervous system, endocrine glands and muscles.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
<b>b1.</b> Identify the signs of normal functions of nervous system, endocrine glands and muscles.	
<b>b2.</b> Interpret the outcomes of normal functions of nervous system, endocrine glands and muscles.	
<b>b3.</b> Classify neurotransmitters and hormones physiologically.	
<b>b4.</b> Compare physiologically between different types of nervous system, endocrine glands and muscles.	
<b>b5.</b> Relate the normal functions in nervous system, endocrine glands and muscles to their affecting factors.	
<b>b6.</b> . Assess the normal functions of nervous system, endocrine glands and muscles	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
<b>c1.</b> Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
<b>d1.</b> Share successfully in team-work.	
<b>d2.</b> Show respect to life.	

11. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Discuss the concept of homeostasis and feedback mechanisms observed in normal functions of human body organs.	<b>Lecture</b>	<b>written exam , , assignment</b>



a2. . Identify the mechanisms of transport of material into and out of human cells.	feed-back learning	
a3. Determine the normal functions and regulation of nervous system, endocrine glands and muscles.		
a4. Explain the biological role of certain endogenous substances in regulation the normal functions of nervous system, endocrine glands and muscles.		

**(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Identify the signs of normal functions of nervous system, endocrine glands and muscles.	Lecture Feed-back learning, Group-project.	Written exams, quizzes, lab. term work, practical final exam
b2. Interpret the outcomes of normal functions of nervous system, endocrine glands and muscles.		
b3. Classify neurotransmitters and hormones physiologically.		
b4. Compare physiologically between different types of nervous system, endocrine glands and muscles.		
b5 .Relate the normal functions in nervous system, endocrine glands and muscles to their affecting factors.		
b6 . Assess the normal functions of nervous system, endocrine glands and muscles		

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media.	Feed-back learning ,Group-project.	quizzes

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Share successfully in team-work.	Group-project ,, feed-back learning	Assignment Written exam
d2. Show respect to life.		

XXIII. Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours



1	<b>Introduction</b>	a1, a4, b4, b5	physiology definition, the concept of homeostasis. Negative feedback.	1	2
2	<b>The Cell and body fluids physiology</b>	a2, a4, b1,b2, b4, b4, b5, d1, d2	<ul style="list-style-type: none"> <li>• structure, functions, membrane transport mechanisms: (passive diffusion , mediated transport, osmosis)</li> <li>• membrane potential(resting, action)</li> <li>• Cell repair : mechanisms.</li> <li>• Composition and regulations of Body fluids, electrolytes and acid-base balance</li> </ul>	2	4
3	<b>The Nervous system</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>• Classification of nervous system</li> <li>• classes of neurons</li> <li>• Synaptic transmission ( chemical synapsis, summation, interconnection between neurons, factors affecting the transmission)</li> </ul>	1	2
4	<b>Central nervous system (CNS) Part (1)</b>	a3, a4, b4, b5, b6, c1 ,d1, d2	<ul style="list-style-type: none"> <li>• Components of CNS</li> <li>• level of CNS functions</li> <li>• functions of brain composition (cerebrum, cerebral cortex, etc. ),</li> <li>• blood brain barrier</li> <li>• spinal cord (function, composition, spinal reflex, cerebrospinal fluid)</li> </ul>	2	4
<b>MID-TERM EXAM</b>				1	2
4	<b>Central nervous system (CNS) Part (2)</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>• Sensation: nociception, hyperalgesia, pain pathway, neurotransmitters of pain, types of pain (cutaneous, visceral, deep, , referred , phantom) , endogenous analgesic system</li> <li>• Regulating areas in brain (function, neurotransmitters) : nociceptionarea, psychic</li> </ul>	2	4

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			area, heat regulating center, area controlling muscles relaxation and contraction vasomotor center, Chemoreceptor trigger zone and other areas involved in diseases.		
5	<b>Autonomic nervous system</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>definition and composition &amp; regulation</li> <li>sympathetic system (functions, neurotransmitters, receptors), adrenal medulla ,</li> <li>parasympathetic system (functions, neurotransmitters, receptors)</li> </ul>	2	4
6	<b>Endocrine system</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>hormones (biochemical classification, transport, mechanism of actions)</li> <li>functions and regulation of</li> <li>hormones of (pituitary gland, thyroid gland, parathyroid gland, pancreas, sex organs)</li> </ul>	2	4
7	<b>Muscles</b>	a3, a4, b4, b5, b6,d1, d2	<ul style="list-style-type: none"> <li>types , functions</li> <li>factors affecting contraction and relaxation</li> </ul>	1	2
<b>Course Review</b>		all	Review of the course topics by discussion session.	1	2
FINAL - EXAM				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>7 Units</b>

#### XIV. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or

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**Concepts map:** which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### XV. Assignments:

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### XIII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, a3, a4, b4, b5, b6,c1, d1, d2
2	Assignments (1 + 2)	4, 14	10	10	a3, a4, c1, d1
3	Quiz 1 + Quiz 2	7, 12	5	5	b3, b4, b5
4	Mid-semester exam of theoretical part ( written exam)	7	20	20	a1, a2, a3, a4, b4, b5, b6,c1, d1, d2
5	Final exam of theoretical part ( written exam)	17	60	60	a1, a2, a3, a4, b4, b5, b6,c1, d1, d2
<b>TOTAL</b>			100	100 %	100

### XXIII. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

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6. W. F. Ganong. Review of medical physiology
<b>3- Electronic Materials and Web Sites etc.</b>
<a href="http://www.en.wikipedia.org/">www.en.wikipedia.org/</a>

X. Course Policies:	
9.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
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11.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
12.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

## Faculty of Medicine and Health Sciences

Department of: **Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHYSICAL PHARMACY**  
Course No. (PHT211)

2022



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<b>I. Course Identification and General Information:</b>					
1	<b>Course Title:</b>	Physical Pharmacy			
2	<b>Course Code &amp; Number:</b>	PHT211			
3	<b>Credit Hours:</b>	<b>Credit Hours</b>	<b>Theory Hours</b>		<b>Lab. Hours</b>
			<b>Lecture</b>	<b>Exercise</b>	
		3	2	--	1
4	<b>Study Level/ Semester at which this Course is offered:</b>	Second Level / 1 <sup>st</sup> Semester			
5	<b>Pre –Requisite (if any):</b>	PHT123			
6	<b>Co –Requisite (if any):</b>	None			
7	<b>Program (s) in which the Course is Offered:</b>	Bachelor of Pharmacy			
8	<b>Language of Teaching the Course:</b>	English			
9	<b>Study System:</b>	Semester based System			
10	<b>Mode of Delivery:</b>	Full Time			
11	<b>Location of Teaching the Course:</b>	At University Facilities			
12	<b>Prepared by:</b>	Dr. Ameen Alwossabi			
13	<b>Date of Approval:</b>	2022			

<b>II. Course Description:</b>
<p>This course provides the student with knowledge related to physical properties of solid, liquid and gaseous matters and various physical phenomena observed in matters. Moreover, the course deals with stability and degradation of matters and physical interactions that occur between matters. The practical part of the course intends to acquire the student the skills to measure and observe those properties and phenomena. The course also links these properties with their observation or application in pharmacy in particular their correlation or influence on design and formulation of pharmaceutical dosage forms design. Therefore, this course can be referred so as to introduction to "pharmaceutics" courses.</p>

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Dr. Ameen Alwossabi	Dr. Anes Thabit	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies.</b>		
<b>12. Alignment CILOs to PILOs</b>		
	<b>PILOs</b>	<b>CILOs</b>
<b>Knowledge &amp; understanding :</b> Upon successful completion of the course, students will be able to:		
<b>A2.</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Show sound understanding of physical properties and phenomena that influence the design of pharmaceutical preparations
<b>Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B2.</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines	<b>b1.</b> Apply relevant equations to calculate physical measurements related to vapor pressure, atmospheric pressure, thermal energy formulation and stability of pharmaceutical preparations.
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1.</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory.  <b>c2.</b> Operate the instruments and measure physical properties successfully in the laboratory.
<b>Transferable skills:</b> Upon successful completion of the course, students will be able to:		

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<b>D1.</b> Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues and in teacher in the lab..
	<b>d2.</b> Demonstrate the skills of time management and self-learning.
	<b>d3.</b> Participate efficiently with his colleagues in a teamwork.

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<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Show sound understanding of physical properties and phenomena that influence the design of pharmaceutical preparations	Active-lecture	written exams
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Apply relevant equations to calculate physical measurements related to formulation and stability of pharmaceutical preparations	Active-lecture, feed-back learning	Written exam, Quizzes, assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory.	Lab. Practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and measure physical properties successfully in the laboratory.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues and in teacher in the lab..	Lab. Practice, feed-back learning	Lab. term works, assignment
<b>d2.</b> Demonstrate the skills of time management and self-learning.	Lab. Practice ,feed-back learning	Lab. term works, assignment
<b>d3.</b> Participate efficiently with his colleagues in a teamwork.	Lab. Practice , Group-project	Lab. term works, assignment

#### **IV. Course Content:**

##### **A. Theoretical Aspect:**

(Definition, types, principle, mathematical expression, measurement (Analysis), factors affecting and pharmaceutical applications of physical properties /phenomena)

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Order	Units/ Topics List	Sub Topics List	No. of Weeks	Conta ct hours	CILO s
1	Introducti on to physical pharmacy	<ul style="list-style-type: none"> <li>▪ <b>Scope and purposes</b> of physical pharmacy</li> <li>▪ <b>State of matters</b> : factors affecting ( intermolecular forces, vapor pressure, atmospheric pressure, thermal energy)</li> <li>▪ <b>Circle of inter-conversion</b> of a matter from a state of state ; name of processes, internal and external factors</li> </ul>	1	2	a1, b1, d1
2	Physical properties of solid state	<ul style="list-style-type: none"> <li>• <b>Melting point</b></li> <li>• <b>Micrometrics</b> <ul style="list-style-type: none"> <li>○ Particle size, particle shape</li> <li>○ Arrangement of particles: Crystals, amorphous, polymorphism, solvate (hydrates)</li> <li>○ Crystallization : principles and applications</li> <li>○ Tapped and bulk density and porosity</li> <li>○ Flowability : Carr`s index&amp; angle of repose</li> </ul> </li> <li>• <b>Surface Energy &amp; wettability.</b></li> </ul>	3	6	a1, b1,c1, d2
3	liquid and gas states physical properties	<ul style="list-style-type: none"> <li>▪ <b>Thermodynamic liquids:</b> Evaporation, boiling, vaporization and volatiliztion</li> <li>▪ <b>Vapor pressure</b></li> <li>▪ <b>Viscosity</b></li> <li>▪ <b>Surface phenomena:</b> Surface tension, interfacial tension</li> </ul>	3	6	a1, b1, c1, d3
<b>MID-TERM EXAM</b>			1	2	
4	Physical interaction s between matters	<ul style="list-style-type: none"> <li>▪ <b>Bulk Interactions</b> <ul style="list-style-type: none"> <li>○ Dissolution; solubility , miscibility;</li> <li>○ Dispersion, Solubilization,&amp; Critical micelles concentration; types and roles of surfactants; factors reducing surfactant activity</li> <li>○ Partition coefficient: Hydrophilicity and lipophilicity and role of pH</li> </ul> </li> <li>▪ <b>Surface interactions</b> <ul style="list-style-type: none"> <li>○ Adsorption</li> </ul> </li> </ul>	4	8	a1, b1, c2, d1

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		<ul style="list-style-type: none"> <li>○ Complexation</li> <li>▪ <b>Transfer of matter:</b> Diffusion</li> <li>▪ <b>Incompatibility</b></li> </ul>			
5	<b>Stability and Degradation</b>	<ul style="list-style-type: none"> <li>▪ <b>Concept of stability</b> <ul style="list-style-type: none"> <li>○ Definition and types of degradation</li> <li>○ Definition and types of stability</li> <li>○ Causes of degradation</li> <li>○ Stabilizers and other approaches to reduce degradation</li> </ul> </li> <li>▪ <b>Kinetics of stability</b> <ul style="list-style-type: none"> <li>○ Order of degradation (zero, first, second): equations, rate constants, half-life</li> </ul> </li> <li>▪ Stability determination: accelerated, long-term, shelf life (<math>t_{10}</math>)</li> </ul>	3	6	a1, b1, c2, d3
6	<b>Course Review</b>	Review of the course topics by discussion session.	1	2	a1, b1
<b>FINAL - EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	5 Units	

### B. Practical Aspect:

Order	Tasks/ Experiments	Number of Weeks	Contact hours	CILOs
1.	Melting point determination by capillary method	1	2	c1, d1, d2
2.	Particle size analysis ( sieve and sedimentation method)	1	2	c1, d1, d2
3.	Crystallization: preparation of salicylic acid crystals	1	2	c1, d1, d3
4.	Tapped and bulk density porosity and Carr`s index of flowability description.	1	2	c1, d1, d3

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5.	Viscosity determination (Ostwald tube)	1	2	c1, d2, d3
6.	Surface tension determination (Capillary or Drop weight method)	1	2	c2, d1, d2
7.	Critical micelles concentration (CMC) determination	1	2	c2, d1, d2
8.	Partition coefficient determination (salicylic acid between water & ether)	1	2	c2, d1, d3
9.	Review	1	2	c1, c2, d1, d2, d3
<b>PRACTICAL EXAM</b>		1	2	c1, c2, d1, d2, d3
<b>Total</b>		<b>10</b>	<b>20</b>	

#### V. Teaching strategies of the course:

##### Active Lecture:

It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

##### Laboratory practice:

students doing experiments in labs individually or in small groups

##### Feedback learning:

students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home-works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

##### Group projects:

students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

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VI. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provide the students with mathematical problems related to the studied topics. Every student is assigned to solve some of those problems individually.	d1, d2, d3	4-13	3
2	<b>Group:</b> each group of students will be assigned to make a search-report supported by illustrating videos on one of the studied physical phenomenon.	d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students during the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b1, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam)		7	10	10	a1, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, b1
TOTAL				70	70 %	

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, d1, d2
Total				30	30 %	

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Dr. Ameen Alwossabi	Dr. Anes Thabit	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

### VIII. Learning Resources:

#### 1- Required Textbook(s) (maximum two).

1. Martin`s Physical pharmacy and pharmaceutical sciences, 2015, Lippincott Williams & Wilkins, UK

#### 2- Essential References.

1. Aulton M.E., Pharmaceutics: the science of dosage form design, 2018, Elsevier Ltd
2. Subrahmanyam. A text book of physical pharmaceutics, 3<sup>rd</sup> edition, 2015, Vallabh Prakashan, India

#### 3- Electronic Materials and Web Sites *etc.*

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[www.ovid.com](http://www.ovid.com)

[www.pubmed.com](http://www.pubmed.com)

<https://toaz.info/doc-view>

### IX. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية العربية السورية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة

Second Part of Course Specification

Faculty of Medicine and Health Sciences

Department of Pharmacy

Program of Pharmacy Bachelor

Course Plan (Syllabus) of

## PHYSICAL PHARMACY

Course Code No. (211)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ameen Alwossabi	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

### II. Course Description:

- 1) This course provides the student with knowledge related to physical properties of solid, liquid and gaseous matters and various physical phenomena observed in matters. Moreover, the course deals with stability and degradation of matters and physical interactions that occur between matters. The practical part of the course intends to acquire the student the skills to measure and observe those properties and phenomena. The course also links these properties with their observation or application in pharmacy in particular their correlation or influence on design and formulation of pharmaceutical dosage forms design. Therefore, this course can be referred so as to introduction to "pharmaceutics" courses





<b>III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies</b>	
<b>13. Alignment CILOs to PILOs</b>	
<b>PILOs</b>	<b>CILOs</b>
<b>Knowledge &amp; understanding :</b> Upon successful completion of the course, students will be able to:	
a1. Show sound understanding of physical properties and phenomena that influence the design of pharmaceutical preparations	
<b>Intellectual skills :</b> Upon successful completion of the course, students will be able to:	
b1. Apply relevant equations to calculate physical measurements related to formulation and stability of pharmaceutical preparations	
<b>Professional &amp; practical skills :</b> Upon successful completion of the course, students will be able to:	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory.	
c2. Operate the instruments and measure physical properties successfully in the laboratory.	
<b>Transferable skills :</b> Upon successful completion of the course, students will be able to:	
d1. Communicate effectively and behave in discipline with colleagues and in teacher in the lab..	
d2. Demonstrate the skills of time management and self-learning.	
d3. Participate efficiently with his colleagues in a teamwork.	

<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Show sound understanding of physical properties and phenomena that influence the design of pharmaceutical preparations	Active-lecture	written exams
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Apply relevant equations to calculate physical measurements related to formulation and stability of pharmaceutical preparations	Active-lecture, feed-back learning	Written exam, Quizzes, assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory.	Lab. Practice	Lab. term works, final practical exam
c2. Operate the instruments and measure physical properties successfully in the laboratory.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues and in teacher in the lab..	Lab. Practice, feed-back learning	Lab. term works, assignment
d2. Demonstrate the skills of time management and self-learning.	Lab. Practice ,feed-back learning	Lab. term works, assignment
d3. Participate efficiently with his colleagues in a teamwork.	Lab. Practice , Group-project	Lab. term works, assignment

<b>IV. Course Content:</b>					
<b>C. Theoretical Aspect:</b>					
(Definition, types, principle, mathematical expression, measurement (Analysis), factors affecting and pharmaceutical applications of physical properties/phenomena)					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	Introduction to physical pharmacy	<ul style="list-style-type: none"> <li>▪ <b>Scope and purposes</b> of physical pharmacy</li> <li>▪ <b>State of matters</b> : factors affecting ( intermolecular forces, vapor pressure, atmospheric pressure, thermal energy)</li> <li>▪ <b>Circle of inter-conversion</b> of a matter from a state of state ; name of processes, internal and external factors</li> </ul>	1	2	a1, b1, d1

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2	Physical properties of solid state	<ul style="list-style-type: none"> <li>• <b>Melting point</b></li> <li>• <b>Micrometrics</b> <ul style="list-style-type: none"> <li>○ Particle size, particle shape</li> <li>○ Arrangement of particles: Crystals, amorphous, polymorphism, solvate (hydrates)</li> <li>○ Crystallization : principles and applications</li> <li>○ Tapped and bulk density and porosity</li> <li>○ Flowability : Carr`s index&amp; angle of repose</li> </ul> </li> <li>• <b>Surface Energy &amp; wettability.</b></li> </ul>	3	6	a1, b1, c1, d2
3	liquid and gas states physical properties	<ul style="list-style-type: none"> <li>▪ <b>Thermodynamic liquids:</b> Evaporation, boiling, vaporization and volatilization</li> <li>▪ <b>Vapor pressure</b></li> <li>▪ <b>Viscosity</b></li> <li>▪ <b>Surface phenomena:</b> Surface tension, interfacial tension</li> </ul>	3	6	a1, b1, c1, d3
<b>MID-TERM EXAM</b>			1	2	
4	Physical interactions between matters	<ul style="list-style-type: none"> <li>▪ <b>Bulk Interactions</b> <ul style="list-style-type: none"> <li>○ Dissolution; solubility , miscibility;</li> <li>○ Dispersion , Solubilization, &amp; Critical micelles concentration; types and roles of surfactants; factors reducing surfactant activity</li> <li>○ Partition coefficient: Hydrophilicity and lipophilicity and role of pH</li> </ul> </li> <li>▪ <b>Surface interactions</b> <ul style="list-style-type: none"> <li>○ Adsorption</li> <li>○ Complexation</li> </ul> </li> <li>▪ <b>Transfer of matter:</b> Diffusion</li> <li>▪ <b>Incompatibility</b></li> </ul>	4	8	a1, b1, c2, d1
5	Stability and Degradation	<ul style="list-style-type: none"> <li>▪ <b>Concept of stability</b> <ul style="list-style-type: none"> <li>○ Definition and types of degradation</li> <li>○ Definition and types of stability</li> <li>○ Causes of degradation</li> <li>○ Stabilizers and other approaches to reduce degradation</li> </ul> </li> <li>▪ <b>Kinetics of stability</b></li> </ul>	3	6	a1, b1, c2, d3

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		<ul style="list-style-type: none"> <li>○ Order of degradation (zero, first, second): equations, rate constants, half-life</li> <li>▪ Stability determination: accelerated, long-term, shelf life (<math>t_{10}</math>)</li> </ul>			
6	<b>Course Review</b>	Review of the course topics by discussion session.	1	2	a1, b1
<b>FINAL - EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	5 Units	

<b>D. Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	CILOs
1	Melting point determination by capillary method	1	2	c1, d1, d2
2	Particle size analysis (sieve and sedimentation method)	1	2	c1, d1, d2
3	Crystallization: preparation of salicylic acid crystals	1	2	c1, d1, d3
4	Tapped and bulk density porosity and Carr's index of flowability description.	1	2	c1, d1, d3
5	Viscosity determination (Ostwald tube)	1	2	c1, d2, d3
6	Surface tension determination (Capillary or Drop weight method)	1	2	c2, d1, d2
7	Critical micelles concentration (CMC) determination	1	2	c2, d1, d2
8	Partition coefficient determination (salicylic acid between water & ether)	1	2	c2, d1, d3
9	Review	1	2	c1, c2, d1, d2, d3
<b>PRACTICAL EXAM</b>		1	2	c1, c2, d1, d2, d3
<b>Total</b>		<b>10</b>	<b>20</b>	

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### V. Teaching strategies of the course:

#### Active Lecture:

It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

#### Laboratory practice:

students doing experiments in labs individually or in small groups

#### Feedback learning:

students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home-works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

#### Group projects:

students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provide the students with mathematical problems related to the studied topics. Every student is assigned to solve some of those problems individually.	d1, d2, d3	4-13	3
2	<b>Group:</b> each group of students will be assigned to make a search-report supported by illustrating videos on one of the studied physical phenomenon.	d1, d2, d3	14	2

### VII. Schedule of Assessment Tasks for Students during the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b1, d1, d2, d3
2	Mid-semester exam of theoretical part (written exam)		7	10	10	a1, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, b1

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TOTAL	70	70 %
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Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILO s)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2,d1, d2, d3
Total				30	30 %	

### VIII. Learning Resources:

#### 1- Required Textbook(s) (maximum two).

2. Martin`s Physical pharmacy and pharmaceutical sciences, 2015, Lippincott Williams & Wilkins, UK

#### 2- Essential References.

3. Aulton M.E., Pharmaceutics: the science of dosage form design, 2018, Elsevier Ltd  
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### IX. Course Policies: (Based on the Uniform Students

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
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5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

**Faculty of Medicine and Health Sciences**

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification**

**Psychology**

**علم النفس**

Course Code No. (MSC212)

الكلية Faculty : كلية الطب والعلوم الصحية  
القسم Department : جميع اقسام الكلية  
البرنامج Program: جميع اقسام الكلية



This template of course specifications was prepared by CAQA, Yemen, 2017.





X. معلومات عامة عن المقرر:				
علم النفس Psychology				اسم المقرر
MSC212				رمز المقرر ورقمه
الإجمالي	تدريب	عملي	سمنار/تمارين	محاضرة
2				2
المستوى الثاني – المستوى الرابع				الساعات المعتمدة:
لا يوجد.				المستوى والفصل الدراسي
لا توجد				المتطلبات السابقة لدراسة المقرر (إن وجدت):
جميع برامج كليات الجامعة				المتطلبات المصاحبة (إن وجدت)
علم النفس				البرنامج الذي يدرس له المقرر:
انتظام – فصلي				لغة تدريس المقرر:
د. حنان صالح احمد الخولاني				نظام الدراسة:
				معد توصيف المقرر:
				مراجعة
2022م				تأريخ اعتماد توصيف:
جامعة الرازي				الجهة التي اعتمدت التوصيف:

X. وصف المقرر Course Description:
يهتم هذا المقرر بالتعريف بعلم النفس ومجالاته وميادينه وموضوعاته ومدارسه ومناهج البحث في علم النفس وعلاقته بالعلوم الأخرى وكذلك التعريف بفوائده، ويستند المقرر في تدريس وتقييم هذه المواضيع على جميع اساليب العرض والتقييم مع التركيز على التدريب داخل القاعة.
X. أهداف المقرر Course Aims:
يهدف المقرر إلى: 1- بالتعريف بعلم النفس (مجالاته وميادينه) والتطور التاريخي لعلم النفس. 2- دراسة مدارس علم النفس (التحليل النفسي- السلوكية- المعرفية) وغيرها. 17- معرفة مناهج علم النفس وفوائده من الناحية العملية والنظرية 18- تزويد الطلبة بموضوعات علم النفس ( الدوافع والانفعالات والعواطف والاحساس والادراك والذكاء ومقاييسه والتعلم والتذكر والنسيان والتفكير والاضطرابات النفسية والشخصية )

X. مخرجات التعلم المقصودة للمقرر (CILOs) Course Intended Learning Outcomes:	
المعرفة والفهم Knowledge and Understanding:	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (معرفة وفهم) CILOs	مخرجات البرنامج (معرفة وفهم) PILOs
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
a1 - يتعرف على مدارس علم النفس ومجالاته من حيث المفهوم والفئات والاهداف.	A يظهر المعرفة والفهم للأسس النظرية والمفاهيم الاساسية لعلم النفس .

a2 - يحدد مدارس ومجالات ونظريات علم النفس المختلفة	
--	--

المهارات الذهنية Intellectual Skills:	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات ذهنية) CILOs	مخرجات البرنامج (مهارات ذهنية) PILOs
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
b1 - اتباع المنهج العلمي وطرق التفكير العلمي وطرق الاستدلال .	B يتبع المنهج العلمي وطرق التفكير المتبعة في مناهج علم النفس وأساليب التعامل مع الشخصيات المختلفة.
المهارات العملية والمهنية Professional and Practical Skills:	
ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات عملية ومهنية)	مخرجات البرنامج (مهارات عملية ومهنية)
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
c1 يستخدم مصادر التعلم المختلفة - ومنها الانترنت- عند كتابة الأبحاث والتكاليف المتعلقة بالموضوعات التي درسها في علم النفس.	C يستخدم الموارد التعليمية ومصادر التعلم بشكل فعال.
المهارات الانتقالية (العامة) Transferable (General) Skills:	
يتم ربط مخرجات البرنامج بمخرجات المقرر	
مخرجات المقرر (مهارات انتقالية (عامة)	مخرجات البرنامج (مهارات انتقالية (عامة))
بعد الانتهاء من هذا المقرر سيكون الطالب قادراً على أن:	بعد الانتهاء من هذا البرنامج سيكون الطالب قادراً على أن:
d1 - يطبق مهارات علم النفس بوضوح عبر مدارس علم النفس وميادينه:	D يتواصل بفاعلية ويمارس العمل في فريق في المواقف المختلفة.

X ربط مخرجات التعلم بإستراتيجيات التدريس والتقييم		
أولاً: ربط مخرجات تعلم المقرر/المعرفة والفهم بإستراتيجية التدريس والتقييم:		
مخرجات المقرر/ المعرفة والفهم	إستراتيجية التدريس	إستراتيجية التقييم
a1 - يتعرف على مدارس علم النفس ومجالاته من حيث المفهوم والفئات والاهداف.	- الإلقاء الفاعل (المحاضرات)	- اختبارات شفوية
a2 - يتعرف على التطورات العلمية والاتجاهات الحديثة في مجال التخصص	- الحوار والمناقشة	- تقويم التكليف
a3 . يعدد مدارس ومجالات ونظريات علم النفس المختلفة	- العروض الايضاحية	- تقويم مشاركات الدارس في المناقشة
	- مجموعات العمل	
	- خرائط المفاهيم.	
	- العصف الذهني	
	- التكاليف	
ثانياً: ربط مخرجات تعلم المقرر/المهارات الذهنية بإستراتيجية التدريس والتقييم:		
مخرجات المقرر/ المهارات الذهنية	إستراتيجية التدريس	إستراتيجية التقييم

اختبارات تحريرية قصيرة عمل تقارير تقويم مشاركات الدارس في المناقشة	- المحاضرات. - الحوار والمناقشة. - التطبيق الفردي والجماعي. - العصف الذهني	b 1 : اتباع المنهج العلمي وطرق التفكير العلمي وطرق الاستدلال. b 2 : يطرح الأسئلة ويفكر تفكيراً ناقداً b 3 : يتناول الظواهر تناوياً مختلفاً في مجال التخصص.
ثالثاً: ربط مخرجات تعلم المقرر/المهارات المهنية والعملية بإستراتيجية التدريس والتقييم:		
إستراتيجية التقييم	إستراتيجية التدريس	مخرجات المقرر/ المهارات المهنية والعملية
- الاختبارات التحريرية. - التكاليف وتقييمها. - تقييم مناقشة الطلبة في الحوار والمناقشة.	- الحوار والمناقشة - حل المشكلات. - عمل مجموعات	c 1 : يطبق الاختبارات النفسية الجمعية والاختبارات النفسية الفردية وفهمها وتحليل نتائجها. c 2 : يحلل المصادر التي تشتق منها الاهداف والغايات لبناء المناهج. c 3 : يجمع المعلومات باستخدام التكنولوجيا الحديثة.
رابعاً: ربط مخرجات تعلم المقرر/المهارات الانتقالية (العامة) بإستراتيجية التدريس والتقييم:		
إستراتيجية التقييم	إستراتيجية التدريس	مخرجات المقرر/ المهارات الانتقالية (العامة)
- جمع دراسات وبحوث (تكليف) - إعداد ورقة عمل بحثية - كتابة عناوين بحثية مقترحه	- أنشطة مكتبية وصفية باستخدام النت. - البحث الذاتي.	d 1 . يحصل على المعلومات من مصادر متنوعة ويستخدم تكنولوجيا المعلومات في مجال التخصص والاطلاع والبحث. d 2 . يساهم في إجراء بحوث مشتركة في مجال تخصصه. d 3 . يعمل عملاً جماعياً ويدير الفريق ويستخدم اساليب حل المشكلات.

XX. كتابة مواضيع المقرر الرئيسية والفرعية (النظرية والعملية) وربطها بمخرجات التعلم المقصودة للمقرر مع تحديد الساعات الفعلية لها.					
وحدات /مواضيع محتوى المقرر					
أولاً: الجانب النظري:					
الرقم No.	وحدات/ موضوعات المقرر	المواضيع التفصيلية	عدد الأسابيع	الساعات الفعلية	مخرجات تعلم المقرر CILOs
1	المدخل الى علم النفس	- المفهوم والتعاريف - الميادين النظرية والتطبيقية لعلم النفس	1	2	a1, b3 c3 d4
2	التطور التاريخي لعلم النفس	- دور الفلاسفة الاغريق - دور الفلاسفة العرب - دور الفلاسفة الاوربيين	1	2	a2.b1.c2 d1
3	مناهج البحث في علم النفس	- المنهج العلمي - منهج الملاحظة - المنهج التماثلي - المنهج الميداني	1	2	a2.b1.c2 d1

			- المنهج التجريبي - المنهج الاحصائي		
a2.b1.c2 d1	2	1	- مدرسة التحليل النفسي - المدرسة السلوكية - المدرسة المعرفية - المدرسة الانسانية	مدارس علم النفس	4
a2,b3,c3,d2	2	1	- الجهاز العصبي - الغدد واثرها في السلوك - اثر الوراثة في السلوك	محددات السلوك	5
	2	1	- تحريري	امتحان نصفي	6
a2.b1.c2 d1			- التعريفات - عوامل الاحساس والانتباه - والادراك - انواع الاحساس والانتباه - والادراك	الاحساس والانتباه والادراك	7
a1,b2,c2,d1	2	1	- أهمية دراسة الدافعية - التعريفات - انواع الدوافع - خصائص وعوامل الدوافع - قياس الدوافع	الدافعية	8
a1,b2,c2,d1	2	1	- صفات الانفعال - مظاهر الانفعال - نظريات الانفعال - العواطف	الانفعالات والعواطف	9
a1,b2,c2,d1	2	1	- المفاهيم - انواع الذاكرة وقياسها - النظريات المفسرة للنسيان - طرق تحسين الذاكرة	الذاكرة والنسيان	10
a1,b2,c2,d1	2	1	- المفهوم - أهمية التفكير - مميزات التفكير - أنواع التفكير	التفكير	11
a1,b2,c2,d1	2	1	- المفهوم - محددات الشخصية - نظريات الشخصية	الشخصية ونظرياتها	12
	2	1	- تحريري	اختبار نهاية الفصل	13
	26 ساعة	13		إجمالي عدد الأسابيع والساعات	

XX. استراتيجيات التدريس
41- الإلقاء الفاعل (المحاضرات)
42- الحوار والمناقشة
43- العصف الذهني
44- العروض الإيضاحية
45- خرائط المفاهيم.
46- التكاليف
47- عمل تطبيقات على النصوص
48- البحوث العلمية
49- حل المشكلات
50- التعلم التعاوني

9- الأنشطة :				
الرقم No.	النشاط / التكلفة	مخرجات التعلم CILOs	الأسبوع	الدرجة
1	قيام الطالب بعمل التكاليف والأبحاث حول الموضوعات المقررة عليهم.	c1,c2,c3,d1,d2	كل محاضرة	10
2	قيام الطالب بحل التطبيقات والتدريبات المتعلقة بالمقرر بطريقة فردية أو جماعية.	c1,c2,c3,b1,b2,b3	كل محاضرة	10

10- تقييم التعلم:					
الرقم No.	أنشطة التقييم	الأسبوع	الدرجة	نسبة الدرجة إلى درجة التقييم النهائي	المخرجات التي يحققها
1	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة	ابتداء من المحاضرة الرابعة	20	%20	تقييم تكاليف/أبحاث/دراسات والمشاركة في القاعة
2	اختبار نصفي	بعد المحاضرة السادسة	20	%20	اختبار نصفي
3	الاختبار النهائي	بعد آخر أسبوع	60	%60	الاختبار النهائي
	المجموع		100	%100	

XXX. مصادر التعلم:
المراجع الرئيسية:
3. رمزي ، طارق محمود وآخرون(1996): مقدمة في علم النفس، بيروت، دار الفكر المعاصر،
4. عكاشة ، محمود فتحي(2000): مبادئ علم النفس ، مطبعة الجمهورية ، الإسكندرية ،
المراجع المساعدة:

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17. عبد القادر ، أحمد فائق، محمود(1980) : مدخل الى علم النفس العام ، القاهرة، مكتبة الانجلو ،
18. عبدالرحمن ، محمد السيد (1998) :نظريات الشخصية ، دار قباء للطباعة والنشر والتوزيع، القاهرة ،
19. عبد الخالق ، أحمد محمد(1993) : اسس علم النفس ، دار المعرفة الجامعية ، الاسكندرية ،
مواد إلكترونية وإنترنت: (إن وجدت)
عرض باوربوينت. سيديهاات .
● 1 شبكة العلوم النفسية العربية <a href="http://arabpsynet.com/">http://arabpsynet.com/</a> مجلة العلوم النفسية – مركز البحوث النفسية <a href="http://esprc.uobaghdad.edu.iq/?page_id=15072">http://esprc.uobaghdad.edu.iq/?page_id=15072</a>

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of

**Botany**

Course No. (PHG216)

2022



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I. Course Identification and General Information:					
1	Course Title:	Botany			
2	Course Code & Number:	PHG216			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	MSC116			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Hassan Ebrahim			
13	Date of Approval:	2022			

II. Course Description:
<p>The course concerns with providing the student with essential knowledge on plants as a source of drugs in their taxonomy, biological features of plants (morphology, reproduction, nutrition, metabolism and growth). The course focus is mainly on the plant parts and classification of the suborder angiosperm as major source of vegetable drugs. The practical part of the course provides the student with skills of identifying the morphological and Microscopical of different types of plant part which will help the student in specific pharmacy courses and hence this course can be referred as introduction to those courses including “Pharmacognosy” and “Phytochemistry” and “Complementary and alternative medicine”.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
14. Alignment CILOs to PILOs		
	PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon completion this course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Identify the general characters, life cycles and nutritional sources of the common orders, families, genera and species of the plant kingdom
		<b>a2.</b> Describe the types, morphological and microscopical features of plant seeds, roots, leaves, stems, barks, flowers and fruits
		<b>a3.</b> Determine the structural/functional components and biological processes of plant cell and the anatomical and physiological features of tissues and systems in common plant species.
		<b>a4.</b> Explicit the economic and medical uses of common plant genera and species in particular plants belonging to Angiosperm.
<b>B: Intellectual skills</b> Upon completion this course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Differentiate between various plant species based on their morphological and microscopical features.
		<b>b2.</b> Classify plant kingdom into orders, families, genera and species.
		<b>b3.</b> Compare between animal cell and plant cell.
<b>C: Professional &amp; practical skills:</b> Upon completion this course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the Biology & Pharmacognosy lab.

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<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (Microscopes) and perform experiments successfully in the Biology & Pharmacognosy lab.
<b>D: Transferable skills:</b> Upon completion this course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues and in teacher in the lab.
		<b>d2.</b> Work successfully within a team.
<b>D2.</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate the ability of time management, self-learning and problem-solving skills.

<b>8. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the general characters, life cycles and nutritional sources of the common orders, families, genera and species of the plant kingdom	Active Lecture	written exams
<b>a2.</b> Describe the types morphological and microscopical features of plant seeds, roots, leaves, stems, barks, flowers and fruits		
<b>a3.</b> Determine the structural/functional components and biological processes of plant cell and the anatomical and physiological features of tissues and systems in common plant species.		
<b>a4.</b> Explicit the economic and medical uses of common plant genera and species in particular plants belonging to Angiosperm.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Differentiate between various plant species based on their morphological and microscopical features.	Active Lecture, feed-back learning	Written exams, assignment, quizzes
<b>b2.</b> Classify plant kingdom into orders, families, genera and species.		

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b3. Compare between animal cell and plant cell.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of professional &amp; practical skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in Biology & Pharmacognosy lab.	Lab. Practice	Lab. term works, final practical exam
c2. Operate the instruments (Microscopes) and perform experiments successfully in the Biology & Pharmacognosy lab.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues and in teacher in the lab.	Lab. Practice	Lab. term works, final practical exam
d3. Demonstrate the ability of time management, self-learning and problem-solving skills.	Lab. Practice works, feed-back learning	Lab. practical works, individual assignment
d2. Work successfully within a team.	Lab. practice, group project	Lab. term works, group-assignment

<b>XXIV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction to botany</b>	a1, a3, a4, b1, b2	<ul style="list-style-type: none"> <li>Definition and Brief history of botany</li> <li>Basis of plant structures: plant cell and plant cellular contents, types of plant tissues and plant organs</li> <li>Differences between plant kingdom and animal kingdom</li> <li>Nutrition, metabolism and growth of plant</li> </ul>	2	4

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			<ul style="list-style-type: none"> <li>Plant taxonomy: basis of classification of plant kingdom into orders, families, suborders, genera, species.</li> </ul>		
2	<b>Plant Order (1) (Thallophytae)</b>	a1, a3, a4, b1, b2,	<ul style="list-style-type: none"> <li>General characters</li> <li><b>Algae</b>.g. Pleurococcus, Spirogyra, Vaucheria, Diatoms.), economic use of algae</li> <li><b>Fungi</b>: differences from algae, types phycomycetes (oomycetes e.g., saprolegnia), (zygomycetes e.g., black mold) eumycetes (ascomycetes e.g., yeasts: Ergot fungi) (Basidiomycetes edible mushroom, amanita) economic use of fungi</li> <li><b>lichens</b> types and examples</li> <li><b>Bacteria</b> (only brief study on general characters and differences from fungi, algae and lichens.</li> <li><b>Viruses</b>: general characters, examples</li> </ul>	2	4
3	<b>Plant order (2) (Archegoniatae)</b>	a1, a3, a4,b1, b3,	<ul style="list-style-type: none"> <li>General characters</li> <li>Bryophytes e.g. Hepaticae, mosses</li> <li>Pteridophytes e.g. Ferns, club mosses</li> </ul>	2	4
4	<b>Plant order (3) Spermophytes (seeding plants)</b>	a1, a3, a4, b1, b2,	<ul style="list-style-type: none"> <li>Gymnosperms, characters, differences, examples of plants</li> <li>Angiosperms: characters, differences, economically and medically valuable families.</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2
5	<b>Plant parts in Angiosperms</b>	a1, a2, a3, a4, b1, b2,	(morphology, anatomy and physiology) of: <ul style="list-style-type: none"> <li>The roots</li> <li>The stems</li> <li>The bark</li> <li>The leaf</li> <li>The flower</li> <li>The fruit</li> <li>The seed</li> </ul>	3	6
6	<b>classification of angiosperms yielding</b>	a1, a3, a4, b1, b3	<ul style="list-style-type: none"> <li><b>Monocotyledons</b>: general characters, classification, examples of plants and their yielding drugs</li> </ul>	3	6

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Dr. Hassan Ebrahim	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



	vegetable drugs.		<ul style="list-style-type: none"> <li><b>Dicotyledons:</b> (Archichlamydeae or Choripetalae, Metachlamydeas or Sympetalas): general characters, classification, examples of plants and their yielding drugs</li> </ul>		
<b>Course Review</b>	a1, a2, a3, a4, b1, b2,	Review of the course topics by discussion session.		1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	introduction to pharmaceutical organic Biology & Pharmacognosy lab.: safety requirements, list of experiments, how to report, etc.	c1, c2, d1, d3	1	2
2	Algea: microscopical slides	c1, c2, d2	1	2
3	Fungi: microscopical and morphological features of different fungi species	c1, c2, d1	2	4
4	Plant leaves: morphology and microscopy	c1, c2, d2, d3	2	4
5	Plant barks: morphology and microscopy	c1, c2, d2, d3	1	2
6	Plant roots and rhizomes: morphology and microscopy	c1, c2, d1, d2	1	2
7	Plant flowers: morphology and microscopy	c1, c2, d1, d2	1	2
8	Plant fruits: morphology and microscopy	c1, c2, d1, d2	1	2

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9	Differentiation between Monocotyledons and Dicotyledons: morphology and microscopy	c1, c2, d1, d2	1	2
PRACTICAL EXAM		c1, c2, d1, d2,d3	1	2
Total			12	24
Number of Weeks			12	

#### XV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

#### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search report on one species of one medically valuable plant family.	d1	4-13	3
2	<b>Group</b> : each group of students will be assigned to do a search report supported with illustrating videos on one of the followings : <ul style="list-style-type: none"> <li>Plant taxonomy</li> <li>Plant cell</li> <li>Algae</li> <li>phycomycetes</li> </ul>	d1, d2	14	2

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### VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	d1, d2, d3
2	Mid-semester exam of theoretical part (written exam)		7	10	10	a1, a2, a4, b1, b2, b3, d3
3	Final exam of theoretical part (written exam)		16	50	50	a1, a2, a3, a4, b1, b2, b3, d3
TOTAL				70	70 %	70

### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion To Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, d1, d3
Total				30	30%	

### XXIV. Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Alexey Shipunov., Introduction to Botany. 2022, Minot State University (North Dakota, USA)

#### 2- Essential References.

W.C. Evans, Trease and Evans Pharmacognosy, 2009, W.B. Saunders

#### 3- Electronic Materials and Web Sites etc.

[http://herba.msu.ru/shipunov/school/biol\\_154/textbook/intro\\_botany.pdf](http://herba.msu.ru/shipunov/school/biol_154/textbook/intro_botany.pdf)

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VIII. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



Second Part of Course Specification  
Faculty of Medicine and Health Sciences

Department of **Pharmacy**  
Program of Pharmacy Bachelor

Course Plan (Syllabus) of

# BOTANY

Course code No. (PHG216)

VIII.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Hassan Ebrahim	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
<p>The course concerns with providing the student with essential knowledge on plants as a source of drugs in their taxonomy, biological features of plants (morphology, reproduction, nutrition, metabolism and growth) The course focus is mainly on the plant parts and classification of the suborder angiosperm as major source of vegetable drugs. The practical part of the course provides the student with skills of identifying the morphological and Microscopical of different types of plant part which will help the student in specific pharmacy courses and hence this course can be referred as introduction to those courses including “Pharmacognosy” and “Phytochemistry” and “Complementary and alternative medicine”.</p>

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III. program Intended Learning Outcomes (PILOs) :	Course Intended Learning (CILOs) :
<b>C. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Identify the general characters, life cycles and nutritional sources of the common orders, families, genera and species of the plant kingdom.	
a2. Describe the types morphological and microscopical features of plant seeds, roots, leaves, stems , barks, flowers and fruits.	
a3. Determine the structural/functional components and biological processes of plant cell and the anatomical and physiological features of tissues and systems in common plant species.	
a4. Explicit the economic and medical uses of common plant genera and species in particular plants belonging to Angiosperm.	
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:	
b1. Distinguish the tasks of different hospital pharmacy organizations in hospital setting	
b2. Identify the components of typical medication use systems in different pharmacy practice settings.	
b3. Compare between animal cell and plant cell.	
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:	
c1. Handle efficiently and safely the chemical materials and tools used in the Biology & Pharmacognosy lab.	
c2. Operate the instruments (Microscopes) and perform experiments successfully in the Biology & Pharmacognosy lab.	
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:	
d1. Communicate effectively and behave in discipline with colleagues and in teacher in the lab.	
d2. Work successfully within a team.	
d3. Demonstrate the ability of time management, self-learning and problem-solving skills.	

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<b>1. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the general characters, life cycles and nutritional sources of the common orders, families, genera and species of the plant kingdom	Active Lecture	written exams
<b>a2.</b> Describe the types morphological and microscopical features of plant seeds, roots, leaves, stems, barks, flowers and fruits		
<b>a3.</b> Determine the structural/functional components and biological processes of plant cell and the anatomical and physiological features of tissues and systems in common plant species.		
<b>a4.</b> Explicit the economic and medical uses of common plant genera and species in particular plants belonging to Angiosperm.		
<b>(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Differentiate between various plant species based on their morphological and microscopical features.	Active Lecture, feed-back learning	Written exams, assignment, quizzes
<b>b2.</b> Classify plant kingdom into orders, families, genera and species.		
<b>b3.</b> Compare between animal cell and plant cell.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of professional &amp; practical skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in Biology & Pharmacognosy lab.	Lab. Practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and perform experiments successfully in the Biology & Pharmacognosy lab.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

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<b>d1.</b> Communicate effectively and behave in discipline with colleagues and in teacher in the lab.	Lab. Practice	Lab. term works, final practical exam
<b>d3.</b> Demonstrate the ability of time management, self-learning and problem-solving skills.	Lab. Practice works, feed-back learning	Lab. practical works, individual assignment
<b>d2.</b> Work successfully within a team.	Lab. practice, group project	Lab. term works, group-assignment

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction to botany</b>	a1, a3, a4, b1, b2	<ul style="list-style-type: none"> <li>• Definition and Brief history of botany</li> <li>• Basis of plant structures: plant cell and plant cellular contents, types of plant tissues and plant organs</li> <li>• Differences between plant kingdom and animal kingdom</li> <li>• Nutrition, metabolism and growth of plant</li> <li>• Plant taxonomy: basis of classification of plant kingdom into orders, families, suborders, genera, species.</li> </ul>	2	4
2	<b>Plant Order (1) (Thallophyta)</b>	a1, a3, a4, b1, b2,	<ul style="list-style-type: none"> <li>• General characters</li> <li>• <b>Algae</b>.g. Pleurococcus, Spirogyra, Vaucheria, Diatoms.), economic use of algae</li> <li>• <b>Fungi</b>: differences from algae, types phycomycetes (oomycetes e.g., saprolegnia), (zygomycetes e.g. black mold) eumycetes (ascomycetes e.g. yeasts: Ergot fungi) (Basidiomycetes edible</li> </ul>	2	4

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			mushroom, amanita) economic use of fungi • <b>lichens</b> types and examples • <b>Bacteria</b> (only brief study on general characters and differences from fungi, algae and lichens. • <b>Viruses</b> : general characters, examples		
3	<b>Plant order (2) (Archegoniatae)</b>	a1, a3, a4, b1, b3,	<ul style="list-style-type: none"> <li>• General characters</li> <li>• Bryophytes e.g. Hepaticae, mosses</li> <li>• Pteridophytes e.g. Ferns, club mosses</li> </ul>	2	4
4	<b>Plant order (3) Spermophytes (seeding plants)</b>	a1, a3, a4, b1, b2,	<ul style="list-style-type: none"> <li>•Gymnosperms , characters, differences, examples of plants</li> <li>•Angiosperms: characters, differences, economically and medically valuable families.</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2
5	<b>Plant parts in Angiosperms</b>	a1, a2, a3, a4, b1, b2,	(morphology, anatomy and physiology) of : <ul style="list-style-type: none"> <li>• The roots</li> <li>• The stems</li> <li>• The bark</li> <li>• The leaf</li> <li>• The flower</li> <li>• The fruit</li> <li>• The seed</li> </ul>	3	6
6	<b>classification of angiosperms yielding vegetable drugs.</b>	a1, a3, a4, b1, b3	<ul style="list-style-type: none"> <li>• <b>Monocotyledons:</b> general characters, classification, examples of plants and their yielding drugs</li> <li>• <b>Dicotyledons:</b> (Archichlamydeae or Choripetalae, Metachlamydeas or Sympetalas): general characters, classification, examples of plants and their yielding drugs</li> </ul>	3	6
	<b>Course Review</b>	a1, a2, a3, a4, b1, b2,	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32

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<b>Number of Weeks /and Units Per Semester</b>	16 weeks	6 Units
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B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1.	<b>introduction to pharmaceutical organic Biology &amp; Pharmacognosy lab.: safety requirements, list of experiments, how to report, etc.</b>	c1, c2, d1, d3	1	2
2.	<b>Algae: microscopical slides</b>	c1, c2, d2	1	2
3.	<b>Fungi: microscopical and morphological features of different fungi species</b>	c1, c2, d1	2	4
4.	<b>Plant leaves: morphology and microscopy</b>	c1, c2, d2, d3	2	4
5.	<b>Plant barks: morphology and microscopy</b>	c1, c2, d2, d3	1	2
6.	<b>Plant roots and rhizomes: morphology and microscopy</b>	c1, c2, d1, d2	1	2
7.	<b>Plant flowers: morphology and microscopy</b>	c1, c2, d1, d2	1	2
8.	<b>Plant fruits: morphology and microscopy</b>	c1, c2, d1, d2	1	2
9.	<b>Differentiation between Monocotyledons Dicotyledons: morphology and microscopy</b>	c1, c2, d1, d2	1	2
<b>PRACTICAL EXAM</b>		c1, c2, d1,d2,d3,	1	2
<b>Total</b>			<b>12</b>	<b>24</b>
Number of Weeks			12	

### V. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

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**Laboratory practice:** students doing experiments in labs individually or in small groups

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

## VI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to do a search report on one species of one medically valuable plant family.	d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to do a search report supported with illustrating videos on one of the followings: <ul style="list-style-type: none"> <li>• Plant taxonomy</li> <li>• Plant cell</li> <li>• Algae</li> <li>• Phycomycetes</li> </ul>	d1, d3	14	2

## VII. Schedule of Assessment Tasks for Students During the Semester

### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	d1, d2, d3
2	Mid-semester exam of theoretical part (written exam)		7	10	10	a1, a2, a4, b1, b2, b3, d3
3	Final exam of theoretical part (written exam)		16	50	50	a1, a2, a3, a4, b1, b2, b3, d3
TOTAL				70	70%	70

### Practical part assessment

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N o.	Assessment Method		Week Due	Mar k	Proportion To Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, d1, d3
Total				30	30%	

### VIII. Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Alexey Shipunov., Introduction to Botany. 2022, Minot State University (North Dakota, USA)

#### 2- Essential References.

W.C. Evans, Trease and Evans Pharmacognosy, 2009, W.B. Saunders

#### 3- Electronic Materials and Web Sites etc.

[http://herba.msu.ru/shipunov/school/biol\\_154/textbook/intro\\_botany.pdf](http://herba.msu.ru/shipunov/school/biol_154/textbook/intro_botany.pdf)

### IX. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.

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<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head	Page <b>440</b>
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL CALCULATIONS**

Course No. (PHT217)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Calculations			
2	Course Code & Number:	PHT217			
3	Credit Hours:2	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHT124			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhawlani			
13	Date of Approval:	2022			

VIII. Course Description:
The course provides the student with basic knowledge and skills of pharmaceutical calculations including: how to express and convert numerals (Arabic and Roman), measurement of weight and volume systems (American, British and French) and interconversion between these systems, how to interpret and quantify compounded prescriptions. The knowledge and skills are significant during medication`s formulation, dispensing, dosing and others missions of pharmacy practice.

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
15. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A:Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and	<b>a1.</b> Describe the methods of pharmaceutical calculations.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





	biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Interpret abbreviations employed in pharmaceutical prescriptions.
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems	<b>b2.</b> Apply pharmaceutical calculations in preparation of medications and dispensing of prescriptions
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c1.</b> Operate calculator correctly during formulation of pharmaceutical preparations
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Demonstrate the skill of time management and self-learning <b>d2.</b> Participate efficiently with his colleagues in a team work.

16. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Describe the methods of pharmaceutical calculations.	Active Lecture	Written exam
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret abbreviations employed in pharmaceutical prescriptions.	Active Lecture, feed-back learning	Written exam, quizzes,

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b2. Apply pharmaceutical calculations in preparation of medications and dispensing of prescriptions	Active Lecture, feed-back learning	Written exam, quizzes, assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Operate calculator correctly during formulation of pharmaceutical preparations	Active Lecture, Feed-back learning	written exam, Quizzes
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate the skill of time management and self-learning	Feed-back learning	Assignment
d2. Participate efficiently with his colleagues in a team work.	Group-project	Assignment

<b>XXV. Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction</b>	a1	<ul style="list-style-type: none"> <li>Basic mathematical processing, calculators, source of errors, Roman and Arabic Numerals</li> </ul>	1	2
2	<b>Pharmaceutical measurement systems of weights</b>	a1, b2, c1	<ul style="list-style-type: none"> <li>Apothecary and avoid systems.</li> <li>metric system.</li> <li>Equivalent weight and milliequivalent weight</li> </ul>	2	4
3	<b>Pharmaceutical measurement systems of volumes</b>	a1, b2, c1	<ul style="list-style-type: none"> <li>Apothecary</li> <li>Metric system</li> <li>house-hold systems</li> </ul>	2	4
4	<b>Expressions of concentrations</b>	a1, b2, c1	<ul style="list-style-type: none"> <li>percentage, ratio, quantity/quantity, PPM, PPB, molarity</li> </ul>	1	2
5	<b>Dilution &amp; Allegation</b>	b2, c1	<ul style="list-style-type: none"> <li>Dilution of conc. Solutions</li> <li>dilution of potent solids</li> </ul>	1	2
<b>MID-TERM EXAM</b>				1	2

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6	<b>Isotonicity</b>	a1, b2, c1	<ul style="list-style-type: none"> <li>definition &amp; significance</li> <li>determination</li> </ul>	1	2
7	<b>Buffer capacity</b>	a1, b2, c1	<ul style="list-style-type: none"> <li>definition &amp; significance</li> <li>determination</li> </ul>	1	2
8	<b>Medical prescriptions</b>	b1,b2	<ul style="list-style-type: none"> <li>ideal prescription</li> <li>components of the prescriptions</li> <li>common symbols and abbreviations</li> </ul>	2	4
9	<b>Enlarging and reducing prescription formulas</b>	a1,b1,b2, c1	<ul style="list-style-type: none"> <li>definition</li> <li>determination</li> </ul>	1	2
10	<b>Pediatric Dose</b>	a1,b2, c1	<ul style="list-style-type: none"> <li>Definitions of doses</li> <li>Expression of doses</li> <li>Rules for calculation the child's dose based on age, weight and body surface area</li> </ul>	2	4
<b>Course Review</b>		a1,b1,b2, c1	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>10 Units</b>

### XVI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XVI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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1	<b>Individual:</b> the teacher provides the students with mathematical problems after each unit. Every student is assigned to solve some of those problems individually.	b2, d2	4-13	6
2	<b>Group:</b> each group of students will be assigned to present a report of typical answers of problems of one unit with assessing the correction of answers.	b2, d1, d2	14	4

#### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	c1, b1
		Assignments	7, 12	10	10	b2, d1, d2
2	Mid- exam		7	20	20	a1, b2, c1, d1
3	Final exam		16	60	60	a1, b1, b2, c1
TOTAL				100	100 %	

#### XXV. Learning Resources:

##### 1- Required Textbook(s) (maximum two ).

11. Howard C. Ansel, Pharmaceutical Calculations, 2017, Lippincott Williams & Wilkins .

##### 2- Essential References.

Ryan F Donnelly, Johanne Barry, MCQs in Pharmaceutical Calculations, 2016, pharmaceutical press

##### 3- Electronic Materials and Web Sites etc.

<https://4lmppguhpp.pdcdn1.top/dl2.php?id=21670075&h=9d6cc5f1a85c7164d6784613a3591bcc&u=cache&ext=pdf&n=Mcqs%20in%20pharmaceutical%20calculations>

#### IX. Course Policies: (Based on the Uniform Students' By law (2007)

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.

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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



جامعة الرازي  
AL-RAZI UNIVERSITY

وزارة التعليم العالي والبحث العلمي

جامعة الرازي  
كلية الطب والعلوم الصحية  
قسم الصيدلة





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
Bachelor of Pharmacy

Course Plan (Syllabus) of  
**Pharmaceutical Calculations**  
Course Code No. (PHT217)

VIII. - Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Mohammed Alkhawlani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

IX. Course Description:
The course provides the student with basic knowledge and skills of pharmaceutical calculations including: how to express and convert numerals (Arabic and Roman), measurement of weight and volume systems (American, British and French) and interconversion between these systems, how to interpret and quantify compounded prescriptions. The knowledge and skills are significant during medication`s formulation, dispensing, dosing and others missions of pharmacy practice.

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III. Intended learning outcomes of the course (CILOs)	
<b>17. Alignment CILOs</b>	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Describe the methods of pharmaceutical calculations.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
b1. Interpret abbreviations employed in pharmaceutical prescriptions.	
b2. Apply pharmaceutical calculations in preparation of medications and dispensing of prescriptions	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
c1. Operate calculator correctly during formulation of pharmaceutical preparations	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
d1. Demonstrate the skill of time management and self-learning	
d2. Participate efficiently with his colleagues in a team work.	

18. Alignment CILOs to teaching strategies and assessment strategies		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Describe the methods of pharmaceutical calculations.	Active Lecture	Written exam
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Interpret abbreviations employed in pharmaceutical prescriptions.	Active Lecture, feedback learning	Written exam, quizzes,
b2. Apply pharmaceutical calculations in preparation of medications and dispensing of prescriptions	Active Lecture, feedback learning	Written exam, quizzes, assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
c1. Operate calculator correctly during formulation of pharmaceutical preparations	Active Lecture, Feedback learning	written exam, Quizzes
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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d1. Demonstrate the skill of time management and self-learning	Feed-back learning	Assignment
d2. Participate efficiently with his colleagues in a team work.	Group-project	Assignment

XXVI. Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction	a1	<ul style="list-style-type: none"> <li>Basic mathematical processing, calculators, source of errors, Roman and Arabic Numerals</li> </ul>	1	2
2	Pharmaceutical measurement systems of weights	a1, b2, c1	<ul style="list-style-type: none"> <li>Apothecary and avoid systems.</li> <li>metric system.</li> <li>Equivalent weight and milliequivalent weight</li> </ul>	2	4
3	Pharmaceutical measurement systems of volumes	a1, b2, c1	<ul style="list-style-type: none"> <li>Apothecary</li> <li>Metric system</li> <li>house-hold systems</li> </ul>	2	4
4	Expressions of concentrations	a1, b2, c1	<ul style="list-style-type: none"> <li>percentage, ratio, quantity/quantity, PPM, PPB, molarity</li> </ul>	1	2
5	Dilution & Allegation	b2, c1	<ul style="list-style-type: none"> <li>Dilution of conc. Solutions</li> <li>dilution of potent solids</li> </ul>	1	2
MID-TERM EXAM				1	2
6	Isotonicity	a1, b2, c1	<ul style="list-style-type: none"> <li>definition &amp; significance</li> <li>determination</li> </ul>	1	2
7	Buffer capacity	a1, b2, c1	<ul style="list-style-type: none"> <li>definition &amp; significance</li> <li>determination</li> </ul>	1	2
8	Medical prescriptions	b1,b2	<ul style="list-style-type: none"> <li>ideal prescription</li> <li>components of the prescriptions</li> <li>common symbols and abbreviations</li> </ul>	2	4
9	Enlarging and reducing prescription formulas	a1,b1,b2, c1	<ul style="list-style-type: none"> <li>definition</li> <li>determination</li> </ul>	1	2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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10	<b>Pediatric Dose</b>	a1,b2, c1	<ul style="list-style-type: none"> <li>Definitions of doses</li> <li>Expression of doses</li> <li>Rules for calculation the child`s dose based on age, weight and body surface area</li> </ul>	2	4
<b>Course Review</b>		a1,b1,b2, c1	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	10 Units

### XVII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XVII. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : the teacher provides the students with mathematical problems after each unit. Every student is assigned to solve some of those problems individually.	b2, d2	4-13	6
2	<b>Group</b> : each group of students will be assigned to present a report of typical answers of problems of one unit with assessing the correction of answers.	b2, d1, d2	14	4

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total	Aligned Course Learning Outcomes (CILOs)
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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				course Assessment		
1	Term Works	Quizzes	4-13, 14	10	10	c1, b1
		Assignments	7, 12	10	10	b2, d1, d2
2	Mid- exam		7	20	20	a1, b2, c1, d1
3	Final exam		16	60	60	a1, b1, b2, c1
TOTAL				100	100 %	

### XXVI. Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

12. Howard C. Ansel, Pharmaceutical Calculations, 2017, Lippincott Williams & Wilkins .

#### 2- Essential References.

Ryan F Donnelly, Johanne Barry, MCQs in Pharmaceutical Calculations, 2016, pharmaceutical press

#### 3- Electronic Materials and Web Sites etc.

<https://4lmpgguhpp.pdcn1.top/dl2.php?id=21670075&h=9d6cc5f1a85c7164d6784613a3591bcc&u=cache&ext=pdf&n=Mcqs%20in%20pharmaceutical%20calculations>

### IX. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**MEDICAL BIOCHEMISTRY**  
Course No. (MSC215)

**2022**



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X. Course Identification and General Information:						
25.	Course Title:	MEDICAL BIOCHEMISTRY				
26.	Course Code & Number:	MSC 09				
27.	Credit hours:	C.H			TOTAL	
		Theoretical		P		Tr.
		L.	Tut.			
2	-	-	1	-	3	
28.	Study level/ semester at which this course is offered:	( <i>SECOND</i> ) Year – ( <i>1<sup>ST</sup></i> ) semester				
29.	Pre –requisite (if any):	<ul style="list-style-type: none"> <li>• General chemistry</li> <li>• Organic chemistry</li> <li>• General biology</li> </ul>				
30.	Co –requisite (if any):	-----				
31.	Program (s) in which the course is offered:	All BC programs offered by the university				
32.	Language of teaching the course:	ENGLISH				
33.	Location of teaching the course:	IN THE UNIVERSITY				
34.	Prepared By:	Dr. Mohammed Abdulwahid				
35.	Date of Approval	10/2014				

XI. Course Description:
The course deals study of the types of biochemical compounds, including carbohydrates, lipids, proteins, enzymes , vitamins and nucleic acids, and the changes to which are undergone to in the body.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Abdulwahid	Dr. Jamal Almahweeti	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
No.	PILOs	CILOs
<b>A: Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:		
A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.		a1. Identify the biochemical compounds and that have significant roles in human and living organisms bodies.
A3. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.		a2. Explicit the physiological/pathological involvement of carbohydrates, lipids, proteins and other biochemicals.
		a3. Discuss the biosynthesis and metabolic pathways of biochemical compounds.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
B1. Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.		b1. Interpret certain body diseases based on disturbances in levels of body biochemicals
B2. Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..		b2. Solve biochemical problems related to nomenclature, synthetic and metabolic reactions.
		b3. Classify biochemicals into various categories.
		b4. Compare between different types of biochemical synthesis or metabolic reactions based on their income and outcomes products.
B5. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.		b5. Predict the outcomes of biochemical reactions.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
C1. Apply knowledge, practical and industrial skills of handling, designing, pre-		c1. Handle efficiently the tools and chemicals used in biochemistry Lab.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Abdulwahid	Dr. Jamal Almahweeti	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.	<b>c2.</b> Operate successfully the instruments used in biochemistry Lab.
<b>C2.</b> Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c3 .</b> Perform efficiently experiments and practical tasks for in vitro and in vivo identifications of biochemical compounds using standard procedures.
	<b>c4.</b> Take and prepare human samples to biochemistry investigations using standard procedures.
<b>C5.</b> Advise/ educate them on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	<b>c5 .</b> Take the required safety criteria during performing practical works in in biochemistry Lab.
<b>C6.</b> Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	<b>c6 .</b> Appropriately search for information and also present and report his/her work using various source of information and media technologies..
	<b>c7.</b> Use effectively symbols and figures and drawing to express chemical reactions and synthesis
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
<b>D1.</b> Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Share successfully in team-work.
	<b>d2.</b> Show respect to life.
	<b>d3.</b> Communicate effectively with his/her colleagues during performing practical works in in biochemistry Lab.
	<b>d4.</b> behave in discipline during performing practical works in biochemistry Lab.
	<b>d5.</b> Demonstrate time management and self-learning during performing assignments and during practical works in in biochemistry Lab.

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<b>19. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the biochemical compounds and that have significant roles in human and living organisms bodies.	<b>Lecture, laboratory practice</b>	<b>written exam , Practical assessment</b>
<b>a2.</b> Explicit the physiological/pathological involvement of carbohydrates, lipids, proteins and other biochemicals.	<b>Lecture,, feed-back learning</b>	<b>written exam , assignment</b>
<b>a3.</b> Discuss the biosynthesis and metabolic pathways of biochemical compounds.	<b>Lecture, feed-back learning, Group-project.</b>	<b>written exam , assignment</b>
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret certain body diseases based on disturbances in levels of body biochemicals	<b>lecture, group-project, feed-back learning</b>	<b>Written exam, assignments</b>
<b>b2 .</b> Solve biochemical problems related to nomenclature, synthetic and metabolic reactions.	<b>Lecture, , feed-back learning</b>	<b>written exam , quizzes</b>
<b>b3.</b> Classify biochemicals into various categories.		
<b>b4.</b> Compare between different types of biochemical synthesis or metabolic reactions based on their income and outcomes products.		
<b>b5.</b> Predict the outcomes of biochemical reactions.	<b>Lecture,, feed-back learning</b>	<b>written exam, quizzes</b>
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently the tools and chemicals used in biochemistry Lab.	<b>Lab. Practice</b>	<b>Practical assessment</b>
<b>c2.</b> Operate successfully the instruments used in biochemistry Lab.		
<b>c3 .</b> Perform efficiently experiments and practical tasks for in vitro and in vivo identifications of biochemical compounds using standard procedures.	<b>Lab. Practice</b>	<b>Practical assessment</b>

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c4. Take and prepare human samples to biochemistry investigations using standard procedures.		
c5 .Take the required safety criteria during performing practical works in in biochemistry Lab.	Lab. Practice	Practical assessment
c6 .Appropriately search for information and also present and report his/her work using various source of information and media technologies..	Group-project, feed-back learning	Written- exam , practical assessment , assignments
c7. Use effectively symbols and figures and drawing to express chemical reactions and synthesis		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skillsto Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Group-project , feed-back learning	Assignment , Practical assessment
d2. Show respect to life.	lecture	Written exam
d3. Communicate effectively with his/her colleagues during performing practical works in in biochemistry Lab.	Lab. Practice	Practical assessment
d4. behave in discipline during performing practical works in biochemistry Lab.	Lab. Practice	Practical assessment (Lab Attitude)
d5. Demonstrate time management and self-learning during performing assignments and during practical works in in biochemistry Lab.	Lab. Practice , Group-project	Practical assessment , assignment

<b>XXVII. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Carbohydrates</b>	a1, a2, a3, b1, b2, b4, c7, d2	<ul style="list-style-type: none"> <li>• Classifications and physiological roles</li> <li>• Glycolysis</li> <li>• Citric acid cycle</li> </ul>	3	

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			<ul style="list-style-type: none"> <li>Glycogenesis and glycogenolysis</li> <li>Hexose monophosphate shunt</li> <li>Uronic acid pathway</li> <li>Blood sugar and its regulation.</li> <li>Pathological conditions related carbohydrates.</li> </ul>		6
2	<b>Lipids</b>	a1, a2, b1, b2, b3, b5, b6, c5, d1	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Biosynthesis of fats</li> <li>Oxidation of fatty acids</li> <li>Ketogenesis and ketosis</li> <li>Metabolism of cholesterol</li> <li>Essential fatty acid and eicosanodis phospholipids.</li> <li>Sphingolipids.</li> <li>Bile salts</li> <li>Pathological conditions related to lipids.</li> </ul>	2	4
<b>MID-TERM EXAM</b>				1	2
3	<b>Proteins</b>	a1, a3, b2, b3, b4, c4, c6, d3	<ul style="list-style-type: none"> <li>Classification of aminoacides</li> <li>General biochemical reaction of amino acids like</li> <li>Transamination</li> <li>Deamination</li> <li>Decarboxylation</li> <li>Peptides and polypeptides</li> <li>Biosynthesis of proteins : role of DNA</li> <li>Classifications and physiological roles of proteins</li> <li>Metabolism of proteins</li> <li>Urea cycle</li> <li>Nitrogen balance</li> <li>Pathological conditions related to proteins.</li> </ul>	2	4
4	<b>Enzymes</b>	a1, a2, a3, b1, b2, b3, b4, c5, c7, d4	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Nomenclature</li> <li>Factors affecting enzyme action</li> <li>Enzyme kinetics</li> <li>Cytochrome P450 enzymes : classification, roles, stimulation and inhibition</li> </ul>	2	4

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			<ul style="list-style-type: none"> <li>Pathological conditions related to enzymes.</li> </ul>		
5	<b>Vitamins and minerals</b>	a1, a2, a3, b1, b2, b3, b4, b5, b6, c7, d2	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Vitamins as coenzymes and their significance</li> <li>Metals as co-factors</li> <li>Role and significant of minerals and trace elements</li> </ul>	2	4
6	<b>Nucleic acids</b>	a1, a2, a3, b1, b3, b4, c5, c6, d1	<ul style="list-style-type: none"> <li>Basic structures</li> <li>Types (DNA, RNA), roles, biosynthesis and catabolism</li> <li>DNA replication and mutation</li> <li>DNA repair mechanism</li> </ul>	1	2
7	<b>Hormones</b>	a1, a2, a3, b1, b2, b5, c4, c6, d5	biosynthesis, catabolism and Pathological conditions related to : <ul style="list-style-type: none"> <li>Insulin</li> <li>Thyroxin</li> <li>Corticosteroids</li> </ul>	1	2
	<b>Course Review</b>	a1, a2, a3, b1, b2, b3, b4, b5, c5, c6, c7, d2	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>7 Units</b>

**B - Practical Aspect:**

Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Intended Learning Outcomes CILOs
1	introduction to biochemistry chemistry Lab.: safety requirements, list of experiments, How to report, etc	1	2	c1, c2, c3, d1, d2,
2	carbohydrates monosaccharaides : physicochemical properties and in vitro identification & differentiation.	1	2	c1, c3, c4, c5, d2, d3
3	carbohydrates disaccharides physicochemical properties and in vitro identification & differentiation.	1	2	c2, c3, c4, d3, d4, d5

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4	carbohydrates polysaccharides physicochemical properties and in vitro identification & differentiation.	1	2	c1, c2, c4, d1, d3, d4
5	Sampling and preserving of human samples : blood, urine		2	c1, c2, c3, c4, c5, d1, d2
6	Bioassay of blood glucose	1	2	c2, c3, c4, c6, d4, d5
7	Lipids physicochemical properties and in vitro identification of cholesterol.	1	2	c2, c3, c4, c5, d1, d2, d3
8	Assay of cholesterol in human blood.	1	2	c1, c2, c4, c5, d3, d4, d5
9	Proteins: physicochemical properties and in vitro identification of certain types of proteins	1	2	c2, c3, c4, c5, d1, d2
10	bioassay of certain enzymes related to hepatic function e.g. GPT	1	2	c2, c3, c4, c5, d3, d4, d5
11	bioassay of thyroxin hormones.	1	2	c3, c4, c5, d1, d3, d5
PRACTICAL EXAM		1	2	c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
Total		12	24	
Number of Weeks			12	

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### XVIII. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

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XVIII. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provide the students with biochemical problems related to the studied topics. Every student is assigned to solve some of those problems individually.	b2, c5, d4	4-13	3
2	<b>Group :</b> each group of students will be assigned to present a search report on one pathological condition related to disturbances in biochemical levels in the body.	b1, d1, d5, c6	14	2

VII. Schedule of Assessment Tasks for Students During the Semester					
Theoretical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	2.5	2.5	a1, a2, a3, b1, b2, b3, b4, b5, b6, c7, d2
2	Assignments (1 + 2)	4-13, 14	5	5	b1, b2, c5, c6, d1, d4, d5
3	Quiz 1 + Quiz 2	7, 12	2.5	2.5	b2, b5
4	Mid-semester exam of theoretical part ( written exam)	7	10	10	a1, a2, a3, b1, b2, b3, b4, b5, c7, d2
5	Final exam of theoretical part ( written exam)	17	40	40	a1, a2, a3, b1, b2, b3, b4, b5, c7, d2
TOTAL			60	60 %	60

Practical part assessment					
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No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Attendance	Weekly	5	5	a1, c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
2	Lab. Attitude	weekly	2.5	2.5	d1, d3, d4
3	Lab. Accomplishments	weekly	5	5	c1, c2, c3
4	Lab. Reporting	weekly	2.5	2.5	c6, c7
5	Exam of practice theory (written exam or oral exam)	14	5	5	a1, c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
6	Practical exam (practical)	14	20	20	a1, c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
<b>Total</b>			<b>40</b>	<b>40 %</b>	

#### XXVII. Learning Resources:

##### 1- Required Textbook(s) ( maximum two ).

13. Pamela C. Champe, Lippincott's illustrated review in Biochemistry, 2010, Lippincott William & Wilkins

##### 2- Essential References.

- Hiram f. Gilbert , Basic concepts in biochemistry ; a student's survival guide, 2000, McGraw-Hill
- Vyas . Pharmaceutical biochemistry

##### 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

#### XI. Course Policies:

13.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
14.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
15.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
16.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b>

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Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.

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**Course Plan (Syllabus) of medical biochemistry**

IX. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Mohammed Abdulwahid	Office Hours					
Location & Telephone No.	Pharmacy department ; 770954876	SAT	SUN	MON	TUE	WED	THU
E-mail	<a href="mailto:aiaameen@hotmail.com">aiaameen@hotmail.com</a>						

XII. Course Description:
The course deals study of the types of biochemical compounds, including carbohydrates, lipids, proteins, enzymes , vitamins and nucleic acids, and the changes to which are undergone to in the body.

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III. Intended learning outcomes of the course (CILOs)
<b>Alignment CILOs</b>
<b>A: Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:
<b>a1.</b> Identify the biochemical compounds and that have significant roles in human and living organisms bodies.
<b>a2.</b> Explicit the physiological/pathological involvement of carbohydrates, lipids, proteins and other biochemicals.
<b>a3.</b> Discuss the biosynthesis and metabolic pathways of biochemical compounds.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:
<b>b1.</b> Interpret certain body diseases based on disturbances in levels of body biochemicals
<b>b2 .</b> Solve biochemical problems related to nomenclature, synthetic and metabolic reactions.
<b>b3.</b> Classify biochemicals into various categories.
<b>b4.</b> Compare between different types of biochemical synthesis or metabolic reactions based on their income and outcomes products.
<b>b5.</b> Predict the outcomes of biochemical reactions.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
<b>c1.</b> Handle efficiently the tools and chemicals used in biochemistry Lab.
<b>c2.</b> Operate successfully the instruments used in biochemistry Lab.
<b>c3 .</b> Perform efficiently experiments and practical tasks for in vitro and in vivo identifications of biochemical compounds using standard procedures.
<b>c4.</b> Take and prepare human samples to biochemistry investigations using standard procedures.
<b>c5 .</b> Take the required safety criteria during performing practical works in in biochemistry Lab.
<b>c6 .</b> Appropriately search for information and also present and report his/her work using various source of information and media technologies..
<b>c7.</b> Use effectively symbols and figures and drawing to express chemical reactions and synthesis
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:
<b>d1.</b> Share successfully in team-work.
<b>d2.</b> Show respect to life.
<b>d3.</b> Communicate effectively with his/her colleagues during performing practical works in in biochemistry Lab.
<b>d4.</b> behave in discipline during performing practical works in biochemistry Lab.
<b>d5.</b> Demonstrate time management and self-learning during performing assignments and during practical works in in biochemistry Lab.

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<b>20. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the biochemical compounds and that have significant roles in human and living organisms bodies.	<b>Lecture, laboratory practice</b>	<b>written exam , Practical assessment</b>
<b>a2.</b> Explicit the physiological/pathological involvement of carbohydrates, lipids, proteins and other biochemicals.	<b>Lecture,, feed-back learning</b>	<b>written exam , assignment</b>
<b>a3.</b> Discuss the biosynthesis and metabolic pathways of biochemical compounds.	<b>Lecture, feed-back learning, Group-project.</b>	<b>written exam , assignment</b>
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret certain body diseases based on disturbances in levels of body biochemicals	<b>lecture, group-project, feed-back learning</b>	<b>Written exam, assignments</b>
<b>b2 .</b> Solve biochemical problems related to nomenclature, synthetic and metabolic reactions.	<b>Lecture, , feed-back learning</b>	<b>written exam , quizzes</b>
<b>b3.</b> Classify biochemicals into various categories.		
<b>b4.</b> Compare between different types of biochemical synthesis or metabolic reactions based on their income and outcomes products.		
<b>b5.</b> Predict the outcomes of biochemical reactions.	<b>Lecture,, feed-back learning</b>	<b>written exam, quizzes</b>
<b>(c)Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skillsto Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handleefficiently the tools and chemicals used in biochemistry Lab.	<b>Lab. Practice</b>	<b>Practical assessment</b>
<b>c2.</b> Operate successfully the instruments used in biochemistry Lab.		

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c3 . Perform efficiently experiments and practical tasks for in vitro and in vivo identifications of biochemical compounds using standard procedures.	Lab. Practice	Practical assessment
c4. Take and prepare human samples to biochemistry investigations using standard procedures.		
c5 .Take the required safety criteria during performing practical works in in biochemistry Lab.	Lab. Practice	Practical assessment
c6 .Appropriately search for information and also present and report his/her work using various source of information and media technologies..	Group-project, feed-back learning	Written- exam , practical assessment , assignments
c7. Use effectively symbols and figures and drawing to express chemical reactions and synthesis		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skillsto Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Group-project , feed-back learning	Assignment , Practical assessment
d2. Show respect to life.	lecture	Written exam
d3. Communicate effectively with his/her colleagues during performing practical works in in biochemistry Lab.	Lab. Practice	Practical assessment
d4. behave in discipline during performing practical works in biochemistry Lab.	Lab. Practice	Practical assessment (Lab Attitude)
d5. Demonstrate time management and self-learning during performing assignments and during practical works in in biochemistry Lab.	Lab. Practice , Group-project	Practical assessment , assignment

<b>XVIII. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Carbohydrates	a1, a2, a3, b1, b2, b4, c7, d2	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Glycolysis</li> <li>Citric acid cycle</li> </ul>	3	

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			<ul style="list-style-type: none"> <li>Glycogenesis and glycogenolysis</li> <li>Hexose monophosphate shunt</li> <li>Uronic acid pathway</li> <li>Blood sugar and its regulation.</li> <li>Pathological conditions related carbohydrates.</li> </ul>		6
2	<b>Lipids</b>	a1, a2, b1, b2, b3, b5, b6, c5, d1	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Biosynthesis of fats</li> <li>Oxidation of fatty acids</li> <li>Ketogenesis and ketosis</li> <li>Metabolism of cholesterol</li> <li>Essential fatty acid and eicosanodis phospholipids.</li> <li>Sphingolipids.</li> <li>Bile salts</li> <li>Pathological conditions related to lipids.</li> </ul>	2	4
<b>MID-TERM EXAM</b>				1	2
3	<b>Proteins</b>	a1, a3, b2, b3, b4, c4, c6, d3	<ul style="list-style-type: none"> <li>Classification of aminoacides</li> <li>General biochemical reaction of amino acids like</li> <li>Transamination</li> <li>Deamination</li> <li>Decarboxylation</li> <li>Peptides and polypeptides</li> <li>Biosynthesis of proteins : role of DNA</li> <li>Classifications and physiological roles of proteins</li> <li>Metabolism of proteins</li> <li>Urea cycle</li> <li>Nitrogen balance</li> <li>Pathological conditions related to proteins.</li> </ul>	2	4
4	<b>Enzymes</b>	a1, a2, a3, b1, b2, b3, b4, c5, c7, d4	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Nomenclature</li> <li>Factors affecting enzyme action</li> <li>Enzyme kinetics</li> <li>Cytochrome P450 enzymes : classification, roles, stimulation and inhibition</li> </ul>	2	4

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			<ul style="list-style-type: none"> <li>Pathological conditions related to enzymes.</li> </ul>		
5	<b>Vitamins and minerals</b>	a1, a2, a3, b1, b2, b3, b4, b5, b6, c7, d2	<ul style="list-style-type: none"> <li>Classifications and physiological roles</li> <li>Vitamins as coenzymes and their significance</li> <li>Metals as co-factors</li> <li>Role and significant of minerals and trace elements</li> </ul>	2	4
6	<b>Nucleic acids</b>	a1, a2, a3, b1, b3, b4, c5, c6, d1	<ul style="list-style-type: none"> <li>Basic structures</li> <li>Types (DNA, RNA), roles , biosynthesis and catabolism</li> <li>DNA replication and mutation</li> <li>DNA repair mechanism</li> </ul>	1	2
7	<b>Hormones</b>	a1, a2, a3, b1, b2, b5, c4, c6, d5	biosynthesis , catabolism and Pathological conditions related to : <ul style="list-style-type: none"> <li>Insulin</li> <li>Thyroxin</li> <li>Corticosteroids</li> </ul>	1	2
	<b>Course Review</b>	a1, a2, a3, b1, b2, b3, b4, b5, c5, c6, c7, d2	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>7 Units</b>

B - Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Intended Learning Outcomes CILOs
1	<b>introduction to biochemistry chemistry Lab.: safety requirements, list of experiments, How to report, etc</b>	1	2	<b>c1, c2, c3, d1, d2,</b>

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2	carbohydrates monosaccharides : physicochemical properties and in vitro identification & differentiation.	1	2	c1, c3, c4, c5, d2, d3
3	carbohydrates disaccharides physicochemical properties and in vitro identification & differentiation.	1	2	c2, c3, c4, d3, d4, d5
4	carbohydrates polysaccharides physicochemical properties and in vitro identification & differentiation.	1	2	c1, c2, c4, d1, d3, d4
5	Sampling and preserving of human samples : blood, urine		2	c1, c2, c3, c4, c5, d1, d2
6	Bioassay of blood glucose	1	2	c2, c3, c4, c6, d4, d5
7	Lipids physicochemical properties and in vitro identification of cholesterol.	1	2	c2, c3, c4, c5, d1, d2, d3
8	Assay of cholesterol in human blood.	1	2	c1, c2, c4, c5, d3, d4, d5
9	Proteins: physicochemical properties and in vitro identification of certain types of proteins	1	2	c2, c3, c4, c5, d1, d2
10	bioassay of certain enzymes related to hepatic function e.g. GPT	1	2	c2, c3, c4, c5, d3, d4, d5
11	bioassay of thyroxin hormones.	1	2	c3, c4, c5, d1, d3, d5
PRACTICAL EXAM		1	2	c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
<b>Total</b>		<b>12</b>	<b>24</b>	
Number of Weeks			12	

### XIX. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

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**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

XIX. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provide the students with biochemical problems related to the studied topics. Every student is assigned to solve some of those problems individually.	b2, c5, d4	4-13	3
2	<b>Group :</b> each group of students will be assigned to present a search report on one pathological condition related to disturbances in biochemical levels in the body.	b1, d1, d5, c6	14	2

VII. Schedule of Assessment Tasks for Students During the Semester					
Theoretical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	2.5	2.5	a1, a2, a3, b1, b2, b3, b4, b5, b6, c7, d2
2	Assignments (1 + 2)	4-13, 14	5	5	b1, b2, c5, c6, d1, d4, d5
3	Quiz 1 + Quiz 2	7, 12	2.5	2.5	b2, b5
4	Mid-semester exam of theoretical part ( written exam	7	10	10	a1, a2, a3, b1, b2, b3, b4, b5, c7, d2

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5	Final exam of theoretical part ( written exam)	17	40	40	a1, a2, a3, b1, b2, b3, b4, b5, c7, d2
TOTAL			60	60 %	60

Practical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Attendance	Weekly	5	5	a1, c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
2	Lab. Attitude	weekly	2.5	2.5	d1, d3, d4
3	Lab. Accomplishments	weekly	5	5	c1, c2, c3
4	Lab. Reporting	weekly	2.5	2.5	c6, c7
5	Exam of practice theory (written exam or oral exam)	14	5	5	a1, c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
6	Practical exam (practical)	14	20	20	a1, c1, c2, c3, c4, c5, d1, d2, d3, d4, d5
Total			40	40 %	

### XXVIII. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

14. Pamela C. Champe, Lippincott's illustrated review in Biochemistry, 2010, Lippincott William & Wilkins

#### 2- Essential References.

- Hiram f. Gilbert , Basic concepts in biochemistry ; a student's survival guide, 2000, McGraw-Hill
- Vyas . Pharmaceutical biochemistry

#### 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

### XII. Course Policies:

17.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
18.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
19.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
20.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work

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5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.

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السنة الثانية  
الفصل الثاني

SECOND level (2 <sup>nd</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr.	Cr.hr	
17.	Pharmaceutics I	صيدلانيات 1	PHT222	2	2	3	Pre: PHT211
18.	Human Physiology II	علم وظائف الأعضاء 2	MSC221	2	-	2	Pre: MSC213
19.	Pharmaceutical analytical chemistry I	كيمياء تحليلية صيدلانية 1	PHM223	2	2	3	Pre: PHM214
20.	Pharmaceutical Microbiology	أحياء دقيقة صيدلانية	PHT225	2	2	3	
21.	Pathology	علم الأمراض	MSC226	2	-	2	Co: PHC221
22.	Pharmacognosy I	علم العقاقير 1	PHG224	2	2	3	Pre: PHG216
23.	Medicinal Chemistry I	كيمياء دوائية 1	PHM227	3	2	4	Co: PHC228
24.	Pharmacology I	علم أدوية 1	PHP228	2	-	2	Co: PHM227
Total				17	10	22	

Th: Theoretical (Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisit



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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of medicine and Health Sciences

Department of :

**Pharmacy**

Bachelor of Pharmacy

Course Specification of

**PHARMACEUTICS I**

Course No. (PHT222)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutics I			
2	Course Code & Number:	PHT222			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Second Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHT211			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ameen Alwossabi			
13	Date of Approval:	2022			

II. Course Description:
<p>The first part of this course provides the student with an introduction to the science and art of designing pharmaceutical dosage forms, especially the roles and types of excipients in the dosage form and the stages of developing the dosage form, which includes the pre-formulation stage, the formulation and development stage, and then the production stage. The second part of the course provides knowledge for preparing liquid dosage forms, compressed gases (pharmaceutical aerosols). The practical part provides the student with skill of compounding the pharmaceutical liquid dosage forms in Pharmaceutics Lab.</p>

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III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies		
1. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A2.</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Describe the significance of pharmaceuticals as art and science of dosage form design <b>a2.</b> Explain the types and roles of excipients and packaging included in pharmaceutical aerosols, and different types of liquid dosage forms.
<b>A3.</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Describe the stages of designing pharmaceutical aerosols and liquid dosage form (solution, suspension, and emulsion) <b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)
<b>A1.</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a5.</b> Explain the general properties, advantages and disadvantages of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion).
<b>A4.</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a6.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' pharmaceutical liquid dosage forms. (solution, suspension, and emulsion)
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B2.</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and	<b>b1.</b> Distinguish pharmaceutical liquid dosage forms <b>b2.</b> Determine the roles and types of pharmaceutical excipients and packaging

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	biopharmaceutical materials/products according to GLP and GMP guidelines.	<p>b3. Classify pharmaceutical aerosols and categorize liquid dosage forms. (solution, suspension, and emulsion)</p> <p>b4. Compare between various types of pharmaceutical aerosols and liquid dosage forms in particular between old and current dosage forms and between solutions and dispersion liquids. (solution, suspension, and emulsion)</p> <p>b5. Design pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)</p>
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1.</b>	<b>C1.</b> Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<p>c1. Handle efficiently and safely the chemical materials and tools used in the laboratory</p> <p>c2. Operate the instruments and perform experiments successfully in the laboratory</p> <p>c3. Employ the relevant way to prepare liquid extemporaneous pharmaceutical dosage forms. (solution, suspension, and emulsion)</p> <p>c4. Search efficiently for information using documented and electronic sources of information.</p> <p>c5. Present and report his/her works correctly using appropriate writing rules and technologies media.</p>
<b>Transferable skills :</b> Upon successful completion of the course, students will be able to:		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<p>d1. Participate efficiently with his colleagues in a teamwork.</p> <p>d2. Demonstrate the skills of time management and self-learning.</p> <p>d3. Communicate effectively and behave in discipline with colleagues.</p>

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<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Describe the significance of pharmaceuticals as art and science of dosage form design	Active Lecture	Written exams
<b>a2.</b> Explain the types and roles of excipients and packaging included in pharmaceutical aerosols, and different types of liquid dosage forms.		
<b>a3.</b> Describe the stages of designing pharmaceutical aerosols and liquid dosage form (solution, suspension, and emulsion)		
<b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)		
<b>a5.</b> Explain the general properties, advantages and disadvantages of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion).		
<b>a6.</b> Discuss the principles, pharmacopeial requirements, and methods of preparation, of various types' pharmaceutical liquid dosage forms. (solution, suspension, and emulsion)		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Distinguish pharmaceutical liquid dosage forms	Active Lecture , Feed-back learning	Written exams, quizzes
<b>b2.</b> Determine the roles and types of pharmaceutical excipients and packaging		
<b>b3.</b> Classify pharmaceutical aerosols and categorize liquid dosage forms. (solution, suspension, and emulsion)		
<b>b4.</b> Compare between various types of pharmaceutical aerosols and liquid dosage forms in particular between old and current dosage forms and between solutions and dispersion liquids. (solution, suspension, and emulsion)		

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b5. Design pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	Laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3. Employ the relevant way to prepare liquid extemporaneous pharmaceutical dosage forms.		
c4. Search efficiently for information using documented and electronic sources of information.	Feed-back learning, Group-project	Assignments
c5. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Participate efficiently with his colleagues in a teamwork.	Laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d2. Demonstrate the skills of time management and self-learning.		
d3. Communicate effectively and behave in discipline with colleagues.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

<b>IV. Course Content:</b>					
<b>A. Theoretical Aspect:</b>					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CIL Os

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1	<b>Introduction to pharmaceuticals</b>	Definitions and brief history of pharmaceuticals, pharmacopeia, Definition of dosage form, the components, the need to dosage forms, classification of dosage forms	1	2	a1, b1
2	<b>Pharmaceutical excipients &amp; packaging</b>	Roles, types with examples <ul style="list-style-type: none"> <li>• <b>Essential:</b> solvents, vehicles, emulsifying agents, binders, etc.</li> <li>• <b>Stabilizers:</b> buffers, preservatives, antioxidants, viscosity enhancers, anti-cake, etc.</li> <li>• <b>Bioavailability enhancers:</b> solubilizer</li> <li>• <b>Organoleptic excipients:</b> colorants, sweeteners, flavors</li> <li>• <b>Excipients for other purposes</b> e.g. isotonic agents</li> <li>• Type and function of packaging materials</li> </ul>	2	4	a1, a2, b2, b3
3	<b>Design of dosage form: Preformulation, Formulation and development</b>	<ul style="list-style-type: none"> <li>• <b>Preformulation stage:</b> physicochemical properties and analytical data required. Scheme of preformulation, Compatibility testing.</li> <li>• <b>Formulation:</b> general rules, sources of raw materials, economic impact</li> <li>• <b>Development stage</b></li> <li>• <b>Production stage</b></li> </ul>	1	2	a3, a5, a6, b3, b4, b5
4	<b>Introduction to Non-sterile Pharmaceutical solutions</b>	Definition of solutions, advantages, disadvantages, , classification of pharmaceutical solutions, general method of preparation, enhancement of dissolution, types of solvents: water, cosolvents, non-aqueous solvents	1	2	a3, a4, a6, b3, b4, b5
5	<b>Aqueous Pharmaceutical Solutions (1)</b>	Definition, General characters, advantages, disadvantages, method of preparation, formulations and excipients with examples of : <b>Topical</b> : (aqueous Tinctures, Douches/washes, Enema, mouthwashes/gargle, nasal solutions, otic aqueous solutions)	1	2	a3, a4, a5, b2, b3, b4, b5
<b>Mid-Term Exam</b>			1	2	
6	<b>Aqueous Pharmaceutical Solutions (2)</b>	Definition, General characters, advantages, disadvantages, method of preparation, formulations and excipients with examples of :	1	2	a2, a4, a5, a6,

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		<b>Oral:</b> Syrups, linctuses, Elixirs, other oral solutions.			b3, b4, b5
7	<b>Non-Aqueous Pharmaceutical Solutions and Specific types of solutions</b>	<b>Non-aqueous solutions</b> Definition, General characters, advantages, disadvantages, method of preparation, formulations and excipients with examples of : <b>Topical :</b> Alcoholic Tinctures, Collodions, liniments, Glycerites <b>Oral:</b> Oleovitamins <b>Specific types of solutions</b> <ul style="list-style-type: none"> <li>Intermediate solutions: aromatic water, spirits, Mucilages, etc.</li> </ul>	1	2	a3, a4, a5, a6, b2, b4, b5
8	<b>Non-sterile liquid Dispersion systems (1)</b>	<ul style="list-style-type: none"> <li><b>Introduction</b> Definition, types: coarse dispersion, fine dispersion; compare disperse system and true solution ; compare colloids, suspensions, emulsions; general advantages and problems of disperse systems</li> <li><b>Coarse dispersions</b> <ul style="list-style-type: none"> <li>➤ <b>Suspensions</b> <ul style="list-style-type: none"> <li>○ Definition, types, advantages , disadvantages, ideal properties</li> <li>○ Formulation: (flocculated, deflocculated) , excipients (suspending agents, flocculating agents; others)</li> <li>○ Steps of preparation</li> <li>○ Instability Problems : sedimentation; cake formation; evaluation and approaches to reduce.</li> <li>○ Packaging</li> </ul> </li> </ul> </li> </ul>	2	4	a3, a4, a5, a6, b3, b4, b5

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8	<b>Non-sterile liquid Dispersion systems (2)</b>	<ul style="list-style-type: none"> <li>➤ <b>Emulsions</b> <ul style="list-style-type: none"> <li>○ Definition, types, advantages, disadvantages</li> <li>○ Formulation: excipients (Emulsifying agents; types and selection; HLB)</li> <li>○ Methods of preparation: wet method, dry method, bottle method</li> <li>○ Self-emulsified emulsions</li> <li>○ Instability problems: coalescence, braking, creaming, phase inversion; causes and how to reduce.</li> </ul> </li> <li>• <b>Fine dispersions</b> Definition, types, advantages, disadvantages, principles and method of preparations</li> <li>• <b>Colloidal suspensions</b></li> <li>• <b>Microemulsion and nanoemulsion</b></li> </ul>	2	4	a2, a4, a5, a6, b1, b3, b5
9	<b>Pharmaceutical aerosols</b>	Definition, advantages, disadvantages, types of aerosols, anatomical features of the bronchi, Pressurized packages (Type of propellants, Containers, Formulation aspects, Air-blast nebulizers), methods of preparation (pressurized filling, cold filling), quality control evaluation	2	4	a2, a4, a5, a6, b1, b2, b3
<b>FINAL – EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	9 Units	

<b>B. Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	CILOs
<b>Aqueous solutions:</b>				
1.	<b>Iodine tincture</b>	1	2	c1,c2, c3, d1, d2
2.	<b>Vaginal douches (sodium borate solution)</b>	1	2	c1,c2, c4, c5, d1, d3
3.	<b>Simple syrup (BP; USP)</b>	1	2	c1, c3, c4, c5, d1, d2
4.	<b>Peppermint aromatic water</b>	1	2	c1,c2, c3, c4, d2, d3

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5.	Oral rehydration solution	1	2	c1,c2, c4, c5, d1, d2
6.	Preparation of elixir (paracetamol elixir)	1	2	c1,c2, c3, c4, d1, d3
<b>Non-aqueous solutions:</b>				
7.	Camphor liniment	1	2	c1,c2, c5, d1, d2
8.	Otic Glycerites	1	2	c1,c2, c3, c5, d1, d2, d3
<b>Liquid disperse systems:</b>				
9.	Calamine lotion (suspension)	1	2	c1, c3, c4, c5, d1, d2
10.	Emulsions (castor oil emulsion)	1	2	c1,c2, c4, c5, d2, d3
<b>Pharmaceutical aerosols:</b>				
11.	construction and use	1	2	c1, c2, c3, c4, d1, d3
<b>PRACTICAL EXAM</b>		1	2	c1, c2, c3, c5, d1, d2
<b>Total</b>		<b>12</b>	<b>24</b>	

#### V. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

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VI. Assignments:				
No	Assignments	Aligned CIOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied dosage forms	c4, c5, d2	4-13	3
2	<b>Group:</b> every group is assigned to present an illustrating videos on lab. And industrial preparation of 3 types of studies dosage forms.	c4, c5, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	c4, c5, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam)		7	10	10	a1, a2, a3, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, a6, b1, b2, b3
TOTAL				70	70 %	

Practical part assessment						
No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CIOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d1, d2, d3
Total				30	30 %	

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III. Learning Resources	
<b>1- Required Textbook(s) (maximum two).</b>	
1 Aulton's Pharmaceutics The Design and Manufacture of Medicines, 2018, Elsevier Ltd	
2.Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK	
<b>2- Essential References.</b>	
15. Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA	
16. United States pharmacopeia (USP-41, NF 36), 2018, the United States Pharmacopeial Convention.	
<b>3- Electronic Materials and Web Sites etc.</b>	
Article from: www.emedicine.com www.sciencedirect.com www.blackwell.com www.ovid.com www.pubmed.com <a href="https://www.slideshare.net/PranatiChavan/introduction-to-dosage-form-251052087">https://www.slideshare.net/PranatiChavan/introduction-to-dosage-form-251052087</a> <a href="https://www.slideshare.net/PranatiChavan/liquid-dosage-forms-ppt">https://www.slideshare.net/PranatiChavan/liquid-dosage-forms-ppt</a>	
X. Course Policies: (Based on the Uniform Students' By law (2007)	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
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7	<b>Other policies:</b>

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The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of PHARMACEUTICS I  
Course Code No. (PHT222)

I.Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ameen Alwossabi	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

X. Course Description:
<p>The first part of this course provides the student with an introduction to the science and art of designing pharmaceutical dosage forms, especially the roles and types of excipients in the dosage form and the stages of developing the dosage form, which includes the pre-formulation stage, the formulation and development stage, and then the production stage. The second part of the course provides knowledge for preparing liquid dosage forms, compressed gases (pharmaceutical aerosols). The practical part provides the student with skill of compounding the pharmaceutical liquid dosage forms in Pharmaceutics Lab.</p>

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XI. The Course Intended Learning Outcomes (CILOs)
<b>3. Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
<b>a1.</b> Describe the significance of pharmaceuticals as art and science of dosage form design
<b>a2.</b> Explain the types and roles of excipients and packaging included in pharmaceutical aerosols, and different types of liquid dosage forms.
<b>a3.</b> Describe the stages of designing pharmaceutical aerosols and liquid dosage form (solution, suspension, and emulsion)
<b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)
<b>a5.</b> Explain the general properties, advantages and disadvantages of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion).
<b>a6.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' pharmaceutical liquid dosage forms. (solution, suspension, and emulsion)
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:
<b>b1.</b> Distinguish pharmaceutical liquid dosage forms.
<b>b2.</b> Determine the roles and types of pharmaceutical excipients and packaging
<b>b3.</b> Classify pharmaceutical aerosols and categorize liquid dosage forms. (solution, suspension, and emulsion)
<b>b4.</b> Compare between various types of pharmaceutical aerosols and liquid dosage forms in particular between old and current dosage forms and between solutions and dispersion liquids. (solution, suspension, and emulsion)
<b>b5.</b> Design pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory
<b>c3.</b> Employ the relevant way to prepare liquid extemporaneous pharmaceutical dosage forms. (solution, suspension, and emulsion)
<b>c4.</b> Search efficiently for information using documented and electronic sources of information.
<b>c5.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills :</b> Upon successful completion of the course, students will be able to:
<b>d1.</b> Participate efficiently with his colleagues in a teamwork.
<b>d2.</b> Demonstrate the skills of time management and self-learning.
<b>d3.</b> Communicate effectively and behave in discipline with colleagues.

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<b>4. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Describe the significance of pharmaceuticals as art and science of dosage form design	Active Lecture	Written exams
<b>a2.</b> Explain the types and roles of excipients and packaging included in pharmaceutical aerosols, and different types of liquid dosage forms.		
<b>a3.</b> Describe the stages of designing pharmaceutical aerosols and liquid dosage form (solution, suspension, and emulsion)		
<b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)		
<b>a5.</b> Explain the general properties, advantages and disadvantages of pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion).		
<b>a6.</b> Discuss the principles, pharmacopeial requirements, and methods of preparation, of various types' pharmaceutical liquid dosage forms. (solution, suspension, and emulsion)		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Distinguish pharmaceutical liquid dosage forms	Active Lecture , Feed-back learning	Written exams, quizzes
<b>b2.</b> Determine the roles and types of pharmaceutical excipients and packaging		
<b>b3.</b> Classify pharmaceutical aerosols and categorize liquid dosage forms. (solution, suspension, and emulsion)		
<b>b4.</b> Compare between various types of pharmaceutical aerosols and liquid dosage forms in particular between old and current dosage forms and between solutions and dispersion liquids. (solution, suspension, and emulsion)		

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b5. Design pharmaceutical aerosols and liquid dosage forms (solution, suspension, and emulsion)		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	Laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3. Employ the relevant way to prepare liquid extemporaneous pharmaceutical dosage forms.		
c4. Search efficiently for information using documented and electronic sources of information.	Feed-back learning, Group-project	Assignments
c5. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Participate efficiently with his colleagues in a teamwork.	Laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d2. Demonstrate the skills of time management and self-learning.		
d3. Communicate effectively and behave in discipline with colleagues.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

## XII. Course Content:

### C. Theoretical Aspect:

Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
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1	<b>Introduction to pharmaceuticals</b>	Definitions and brief history of pharmaceuticals, pharmacopeia, Definition of dosage form, the components, the need to dosage forms, classification of dosage forms	1	2	a1, b1
2	<b>Pharmaceutical excipients &amp; packaging</b>	Roles, types with examples <ul style="list-style-type: none"> <li>• <b>Essential:</b> solvents, vehicles, emulsifying agents, binders, etc.</li> <li>• <b>Stabilizers:</b> buffers, preservatives, antioxidants, viscosity enhancers, anti-cake, etc.</li> <li>• <b>Bioavailability enhancers:</b> solubilizer</li> <li>• <b>Organoleptic excipients:</b> colorants, sweeteners, flavors</li> <li>• <b>Excipients for other purposes</b> e.g. isotonic agents</li> <li>• Type and function of packaging materials</li> </ul>	2	4	a1, a2, b2, b3
3	<b>Design of dosage form: Preformulation, Formulation and development</b>	<ul style="list-style-type: none"> <li>• <b>Preformulation stage:</b> physicochemical properties and analytical data required. Scheme of preformulation, Compatibility testing.</li> <li>• <b>Formulation:</b> general rules, sources of raw materials, economic impact</li> <li>• <b>Development stage</b></li> <li>• <b>Production stage</b></li> </ul>	1	2	a3, a5, a6, b3, b4, b5
4	<b>Introduction to Non-sterile Pharmaceutical solutions</b>	Definition of solutions, advantages, disadvantages, , classification of pharmaceutical solutions, general method of preparation, enhancement of dissolution, types of solvents: water, cosolvents, non-aqueous solvents	1	2	a3, a4, a6, b3, b4, b5
5	<b>Aqueous Pharmaceutical Solutions (1)</b>	Definition, General characters, advantages, disadvantages, method of preparation, formulations and excipients with examples of : <b>Topical</b> : (aqueous Tinctures, Douches/washes, Enema, mouthwashes/gargle, nasal solutions, otic aqueous solutions)	1	2	a3, a4, a5, b2, b3, b4, b5
<b>Mid-Term Exam</b>			1	2	
6	<b>Aqueous Pharmaceutical Solutions (2)</b>	Definition, General characters, advantages, disadvantages, method of preparation, formulations and excipients with examples of :	1	2	a2, a4, a5, a6,

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		<b>Oral:</b> Syrups, linctuses, Elixirs, other oral solutions.			b3, b4, b5
7	<b>Non-Aqueous Pharmaceutical Solutions and Specific types of solutions</b>	<p><b>Non-aqueous solutions</b> Definition, General characters, advantages, disadvantages, method of preparation, formulations and excipients with examples of :</p> <p><b>Topical :</b>Alcoholic Tinctures, Collodions, liniments, Glycerites</p> <p><b>Oral:</b> Oleovitamins</p> <p><b>Specific types of solutions</b></p> <ul style="list-style-type: none"> <li>Intermediate solutions: aromatic water, spirits, Mucilages, etc.</li> </ul>	1	2	a3, a4, a5, a6, b2, b4, b5
8	<b>Non-sterile liquid Dispersion systems (1)</b>	<ul style="list-style-type: none"> <li><b>Introduction</b> Definition, types: coarse dispersion, fine dispersion; compare disperse system and true solution ; compare colloids, suspensions, emulsions; general advantages and problems of disperse systems</li> <li><b>Coarse dispersions</b> <ul style="list-style-type: none"> <li>➤ <b>Suspensions</b> <ul style="list-style-type: none"> <li>○ Definition, types, advantages , disadvantages, ideal properties</li> <li>○ Formulation: (flocculated, deflocculated) , excipients (suspending agents, flocculating agents; others)</li> <li>○ Steps of preparation</li> <li>○ Instability Problems : sedimentation; cake formation; evaluation and approaches to reduce.</li> <li>○ Packaging</li> </ul> </li> </ul> </li> </ul>	2	4	a3, a4, a5, a6, b3, b4, b5

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8	<b>Non-sterile liquid Dispersion systems (2)</b>	<ul style="list-style-type: none"> <li>➤ <b>Emulsions</b> <ul style="list-style-type: none"> <li>○ Definition, types, advantages, disadvantages</li> <li>○ Formulation: excipients (Emulsifying agents; types and selection; HLB)</li> <li>○ Methods of preparation: wet method, dry method, bottle method</li> <li>○ Self-emulsified emulsions</li> <li>○ Instability problems: coalescence, braking, creaming, phase inversion; causes and how to reduce.</li> </ul> </li> <li>• <b>Fine dispersions</b> Definition, types, advantages, disadvantages, principles and method of preparations</li> <li>• <b>Colloidal suspensions</b></li> <li>• <b>Microemulsion and nanoemulsion</b></li> </ul>	2	4	a2, a4, a5, a6, b1, b3, b5
9	<b>Pharmaceutical aerosols</b>	Definition, advantages, disadvantages, types of aerosols, anatomical features of the bronchi, Pressurized packages (Type of propellants , Containers , Formulation aspects, Air-blast nebulizers), methods of preparation (pressurized filling, cold filling), quality control evaluation	2	4	a2, a4, a5, a6, b1, b2, b3
<b>FINAL – EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	9 Units	

<b>D. Practical Aspect:</b>				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	CILOs
<b>Aqueous solutions:</b>				
12.	<b>Iodine tincture</b>	1	2	c1,c2, c3, d1, d2
13.	<b>Vaginal douches (sodium borate solution)</b>	1	2	c1,c2, c4, c5, d1, d3
14.	<b>Simple syrup (BP; USP)</b>	1	2	c1, c3, c4, c5, d1, d2
15.	<b>Peppermint aromatic water</b>	1	2	c1,c2, c3, c4, d2, d3

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16.	Oral rehydration solution	1	2	c1,c2, c4, c5, d1, d2
17.	Preparation of elixir (paracetamol elixir)	1	2	c1,c2, c3, c4, d1, d3
<b>Non-aqueous solutions:</b>				
18.	Camphor liniment	1	2	c1,c2, c5, d1, d2
19.	Otic Glycerites	1	2	c1,c2, c3, c5, d1, d2, d3
<b>Liquid disperse systems:</b>				
20.	Calamine lotion (suspension)	1	2	c1, c3, c4, c5, d1, d2
21.	Emulsions (castor oil emulsion)	1	2	c1,c2, c4, c5, d2, d3
<b>Pharmaceutical aerosols:</b>				
22.	construction and use	1	2	c1, c2, c3, c4, d1, d3
<b>PRACTICAL EXAM</b>		1	2	c1, c2, c3, c5, d1, d2
<b>Total</b>		<b>12</b>	<b>24</b>	

### XIII. Teaching strategies of the course:

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### XIV. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to present a search report supported with images	c4, c5, d2	4-13	3

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	on 5 trade names (commercial preparations) of the studied dosage forms			
2	<b>Group:</b> every group is assigned to present an illustrating videos on lab. And industrial preparation of 3 types of studies dosage forms.	c4, c5, d1, d2, d3	14	2

### XV. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
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		Assignments	7, 12	5	5	c4, c5, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam)		7	10	10	a1, a2, a3, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, a6, b1, b2, b3
TOTAL				70	70 %	

### Practical part assessment

No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d1, d2, d3
Total				30	30 %	

### VI. Learning Resources

#### 1- Required Textbook(s) (maximum two).

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- 3 Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK

#### 2- Essential References.

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17. Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA  
18. United States pharmacopeia (USP-41, NF 36), 2018, the United States Pharmacopeial Convention.

### 3- Electronic Materials and Web Sites etc.

Article from:

www.emedicine.com

www.sciencedirect.com

www.blackwell.com

www.ovid.com

www.pubmed.com

<https://www.slideshare.net/PranatiChavan/introduction-to-dosage-form-251052087>

<https://www.slideshare.net/PranatiChavan/liquid-dosage-forms-ppt>

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	<b>Other policies:</b>
7	The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ameen Alwossabi	Dr. Anes Thabit	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



الجمهورية العربية السورية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

## Medicine and Health Sciences

Department of **Pharmacy**

Bachelor of Pharmacy

Course Specification

**PHYSIOLOGY II**  
**Course Code No(MSC221)**





XIII. Course Identification and General Information:							
1	Course Title:	PHYSIOLOGY II					
2	Course Code & Number:	MSC221					
3	Credit hours:	C.H				TOTAL	
		Theoretical			P		Tr.
		L.	Tut.	S.			
2	-	-	-	-	2		
4	Study level/ semester at which this course is offered:	( SECOND ) Year – ( 2 <sup>ND</sup> ) semester					
5	Pre –requisite (if any):	<ul style="list-style-type: none"> <li>• General biology</li> <li>• Anatomy &amp; histology</li> <li>• Physiology I</li> </ul>					
6	Co –requisite (if any):	-----					
7	Program (s) in which the course is offered:	All BC programs offered by the university					
8	Language of teaching the course:	ENGLISH					
9	Location of teaching the course:	IN THE UNIVERSITY					
10	Prepared By:	Dr. Hussien Gumaih					
11	Date of Approval	2022					

L: lecturing ; Tut: Tutorial , S: seminar ; P: practical ; Tr.: training

XIV. Course Description:
The course concerns with the study of functions and regulation of blood , cardiovascular, respiratory, alimentary ,renal and immune systems in human body.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**21. Alignment CILOs to PILOs**

No.	PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
A1.	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Determine the normal functions and regulation of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body
A3.	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a2. Explain the biological role of certain endogenous substances that affect regulation and normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
B1.	Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.	b1. Identify the signs of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body
		b2. Interpret the outcomes of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems.
B2.	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines..	b3. Classify immune system physiologically.
		b4 .Relate the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems to their affecting factors.
		b5 . Assess the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
C6.	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	c1. Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media

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**D: Transferable skills:** Upon successful completion of the course, students will be able to:

**D1.** Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills

**d1.** Share successfully in team-work.

**d2.** Show respect to life.

## 22. Alignment CILOs to teaching strategies and assessment strategies

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Determine the normal functions and regulation of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body	Lecture,, laboratory practice	written exam , , assignment
a2. Explain the biological role of certain endogenous substances that affect regulation and normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body	Lecture, feed-back learning	written exam , assignment

(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Identify the signs of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body	Feed-back learning, Group-project.	Written exam
<b>b2.</b> Interpret the outcomes of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems.		
<b>b3.</b> Classify immune system physiologically.	Lecture, , feed-back learning	written exam , quizzes
<b>b4 .</b> Relate the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems to their affecting factors.	Lecture, feed-back learning	written exam, quizzes
<b>b5 .</b> Assess the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body.	Lecture	written exam

(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Present his/her thoughts , search for information and report works effectively using	Feed-back learning ,Group-project.	assignment

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appropriate references books , internet and technologies media		
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Share successfully in team-work.	Group-project , feed-back learning	Assignment
<b>d2.</b> Show respect to life.	lecture	Written exam

<b>XXIX. Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Cardiovascular system</b>	a1, a2, b1, b2, b3, d2	<ul style="list-style-type: none"> <li>the heart: functions and regulation of the heart work, physiologic parameters of the heart work: heart rate, cardiac output, heart rhythmicity, conductivity, contraction</li> <li>Blood vessels: functions and regulation of the blood vessels (veins, arteries, capillaries), physiologic parameters of the blood vessels : blood pressure, peripheral vascular resistance.</li> </ul>	3	6
2	<b>The Blood</b>	a1, a2, b1, b3, b4, b5, d1	<ul style="list-style-type: none"> <li>Blood composition, functions and regulation of plasma, RBCs, WBCs and platelets.</li> <li>Circulation: regulations and factors affecting venous return and blood flow.</li> </ul>	2	4
3	<b>Respiratory system</b>	a1, a2, b2, b4, b5, c1, d2	<ul style="list-style-type: none"> <li>blood-gas interface, airways, the pleura, mechanism of breathing, Ventilation, Diffusion , Partial pressures of oxygen and carbon dioxide, Ventilation–perfusion matching, Gas transport in blood , Regulation of</li> </ul>	2	4

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			ventilation, Ventilator response to exercise.		
Mid - EXAM				1	2
4	<b>Alimentary system</b>	a1, a2, b1, b2, b3, b4, c1, d2	<ul style="list-style-type: none"> <li>functions and regulations of the mouth, pharynx and the gastrointestinal tract (esophagus, stomach, small and large intestine</li> <li>the digestive system associated –organs: the liver, gall bladder., spleen and pancreases</li> </ul>	2	4
5	<b>Renal system</b>	a1, a2, b1, b2, b3, b5, d2	<ul style="list-style-type: none"> <li>basic unit of the kidney</li> <li>renal blood flow, glomerular filtration, active excretion tubular reabsorption,</li> <li>regulation of plasma volume and plasma osmolality</li> </ul>	2	4
6	<b>immune system</b>	a1, a2, b1, b2, b4, b5, c1, d1	compositions, types, functions , regulations	2	4
<b>Course Review</b>		a1, a2, b1, b2, b3, b4, b5, d2	Review of the course topics by discussion session.	1	2
FINAL - EXAM				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>6 Units</b>

## XX. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works,

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topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

XX. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to do a search on one endogenous mediator that is involved in one of the physiological studied and provide a summary report on it.	a2, c1	4-13	6
2	<b>Group :</b> each group of students will be assigned todo a search on one of the physiological processes studied and make a summary report.	a1, c1, d1	13	4

XIV. Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, b4, b5,c1, d2
2	Assignments (1 + 2)	4-13, 14	10	10	a1, a2, c1, d1
3	Quiz 1 + Quiz 2	7, 12	5	5	b2, b4
4	Mid-semester exam of theoretical part ( written exam)	7	20	20	a1, a2, b4, b5,c1, d2
5	Final exam of theoretical part ( written exam)	17	60	60	a1, a2, b4, b5,c1, d2
TOTAL			100	100 %	100

XXIX. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
19. C.C.Chatterjee. Human physiology	
20. Laurie kelly . Essential of human physiology for pharmacy, 2004, CRC press	
<b>2- Essential References.</b>	
7. Hassan Hamdi, Fundamentals of human physiology	

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8. Salah Abu-Sitta , Synopsis of medical physiology
9. W. F. Ganong. Review of medical physiology
<b>3- Electronic Materials and Web Sites etc.</b>
<a href="http://www.en.wikipedia.org/">www.en.wikipedia.org/</a>

<b>XIII. Course Policies:</b>	
<b>1</b>	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
<b>2</b>	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
<b>5</b>	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
<b>6</b>	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.





## Course Plan (Syllabus) of PHYSIOLOGY II

X. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Hussien Gumaih	Office Hours					
Location & Telephone No.	Pharmacy department; 77064784	SAT	SUN	MON	TUE	WED	THU
E-mail	<a href="mailto:halimosama123@yahoo.com">halimosama123@yahoo.com</a>						

II. Course Description:
The course concerns with the study of functions and regulation of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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### III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies

#### 23. Alignment CILOs to PILOs

No.	PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
a1.		Determine the normal functions and regulation of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body
a2.		Explain the biological role of certain endogenous substances that affect regulation and normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
b1.		Identify the signs of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body
b2.		Interpret the outcomes of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems.
b3.		Classify immune system physiologically.
b4.		Relate the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems to their affecting factors.
b5.		Assess the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
c1.		Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
d1.		Share successfully in team-work.
d2.		Show respect to life.

#### 24. Alignment CILOs to teaching strategies and assessment strategies

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Determine the normal functions and regulation of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body	Lecture,, laboratory practice	written exam , , assignment

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a2. Explain the biological role of certain endogenous substances that affect regulation and normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body	Lecture, feed-back learning	written exam , assignment
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Identify the signs of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body	Feed-back learning, Group-project.	Written exam
<b>b2.</b> Interpret the outcomes of normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems.		
<b>b3.</b> Classify immune system physiologically.	Lecture, , feed-back learning	written exam , quizzes
<b>b4 .</b> Relate the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems to their affecting factors.	Lecture, feed-back learning	written exam, quizzes
<b>b5 .</b> Assess the normal functions of blood , cardiovascular , respiratory, alimentary ,renal and immune systems in human body.	Lecture	written exam
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Present his/her thoughts , search for information and report works effectively using appropriate references books , internet and technologies media	Feed-back learning ,Group-project.	assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Share successfully in team-work.	Group-project ,, feed-back learning	Assignment
<b>d2.</b> Show respect to life.	lecture	Written exam

<b>XXX. Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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1	<b>Cardiovascular system</b>	a1, a2, b1, b2, b3, d2	<ul style="list-style-type: none"> <li>the heart: functions and regulation of the heart work, physiologic parameters of the heart work: heart rate, cardiac output, heart rhythmicity, conductivity, contraction</li> <li>Blood vessels: functions and regulation of the blood vessels (veins, arteries, capillaries), physiologic parameters of the blood vessels : blood pressure, peripheral vascular resistance.</li> </ul>	3	6
2	<b>The Blood</b>	a1, a2, b1, b3, b4, b5, d1	<ul style="list-style-type: none"> <li>Blood composition, functions and regulation of plasma, RBCs, WBCs and platelets.</li> <li>Circulation: regulations and factors affecting venous return and blood flow.</li> </ul>	2	4
3	<b>Respiratory system</b>	a1, a2, b2, b4, b5, c1, d2	<ul style="list-style-type: none"> <li>blood-gas interface, airways, the pleura, mechanism of breathing, Ventilation, Diffusion , Partial pressures of oxygen and carbon dioxide, Ventilation–perfusion matching, Gas transport in blood , Regulation of ventilation, Ventilator response to exercise.</li> </ul>	2	4
<b>Mid - EXAM</b>				1	2
4	<b>Alimentary system</b>	a1, a2, b1, b2, b3, b4, c1, d2	<ul style="list-style-type: none"> <li>functions and regulations of the mouth, pharynx and the gastrointestinal tract (esophagus, stomach, small and large intestine</li> <li>the digestive system associated –organs: the liver, gall bladder., spleen and pancreases</li> </ul>	2	4
5	<b>Renal system</b>	a1, a2, b1, b2,	<ul style="list-style-type: none"> <li>basic unit of the kidney</li> <li>renal blood flow, glomerular filtration,</li> </ul>	2	4

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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		b3, b5, d2	active excretion tubular reabsorption, • regulation of plasma volume and plasma osmolality		
6	<b>immune system</b>	a1, a2, b1, b2, b4, b5, c1, d1	compositions, types, functions , regulations	2	4
	<b>Course Review</b>	a1, a2, b1, b2, b3, b4, b5, d2	Review of the course topics by discussion session.	1	2
FINAL - EXAM				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>6 Units</b>

### XXI. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### XXI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
----	-------------	---------------	----------	------

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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1	<b>Individual:</b> every student is assigned to do a search on one endogenous mediator that is involved in one of the physiological studied and provide a summary report on it.	a2, c1	4-13	6
2	<b>Group :</b> each group of students will be assigned todo a search on one of the physiological processes studied and make a summary report.	a1, c1, d1	13	4

### XV. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, b4, b5,c1, d2
2	Assignments (1 + 2)	4-13, 14	10	10	a1, a2, c1, d1
3	Quiz 1 + Quiz 2	7, 12	5	5	b2, b4
4	Mid-semester exam of theoretical part ( written exam)	7	20	20	a1, a2, b4, b5,c1, d2
5	Final exam of theoretical part ( written exam)	17	60	60	a1, a2, b4, b5,c1, d2
<b>TOTAL</b>			<b>100</b>	<b>100 %</b>	<b>100</b>

### XXX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

21. C.C.Chatterjee. Human physiology
22. Laurie kelly . Essential of human physiology for pharmacy, 2004, CRC press

#### 2- Essential References.

10. Hassan Hamdi, Fundamentals of human physiology
11. Salah Abu-Sitta , Synopsis of medical physiology
12. W. F. Ganong. Review of medical physiology

#### 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

### XIV. Course Policies:

1	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecturewill not be allowed to attend the lecture and will be considered absent.
3	<b>Exam Attendance/Punctuality:</b>

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	any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL ANALYTICAL CHEMISTRY I**  
Course No. (PHM223)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Analytical Chemistry I			
2	Course Code & Number:	PHM223			
3	Credit Hours: 3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHM214			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

XV. Course Description:
<p>The course provides the student with basic knowledge of analysis of substances, including types of qualitative and quantitative analysis, preparation of analytical samples, types of analytical techniques, validation of analysis, and how to avoid the source of errors in analysis. The course also focuses on the concepts and theoretical underpinnings of two types of analysis: titrimetric analysis and electrochemical analysis. The practical part provides the student with the skill of dealing with chemicals, operating analytical instruments, and performing analytical experiments in a chemistry lab. This course is taken in conjunction with another course (Pharmaceutical Organic Chemistry I) to make the student link the concept of analysis and the chemical nature of compounds.</p>

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
1. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action,	<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis

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	effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy	
A2	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	a2. Describe the principles of titrimetric and electrochemical analysis.
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	a3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	b1. Interpret data obtained by titrimetric and electrochemical analysis. b2. Select appropriate standard operating procedure for titrimetric and electrochemical analysis.
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b3. Design a suitable titrimetric and electrochemical analysis. based on the substance physicochemical properties.
B5	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmacoeconomic factors to enhance the healthcare systems.	b4. Calculate the content % of a material in a sample using titrimetric and electrochemical analysis.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
C1	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system	c1. Handle efficiently and safely the chemical materials and tools used in the laboratory

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	according to GLP, GSP, GDP and cGMP guidelines.	
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory <b>c3.</b> Practice pharmaceutical analysis of drugs by all titration methods.
<b>D: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate the skills of time management and self-learning.

25. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exams
<b>a2.</b> Describe the principles of titrimetric and electrochemical analysis.		
<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret data obtained by titrimetric and electrochemical analysis.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Select appropriate standard operating procedure for titrimetric and electrochemical analysis.		
<b>b3.</b> Design a suitable titrimetric and electrochemical analysis. based on the substance physicochemical properties.		
<b>b4.</b> Calculate the content % of a material in a sample using titrimetric and electrochemical analysis.		

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<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory.		
<b>c3.</b> Practice pharmaceutical analysis of drugs by all titration methods.	feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
<b>No.</b>	<b>Units/Topics List</b>	<b>Learning Outcomes (CILOs)</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>
1	<b>Introduction to Analytical Chemistry</b>	a1, a2, d1	<ul style="list-style-type: none"> <li>Definition and Basic Concepts</li> <li>The Analytical Process</li> <li>Choice of Analytical Methods for Pharmaceutical Analysis</li> </ul>	1	2
2	<b>Errors in Analysis and evaluation in Chemical and Evaluation of Analytical Data</b>	b2, b3, d3	<ul style="list-style-type: none"> <li>significant Figures</li> <li>Types of Errors</li> <li>The Mean, Median</li> <li>Standard Deviation, Standard Error of The Mean</li> <li>Variance, F-test, Confidence Limit</li> <li>Significant tests (f-test, t-test, Q-test)</li> </ul>	1	2

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
3	Acid-base titration	a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>End and equivalent point</li> <li>Acid-base indicator</li> <li>Standard solutions</li> </ul>	1	2
4		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Concentration calculations (Molarity, Normality, Strength of solution, Mole Fraction, Dilution Factor and (w/w, w/v, v/v) %</li> </ul>	2	4
		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Acid-Base titration in Aqueous medium</li> <li>Acid –Base indicators</li> <li>Acid-Base titration curves</li> <li>Application of acid –base titration in aqueous medium.</li> </ul>	2	4
		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Acid-Base titration in non-aqueous media</li> <li>Types of non-aqueous solvents</li> <li>Titration of weak acid &amp; base</li> <li>Indicators to detect end points</li> <li>Application of Acid-Base titration in non-aqueous media.</li> </ul>	1	2
		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Calculation of pH for</li> <li>Strong acid and strong base</li> <li>Weak acid and weak base</li> <li>Buffer solution</li> </ul>	2	4
5	Mid-Term Exam	a1, a2, b1, b2, b3, d3		1	2

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
6	Precipitation titrations	a1, a2, b1, b2, b3	<ul style="list-style-type: none"> <li>Factors affecting solubility</li> <li>Solubility product constant.</li> <li>Titration curves of precipitation titration</li> <li>Argentometric methods (Mohr, Fajan &amp; Volhard methods)</li> <li>Iodine- iodide system</li> </ul>	2	4
7	Redox titration	a1, a2, b1, b2, b3,d1	<ul style="list-style-type: none"> <li>Equivalency in Redox titrations</li> <li>Nernst equation</li> <li>Redox indicators</li> <li>Standard oxidation potential</li> <li>Potassium dichromate and Potassium Permanganate as oxidizing agent</li> </ul>	2	4
8	Complexation titration	a1, a2, b1, b2, b3,d1	<ul style="list-style-type: none"> <li>Classification of chelating agents</li> <li>EDTA titrations</li> </ul>	1	2
9	Final Theoretical Exam			1	2
Number of Weeks /and Units Per Semester				16	32

B. Practical Aspect:				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	Introduction to the Lab.: safety requirements, list of experiments, how to report, source of errors, etc.	c1, c2, d2, d3, d4	1	2
2	Preparation of solutions from liquid and solid starting materials	c1, c2, d2, d3,	1	2
3	Standardization of solution (acid and base)	c1, c3, d2, d3	1	2
4	Aqueous titration of weak acid e.g. acetic acid	c1, c2, c3, d2, d3	1	2
5	Aqueous titration of weak acid drugs with sodium hydroxide	c2, c3, d2, d3	1	2

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6	Aqueous titration of weak base drug as with HCl	c1, c2, d2, d3	1	2
7	Non-aqueous titration of weak acids e.g., salicylic acid	c1, c2, c3, d1, d3	1	2
8	Oxidation/reduction titration (iodometry); titration of H <sub>2</sub> O <sub>2</sub> using iodine	c1, c2, c3, d2, d3	1	2
9	Oxidation/reduction titration; of oxalic acid using potassium permanganate.	c1, c2, c3, d3	1	2
10	Titration (chronometry); titration of methanol using potassium dichromate	c1, c2, c3, d2	1	2
11	Complexometric titration of calcium salt	c1, c2, c3, d2, d3	1	2
12	Final Practical Exam	c1, c2, c3, d3	1	2
Number of Weeks /and Units Per Semester			12	24

## XXII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

## XXII. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : the teacher provides the students with problems related to the studied topics. Every student is assigned to solve some of those problems individually.	c3, d1, d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to do a search report on pharmaceutical applications of one method of the studied titrimetric analysis.	c3, d1, d2, d3	14	2

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VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	c3, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4
TOTAL				70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d3
Total				30	30 %	

VIII. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
1. David Harvey. Analytical Chemistry 2.1. 2016, DePauw University 2. Gary G. Christian, analytical chemistry, 2004, John Wiley & sons	
<b>2- Essential References.</b>	
1. Leslie G Chatten: Deans analytical chemistry handbook, 2013, McGraw Hill	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://dpwadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf">http://dpwadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf</a>	

VIII. Course Policies: (Based on the Uniform Students' By law (2007))	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b>

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	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.







Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus)  
Pharmaceutical Analytical Chemistry I  
Course Code No. (PHM223)

XI. - Information about Faculty Member Responsible for the Course:						
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>				
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>
<b>E-mail</b>						

XVI. Course Description:
The course provides the student with basic knowledge of analysis of substances, including types of qualitative and quantitative analysis, preparation of analytical samples, types of analytical techniques, validation of analysis, and how to avoid the source of errors in analysis. The course also focuses on the concepts and theoretical underpinnings of two types of analysis: titrimetric analysis and electrochemical analysis. The practical part provides the student with the skill of dealing with chemicals, operating analytical instruments, and performing analytical experiments in a chemistry lab. This course is taken in conjunction with another course (Pharmaceutical Organic Chemistry I) to make the student link the concept of analysis and the chemical nature of compounds.

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### III. Intended learning outcomes of the course (CILOs)

#### 2. Alignment CILOs

**A: Knowledge & understanding:** Upon successful completion of the course, students will be able to:

**a1.** Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis

**a2.** Describe the principles of titrimetric and electrochemical analysis.

**a3.** Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.

**B: Intellectual skills:** Upon successful completion of the course, students will be able to:

**b1.** Interpret data obtained by titrimetric and electrochemical analysis.

**b2.** Select appropriate standard operating procedure for titrimetric and electrochemical analysis.

**b3.** Design a suitable titrimetric and electrochemical analysis. based on the substance physicochemical properties.

**b4.** Calculate the content % of a material in a sample using titrimetric and electrochemical analysis.

**C: Professional & practical skills:** Upon successful completion of the course, students will be able to:

**c1.** Handle efficiently and safely the chemical materials and tools used in the laboratory

**c2.** Operate the instruments and perform experiments successfully in the laboratory

**c3.** Practice pharmaceutical analysis of drugs by all titration methods.

**D: Intellectual skills:** Upon successful completion of the course, students will be able to:

**d1.** Communicate effectively and behave in discipline with colleagues.

**d2.** Participate efficiently with his colleagues in a team work.

**d3.** Demonstrate the skills of time management and self-learning.

#### 26. Alignment CILOs to teaching strategies and assessment strategies

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exam s
<b>a2.</b> Describe the principles of titrimetric and electrochemical analysis.		
<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		

(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:

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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret data obtained by titrimetric and electrochemical analysis.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Select appropriate standard operating procedure for titrimetric and electrochemical analysis.		
<b>b3.</b> Design a suitable titrimetric and electrochemical analysis. based on the substance physicochemical properties.		
<b>b4.</b> Calculate the content % of a material in a sample using titrimetric and electrochemical analysis.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory.		
<b>c3.</b> Practice pharmaceutical analysis of drugs by all titration methods.	feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

#### IV. Course Contents:

##### A. Theoretical Aspect:

No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Introduction to Analytical Chemistry</b>	a1, a2, d1	• Definition and Basic Concepts	1	2

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
			<ul style="list-style-type: none"> <li>The Analytical Process</li> <li>Choice of Analytical Methods for Pharmaceutical Analysis</li> </ul>		
2	Errors in Analysis and evaluation in Chemical and Evaluation of Analytical Data	b2, b3, d3	<ul style="list-style-type: none"> <li>significant Figures</li> <li>Types of Errors</li> <li>The Mean, Median</li> <li>Standard Deviation, Standard Error of The Mean</li> <li>Variance, F-test, Confidence Limit</li> <li>Significant tests (f-test, t-test, Q-test)</li> </ul>	1	2
3		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>End and equivalent point</li> <li>Acid-base indicator</li> <li>Standard solutions</li> </ul>	1	2
4	Acid-base titration	a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Concentration calculations (Molarity, Normality, Strength of solution, Mole Fraction, Dilution Factor and (w/w, w/v, v/v) %</li> </ul>	2	4
		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Acid-Base titration in Aqueous medium</li> <li>Acid-Base indicators</li> <li>Acid-Base titration curves</li> <li>Application of acid-base titration in aqueous medium.</li> </ul>	2	4
		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Acid-Base titration in non-aqueous media</li> <li>Types of non-aqueous solvents</li> </ul>	1	2

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
			<ul style="list-style-type: none"> <li>Titration of weak acid &amp; base</li> <li>Indicators to detect end points</li> <li>Application of Acid-Base titration in non-aqueous media.</li> </ul>		
		a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Calculation of pH for Strong acid and strong base</li> <li>Weak acid and weak base</li> <li>Buffer solution</li> </ul>	2	4
5	Mid-Term Exam	a1, a2, b1, b2, b3, d3		1	2
6	Precipitation titrations	a1, a2, b1, b2, b3	<ul style="list-style-type: none"> <li>Factors affecting solubility</li> <li>Solubility product constant.</li> <li>Titration curves of precipitation titration</li> <li>Argentometric methods (Mohr, Fajan &amp; Volhard methods)</li> <li>Iodine- iodide system</li> </ul>	2	4
7	Redox titration	a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Equivalency in Redox titrations</li> <li>Nernst equation</li> <li>Redox indicators</li> <li>Standard oxidation potential</li> <li>Potassium dichromate and Potassium Permanganate as oxidizing agent</li> </ul>	2	4
8	Complexation titration	a1, a2, b1, b2, b3, d1	<ul style="list-style-type: none"> <li>Classification of chelating agents</li> <li>EDTA titrations</li> </ul>	1	2
9	Final Theoretical Exam			1	2
Number of Weeks /and Units Per Semester				16	32

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



B. Practical Aspect:				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	Introduction to the Lab.: safety requirements, list of experiments, how to report, source of errors, etc.	c1, c2, d2, d3, d4	1	2
2	Preparation of solutions from liquid and solid starting materials	c1, c2, d2, d3,	1	2
3	Standardization of solution (acid and base)	c1, c3, d2, d3	1	2
4	Aqueous titration of weak acid e.g. acetic acid	c1, c2, c3, d2, d3	1	2
5	Aqueous titration of weak acid drugs with sodium hydroxide	c2, c3, d2, d3	1	2
6	Aqueous titration of weak base drug as with HCl	c1, c2, d2, d3	1	2
7	Non-aqueous titration of weak acids e.g., salicylic acid	c1, c2, c3, d1, d3	1	2
8	Oxidation/reduction titration (iodometry); titration of H <sub>2</sub> O <sub>2</sub> using iodine	c1, c2, c3, d2, d3	1	2
9	Oxidation/reduction titration; of oxalic acid using potassium permanganate.	c1, c2, c3, d3	1	2
10	Titration (chronometry); titration of methanol using potassium dichromate	c1, c2, c3, d2	1	2
11	Complexometric titration of calcium salt	c1, c2, c3, d2, d3	1	2
12	Final Practical Exam	c1, c2, c3, d3	1	2
Number of Weeks /and Units Per Semester			12	24

### XXIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

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XXIII. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provides the students with problems related to the studied topics. Every student is assigned to solve some of those problems individually.	c3, d1, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to do a search report on pharmaceutical applications of one method of the studied titrimetric analysis.	c3, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	c3, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4
TOTAL				70	70 %	70

Practical part assessment						
No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d3
Total				30	30 %	

IX. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
3. David Harvey. Analytical Chemistry 2.1. 2016, DePauw University	
4. Gary G. Christian, analytical chemistry, 2004, John Wiley & sons	
<b>2- Essential References.</b>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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2. Leslie G Chatten: Deans analytical chemistry handbook, 2013, McGraw Hill

**3- Electronic Materials and Web Sites etc.**

[http://dpuadweb.depauw.edu/harvey\\_web/eTextProject/AC2.1Files/AnalChem2.1.pdf](http://dpuadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf)

**IX. Course Policies: (Based on the Uniform Students' By law (2007))**

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL MICROBIOLOGY**  
Course No. (PHT225)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Microbiology			
2	Course Code & Number:	PHT225			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	1	--
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	<ul style="list-style-type: none"> <li>•General biology</li> <li>•Botany</li> </ul>			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Amal Banafea			
13	Date of Approval:	2022			

II. Course Description:
The course deals study of pathogenic microorganisms and their infections as well the applications of microbiology in pharmacy .

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Amal Banafea	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
27. Alignment CILOs to PILOs		
	PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<p><b>a1.</b> Identify and describe the microscopical features of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.</p> <p><b>a2.</b> Determine pathogenicity, management of spread and treatment of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.</p>
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a3.</b> Discuss the principles and technologies of microbiology applied in pharmacy for microbial investigations, product preservation, sterilization and assessment of antimicrobial activity.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Comprehend his/her role as a pharmacist in applying microbiology knowledge for pharmaceutical applications.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<p><b>b1.</b> Differentiate between similar microorganisms such as streptococci and staphylococci using microscopical methods.</p> <p><b>b2.</b> Interpret the data of inhibition zone obtained after antimicrobial activity assessment.</p> <p><b>b3.</b> Classify bacteria, fungi and other studied microorganisms into categories based on their morphologies, life-pattern and pathogenicity.</p> <p><b>b4.</b> Relate the severity of microbial infection to its affecting factors such as immunity.</p>



		<p><b>b5</b> . Assess the sensitivity of microbial pathogens to antimicrobials.</p> <p><b>b6</b>. Select the appropriate method for preservation and sterilization</p>
<p><b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:</p>		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines	<p><b>c1</b>. Handle efficiently the tools and chemicals used in microbiology Lab.</p> <p><b>c2</b>. Operate successfully the instruments used in microbiology Lab</p> <p><b>c3</b> . Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation of microorganism, assessment of antimicrobial activity, determination of microbial content , preparation of culture media, etc., using standard procedures.</p>
<b>C6</b>	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	<p><b>c4</b> .Take the required safety criteria during performing different types of practical and professional pharmacy works</p> <p><b>c5</b> .Search efficiently for information using documented and electronic sources of information.</p> <p><b>c6</b> . Present and report his/her works correctly using appropriate writing rules and technologies media.</p>
<p><b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:</p>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<p><b>d1</b>. Share successfully in team-work.</p> <p><b>d2</b>. Show respect to life.</p> <p><b>d3</b>. Communicate effectively with his/her colleagues.</p>
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<p><b>d4</b>. Behave in discipline during practicing practical and professional works and assignments.</p> <p><b>d5</b>. Demonstrate time management and self-learning during performing practical and professional works and assignments.</p>

### 28. Alignment CILOs to teaching strategies and assessment strategies

#### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1</b> . Identify and describe the microscopical features of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.	Active Lecture	Written exams



a2. Determine pathogenicity, management of spread and treatment of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.		
a3. Discuss the principles and technologies of microbiology applied in pharmacy for microbial investigations, product preservation, sterilization and assessment of antimicrobial activity.		
a4. Comprehend his/her role as a pharmacist in applying microbiology knowledge for pharmaceutical applications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Differentiate between similar microorganisms such as streptococci and staphylococci using microscopical methods.	laboratory practice	lab. term work, practical final exam
b2. Interpret the data of inhibition zone obtained after antimicrobial activity assessment.		
b3 .Classify bacteria, fungi and other studied microorganisms into categories based on their morphologies, life-pattern and pathogenicity.		
b4. Relate the severity of microbial infection to its affecting factors such as immunity.	Lecture, lab. Practice	Written exams, lab. term work, practical final exam
b5 . Assess the sensitivity of microbial pathogens to antimicrobials.		
b6. Select the appropriate method for preservation and sterilization		
<b>(c)Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1.Handleefficiently the tools and chemicals used in microbiology Lab.	laboratory practice	Lab. term works, final practical exam
c2. Operate successfully the instruments used in microbiology Lab		
c3 . Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation of microorganism, assessment of antimicrobial activity, determination of microbial content , preparation of culture media, etc., using standard procedures.		
c4 .Take the required safety criteria during performing different types of practical and professional pharmacy works	feed-back learning, Group-project	Assignments



c5 .Search efficiently for information using documented and electronic sources of information.		
c6. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	laboratory practice, group-project	Lab. term works, final practical exam, Assignments
d2. Show respect to life.		
d3. Communicate effectively with his/her colleagues.		
d4. Behave in discipline during practicing practical and professional works and assignments.	Lab. practice, group-project, feed-back learning	Lab. term works, final practical exam, Assignments
d5. Demonstrate time management and self-learning during performing practical and professional works and assignments.		

<b>XXXI. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction to Microbiology</b>	b2, d2	<ul style="list-style-type: none"> <li>Definition, brief history, role in medical sciences</li> <li>Prokaryotes and Eukaryotes</li> <li>Role of microorganisms in life</li> <li>Classification of microorganisms.</li> </ul>	1	2
2	<b>Bacteria</b>	a1, a2,a3, a4, b1, b3, b4,d2	<ul style="list-style-type: none"> <li>Nomenclature , Morphology and fine structures, biological process : (growth, reproduction , nutrition)</li> <li>Classification</li> <li>Study of the microscopical features , common infections and culture media of pathogenic bacteria e.g. Staphylococci , Streptococci, Neisseriae, E.coli, pseudomonas , Mycobacteria , Vibrio , Mycoplasma , Ureaplasma, Chlamydia etc.</li> </ul>	3	6
3	<b>Micro-organisms other than bacteria</b>	a1, a2,a3, a4, b1, b3, b4,d2	<ul style="list-style-type: none"> <li><b>Fungi:</b> Types, morphology, Reproduction and physiology. Pathogenic yeasts , dermatophytes, aspergillus</li> </ul>	3	6

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Dr. Amal Banafea	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





			<ul style="list-style-type: none"> <li>• <b>Rickettsiae:</b> Introduction, characteristics, Pathogenic rickettsiae, laboratory diagnosis of rickettsiai diseases.</li> <li>• <b>Viruses:</b> History of viruses. Classification. Characteristics. Reproduction and culture of viruses. Virus inhibition. Control of virus infections.</li> </ul>		
<b>Mid-term exam</b>				1	2
4	<b>Application of microbiology in pharmacy</b>	a3, a4, d2 b2, b5, b6	<ul style="list-style-type: none"> <li>• Methods of Preservation and sterilization of pharmaceutical preparations</li> <li>• common pharmaceutical preservatives</li> <li>• Pharmacopeial requirements of microbial contents in various pharmaceutical dosage forms.</li> <li>• Procedures for microbial content test</li> <li>• Culture media preparation <ul style="list-style-type: none"> <li>○ Study of antimicrobial activity of drugs : methods, culture media, etc.</li> </ul> </li> </ul>	6	12
<b>Course Review</b>		all	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	4 Units

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	<b>introduction to the Lab.: safety requirements, list of experiments, How to report, source of errors, etc.</b>	a1, a4, b1, b2,c1, c2, d1, d3	2	4





2	Sterilization & disinfection of plastic and glasswares	b1, b2,b4,c1, c2, c3, d4, d5	1	2
3	Preparation of culture media and inoculums for microorganisms	b2,b6,c1, c2, c4, c6, d1, d3	1	2
4	Wet preparation & Microscopical characteristics differentiation of bacteria: streptococci, staphylococci, pseudomonas aueroginoa, Nessleria, M. tuberculosis.	b3,b6,c1, c2, c3, d1, d3	1	2
5	Microscopical characterstics differentiation of Fungi Candida albicans.	b2,b5,c3, c4, c6, d3, d4, d5	1	2
6	Antimicrobial activity of certain antimicrobial disks.	b2, b3,c3, c4, c6, d4, d5	1	2
7	Antimicrobial activity of certain antimicrobial dermatological products using dilution method	b2, b3,c3, c4, c5, d4, d5	1	2
8	Determination of microbial content (e.g. staphylococci) in pharmaceutical product : paracetamol syrup	b2, b3,c2, c4, c6, d4, d5	1	2
9	Testing of sterility of pharmaceutical products	b4, b6,c3, c4, c5, d2, d3		
PRACTICAL EXAM		c1-c6, d1, d3	1	2
Total			10	20

#### XXIV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills



VII. Assignments:				
No	Assignments	Aligned CIOS	Week Due	Mark
1	<b>Individual:</b> every student is assigned to do a search report on the pharmacopeial specification of microbial content and sensitivity inhibition zone of one of the studied microbial pathogens.	c3, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to provide a search-based report on natural substances (e.g. plant, minerals) that have antimicrobial activity against one of the studied microbial pathogen.	c3, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOS)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c3,d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3,a4,b1,b2,b3, d1,d2, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4,b1,b2, b3, d1,d2,d3
TOTAL				70	70 %	70

Practical part assessment						
No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOS)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3,d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3,d1, d2,d3
Total				30	30%	

XXXI. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
Tim Sandle. Pharmaceutical Microbiology. Essentials for Quality Assurance and Quality Control, 2015, Elsevier
<b>2- Essential References.</b>
1. W. B. Hugo: pharmaceutical microbiology, 2012, Black well science LTD.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Amal Banafea	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



2. Aulton, pharmaceuticals the science of dosage form design, 2002, Churchill Livingston
3. Kar. Pharmaceutical microbiology

**3- Electronic Materials and Web Sites etc.**

<https://www.slideshare.net/SonamkzBhutia/introduction-of-pharmaceutical-microbiology>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head	Page 544
Dr. Amal Banafea	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani	



**IX. Course Policies: (Based on the Uniform Students' By law (2007))**

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة



Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
Pharmaceutical Microbiology  
Course Code No. (PHT225)

IX. - Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Amal Banafea	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

IV. Course Description:
The course deals study of pathogenic microorganisms and their infections as well the applications of microbiology in pharmacy .



V. Intended learning outcomes of the course (CILOs)	
<b>29. Alignment CILOs</b>	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Identify and describe the microscopical features of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.	
a2. Determine pathogenicity, management of spread and treatment of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.	
a3. Discuss the principles and technologies of microbiology applied in pharmacy for microbial investigations, product preservation, sterilization and assessment of antimicrobial activity.	
a4. Comprehend his/her role as a pharmacist in applying microbiology knowledge for pharmaceutical applications.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
b1. Differentiate between similar microorganisms such as streptococci and staphylococci using microscopical methods.	
b2. Interpret the data of inhibition zone obtained after antimicrobial activity assessment.	
b3. Classify bacteria, fungi and other studied microorganisms into categories based on their morphologies, life-pattern and pathogenicity.	
b4. Relate the severity of microbial infection to its affecting factors such as immunity.	
b5. Assess the sensitivity of microbial pathogens to antimicrobials.	
b6. Select the appropriate method for preservation and sterilization	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
c1. Handle efficiently the tools and chemicals used in microbiology Lab.	
c2. Operate successfully the instruments used in microbiology Lab	
c3. Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation of microorganism, assessment of antimicrobial activity, determination of microbial content, preparation of culture media, etc., using standard procedures.	
c4. Take the required safety criteria during performing different types of practical and professional pharmacy works	
c5. Search efficiently for information using documented and electronic sources of information.	
c6. Present and report his/her works correctly using appropriate writing rules and technologies media.	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
d1. Share successfully in team-work.	
d2. Show respect to life.	
d3. Communicate effectively with his/her colleagues.	
d4. Behave in discipline during practicing practical and professional works and assignments.	
d5. Demonstrate time management and self-learning during performing practical and professional works and assignments.	





<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify and describe the microscopical features of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.	Active Lecture	Written exams
<b>a2.</b> Determine pathogenicity, management of spread and treatment of common pathogenic microorganisms including bacteria, fungi, rickettsia and others.		
<b>a3.</b> Discuss the principles and technologies of microbiology applied in pharmacy for microbial investigations, product preservation, sterilization and assessment of antimicrobial activity.		
<b>a4.</b> Comprehend his/her role as a pharmacist in applying microbiology knowledge for pharmaceutical applications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Differentiate between similar microorganisms such as streptococci and staphylococci using microscopical methods.	laboratory practice	lab. term work, practical final exam
<b>b2.</b> Interpret the data of inhibition zone obtained after antimicrobial activity assessment.		
<b>b3.</b> Classify bacteria, fungi and other studied microorganisms into categories based on their morphologies, life-pattern and pathogenicity.		
<b>b4.</b> Relate the severity of microbial infection to its affecting factors such as immunity.	Lecture, lab. Practice	Written exams, lab. term work, practical final exam
<b>b5.</b> Assess the sensitivity of microbial pathogens to antimicrobials.		
<b>b6.</b> Select the appropriate method for preservation and sterilization		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently the tools and chemicals used in microbiology Lab.	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate successfully the instruments used in microbiology Lab		





c3 . Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation of microorganism, assessment of antimicrobial activity, determination of microbial content , preparation of culture media, etc., using standard procedures.		
c4 .Take the required safety criteria during performing different types of practical and professional pharmacy works	feed-back learning, Group-project	Assignments
c5 .Search efficiently for information using documented and electronic sources of information.		
c6. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	laboratory practice, group-project	Lab. term works, final practical exam, Assignments
d2. Show respect to life.		
d3. Communicate effectively with his/her colleagues.		
d4.Behave in discipline during practicing practical and professional works and assignments.	Lab. practice, group-project, feed-back learning	Lab. term works, final practical exam, Assignments
d5. Demonstrate time management and self-learning during performing practical and professional works and assignments.		

<b>XXXII. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction to Microbiology</b>	b2, d2	<ul style="list-style-type: none"> <li>Definition, brief history, role in medical sciences</li> <li>Prokaryotes and Eukaryotes</li> <li>Role of microorganisms in life</li> <li>Classification of microorganisms.</li> </ul>	1	2
2	<b>Bacteria</b>	a1, a2,a3, a4, b1, b3, b4,d2	<ul style="list-style-type: none"> <li>Nomenclature , Morphology and fine structures, biological process : (growth, reproduction , nutrition)</li> <li>Classification</li> <li>Study of the microscopical features , common infections and culture media of pathogenic bacteria e.g.</li> </ul>	3	6

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			Staphylococci , Streptococci, Neisseriae, E.coli, pseudomonas, , Mycobacteria , Vibrio , Mycoplasma , Ureaplasma, Chlamydia etc.		
3	<b>Micro-organisms other than bacteria</b>	a1, a2,a3, a4, b1, b3, b4,d2	<ul style="list-style-type: none"> <li>• <b>Fungi:</b> Types, morphology, Reproduction and physiology. Pathogenic yeasts , dermatophytes, aspergillus</li> <li>• <b>Rickettsiae:</b> Introduction, characteristics, Pathogenic rickettsiae, laboratory diagnosis of rickettsiai diseases.</li> <li>• <b>Viruses:</b> History of viruses. Classification. Characteristics. Reproduction and culture of viruses. Virus inhibition. Control of virus infections.</li> </ul>	3	6
<b>Mid-term exam</b>				1	2
4	<b>Application of microbiology in pharmacy</b>	a3, a4, d2 b2, b5, b6	<ul style="list-style-type: none"> <li>• Methods of Preservation and sterilization of pharmaceutical preparations</li> <li>• common pharmaceutical preservatives</li> <li>• Pharmacopeial requirements of microbial contents in various pharmaceutical dosage forms.</li> <li>• Procedures for microbial content test</li> <li>• Culture media preparation <ul style="list-style-type: none"> <li>○ Study of antimicrobial activity of drugs : methods, culture media, etc.</li> </ul> </li> </ul>	6	12
<b>Course Review</b>		all	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	4 Units

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B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	introduction to the Lab.: safety requirements, list of experiments, How to report, source of errors, etc.	a1, a4, b1, b2,c1, c2, d1, d3	2	4
2	Sterilization & disinfection of plastic and glasswares	b1, b2,b4,c1, c2, c3, d4, d5	1	2
3	Preparation of culture media and inoculums for microorganisms	b2,b6,c1, c2, c4, c6, d1, d3	1	2
4	Wet preparation & Microscopical characteristics differentiation of bacteria: streptococci, staphylococci, E.coli, pseudomonas aeroginoa, Nessleria, M. tuberculosis.	b3,b6,c1, c2, c3, d1, d3	1	2
5	Microscopical characteristics differentiation of Fungi Candida albicans.	b2,b5,c3, c4, c6, d3, d4, d5	1	2
6	Antimicrobial activity of certain antimicrobial disks.	b2, b3,c3, c4, c6, d4, d5	1	2
7	Antimicrobial activity of certain antimicrobial dermatological products using dilution method	b2, b3,c3, c4, c5, d4, d5	1	2
8	Determination of microbial content (e.g. staphylococci) in pharmaceutical product : paracetamol syrup	b2, b3,c2, c4, c6, d4, d5	1	2
9	Testing of sterility of pharmaceutical products	b4, b6,c3, c4, c5, d2, d3		
PRACTICAL EXAM		c1-c6, d1, d3	1	2
Total			10	20

### XXV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

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**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

VIII. Assignments:				
No	Assignments	Aligned CIOS	Week Due	Mark
1	<b>Individual:</b> every student is assigned to do a search report on the pharmacopeial specification of microbial content and sensitivity inhibition zone of one of the studied microbial pathogens.	c3, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to provide a search-based report on natural substances (e.g. plant, minerals) that have antimicrobial activity against one of the studied microbial pathogen.	c3, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOS)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c3,d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3,a4,b1,b2,b3, d1,d2, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4,b1,b2, b3, d1,d2,d3
TOTAL				70	70 %	70

Practical part assessment						
No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOS)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3,d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3,d1, d2,d3
Total				30	30%	



XXXII. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
Tim Sandle. Pharmaceutical Microbiology. Essentials for Quality Assurance and Quality Control, 2015, Elsevier	
<b>2- Essential References.</b>	
4. W. B. Hugo: pharmaceutical microbiology, 2012, Black well science LTD. 5. Aulton, pharmaceuticals the science of dosage form design, 2002, Churchill Livingston 6. Kar. Pharmaceutical microbiology	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.slideshare.net/SonamkzBhunia/introduction-of-pharmaceutical-microbiology">https://www.slideshare.net/SonamkzBhunia/introduction-of-pharmaceutical-microbiology</a>	

IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Science

**All Department**

**Faculty Requirements**

Course Specification of

**Pathology**

Course Code No. (MSC226)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pathology			
2	Course Code & Number:	MSC226			
3	Credit Hours:3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	--	2	
4	Study level/ semester at which this course is offered:	2 <sup>nd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –requisite (if any):	Anatomy, Physiology, Histology			
6	Co –requisite (if any):	None			
7	Program (s) in which the course is offered:	All department			
8	Language of teaching the course:	English			
9	Study System	Semester based System			
10	Mode of delivery:	Full Time			
11	Location of teaching the course:	Faculty of Medicine and Health Science			
12	Prepared By:	Assoc.Prof. Mohammed Al-Awar			
13	Date of Approval	2022			

II. Course Description:
<p>Pathology is defined as the study of disease. The aim of the course is to provide the students with a basic education about the general pathology which is concerned about the basic abnormal alterations in the cells and tissues as a result of diseases. To understand the etiology, pathogenesis and structural changes (gross pathology and histopathology) of pathological lesions of different and common diseases. Each lecture lasts 1 hour and is illustrated with macroscopic and microscopic photographs. On the laboratory practical sessions the students can learn the basic macroscopic and microscopic skills and ability to recognize the pathologic lesions and describe them. To help the students to find the lesions on their own slides the lecturer will demonstrate the slides with the data show and power point slides. The students will have an opportunity to make drawings and notes of the slides. The topics of the practical study match the lectures.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies.	
Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1: Understand the basic mechanisms of tissue (aetiology and pathogenesis) and body reactions ( course and outcomes ) to injury
	a2: Understand the normal and altered morphology (gross & microscopy) of different organ systems of the human body
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
B3. Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b1. Recognize the difference between neoplastic and non-neoplastic lesions based on morphological and clinical characteristic features.
	b2: Able to solve pathological problems
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
C5. Advise/ educate them on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	c1: Diagnose and fully describe the pathologic picture of a disease based on morphology, clinical data and laboratory investigations
	c2: Differentiate between benign and malignant tumors by their morphology
<b>D: Transferable Skills: upon completion of the course, students will be able to:</b>	
D2. Develop life-long learning, in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d1: Make computer search and use the library to search for information
	d2: Work effectively as an individual and as a member of a team

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<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1	Understand the basic mechanisms of tissue (aetiology and pathogenesis) and body reactions ( course and outcomes ) to injury	<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Seminars</li> <li>- Discussion</li> <li>- Case Study</li> <li>- Office Hours</li> <li>- Self learning</li> <li>- Power point slides</li> <li>- Data show.</li> <li>- White board</li> <li>- Markers,</li> </ul>	<ul style="list-style-type: none"> <li>- Oral discussion</li> <li>- Written and oral Quiz by the end of the lecture</li> <li>- Research</li> </ul>
a2	Understand the normal and altered morphology (gross & microscopy) of different organ systems of the human body		
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Recognize the difference between neoplastic and non-neoplastic lesions based on morphological and clinical characteristic features	<ul style="list-style-type: none"> <li>-Lectures</li> <li>- Seminars</li> <li>- Discussion</li> <li>- Case Study</li> <li>- Brain storm</li> </ul>	<ul style="list-style-type: none"> <li>- Oral discussion</li> <li>- Written and oral Quiz by the end of the lecture</li> <li>- Research</li> <li>- Homework</li> </ul>
b2	Able to solve pathological problems		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Diagnose and fully describe the pathologic picture of a disease based on morphology, clinical and laboratory investigations	<ul style="list-style-type: none"> <li>-Lectures</li> <li>- Discussion</li> <li>- Laboratory sessions ( gross specimens, microscopic histopathological slides),</li> <li>- Case Study</li> <li>- Brain storm</li> </ul>	<ul style="list-style-type: none"> <li>- Oral discussion</li> <li>- Written and oral Quiz by the end of lecture</li> <li>- Lab <i>Practical Quiz</i></li> </ul>
c5	Differentiate between benign and malignant tumors by their morphology		
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			

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Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Make computer search and use the library to search for information	-Lectures - Seminars - Research, - Discussion - Case Study - Self Learning - Presentation	- Quizzes - Discussion - Teamwork - Research - Homework
d2	Work effectively as an individual and as a member of a team	- Case study - Discussion	Self and independent learning Solve the cases studies Individual and collective discussion

XXIII. Course Content:					
B – Theoretical Aspect: (if any)					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
1	<b>Introduction to pathology</b>	-Definitions -The core aspects of diseases in pathology -Diagnostic methods used in pathology -Causes of diseases -Course of diseases -Outcomes & consequences of diseases -Clinical & biologic death	2	4	a1, b1, c1, d1
2	<b>Cellular Reactions to Injury</b>	-Response of cells to injury -Ultrastructural changes in injured cell -Types of cellular adaptation and disturbances of growth -Reversible cellular changes & accumulations -Cell death (Necrosis and Apoptosis) -Pathologic calcification	3	6	a1, a2, b1, c2, d1
3	<b>Inflammation</b>	-Definitions -Causes of inflammation -Types of inflammation -Acute inflammation -Cells of acute inflammation -Events in acute inflammation	2	4	a1, b2, c1, d2

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		-General changes in acute inflammation -Cardinal signs and symptoms of acute inflammation -Increased blood flow and edema -Outcome of acute inflammation -Chronic inflammation -Cells of chronic inflammation -Types of chronic inflammation -Systemic effects of inflammation			
4	<b>Healing</b>	-Definition of healing -Processes of healing -Molecular control of healing process -Wound healing -Factors that influence wound healing -Complications of wound healing -Fracture healing	1	2	a1, a2, b1, c2, d1
5	<b>Midterm-Exam</b>		1	2	
6	<b>Tumors (Neoplasia)</b>	-Definition -Types of tumors -Characteristics of Neoplasms -Molecular Basis of Cancer (Carcinogenesis) -Clinical Features of Neoplasms -Laboratory Diagnosis of Cancer -Cancer spreads -Tumor nomenclature	2	4	a2, b1, b2, c1, d2
7	<b>Metabolic Diseases</b>	-Introduction -Diabetes Mellitus -Gout	2	4	a1, a2 b2, c2, d1
8	<b>Hemodynamic Disorders</b>	-Introduction -Edema -Hyperemia & congestion -Hemorrhage -Hemostasis -Thrombosis -Embolism -Infarction -Shock -Disseminated Intravascular Coagulation (DIC)	2	4	a1, b1, b2, c1, c2, d2

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9	<b>Immunopathology</b>	-Hypersensitivity Reactions -Immunologic Tolerance -Autoimmune Diseases -Immunodeficiency Diseases	2	4	a1,a2, b1, c1, d1
11	Final – Exam		1	2	
TOTAL			18	36	
Number of Weeks /and Units Per Semester			16 weeks	2 Units	

#### V. Teaching Strategies of the Course:

- Lectures
- Seminars
- Discussion
- Case Study
- Laboratory sessions (Gross specimens and microscopic histopathological slides)
- Brain storm
- Faculty library
- Office Hours
- Self learning
- Presentation
- Power point slides
- Data show.
- White board
- Markers

#### VI. Assessment Methods of the Course:

- Assignments (Participation and attendance, Presentation on----- Research topic based on---)
- Quizzes
- Mid-term Exam (Essay questions, MCQs)
- Final Written Exam (Essay questions, MCQs)
- Final Practical Exam
- Final Oral Exam
- Oral discussion.
- Homework
- Teamwork

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
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1	Participation and attendance	Weekly	5	a1, a2, b1, b2, c1, c2, d1, d2
2	Presentation on----- Research topic based on---	Week 7,14	5	c1, c2d1, d2
<b>Total</b>			<b>10</b>	

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Attitude	14th week	5	5%	a1, a2, b1, b2, c1, c2, d1, d2
2	Assignments	Weekly, week 7,14	10	10%	a1, a2, b1, b2, c1, c2, d1, d2
3	Quizzes 1 & 2	Week 6,12	5	5%	a1, a2, b1, b2, c1, c2
4	Mid-Term Theoretical Exam	Week 8	20	20%	a1, a2, b1, b2
5	Final Theoretical Exam	Week 16	60	60%	a1, a2, b1, b2
<b>Total</b>			<b>100</b>	<b>100%</b>	

#### IX. Learning Resources:

##### 1- Required Textbook(s) ( maximum two ):

1- Essentials of Pathology by Dr: Mohammed Sadeg Al-Awar, Al-Razi university.

##### 2- Essential References:

1- Rubin, Emanuel; Reisner, Howard M, 2009, Essentials of Rubin's Pathology, 5th Edition, Lippincott Williams, Lippincott Williams and Wilkins, USA, Printed in USA.

Liang Cheng and David G. Bostwick, 2006, Essentials of anatomic pathology, 2nd Edition, Humana Press, Totowa, NJ, Printed in the USA.

2- Pathological Basis of Disease by Kumar, Cortan and Robbins, 7thEd., W.B. Saunders.

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- 3- Clinical Pathology Interpretations by A. H. Nagi Vinay Kumar, Abul K Abbas, and Jon C Aster, 2013, Robbins Basic Pathology, 9th Edition, Elsevier Saunders, Printed in Canada
- 4- Rubin, Strayer, and Rubin, 2011, Clinicopathologic Foundations of Medicine, 6th edition, Lippincott Williams and Wilkins, USA, Printed in the USA.
4. Ursus-NikolausRiede, Martin Werner: Color Atlas of Pathology: Pathologic Principles• Associated Diseases; Thieme Stuttgart• New York 2004
5. Basic Pathology, 9th ed., V. Kumar, A. K. Abbas, J. C. Aster (eds.) Saunders / Elsevier, 2012.

### 3- Electronic Materials and Web Sites etc.:

- 1- <https://webpath.med.utah.edu/>
- 2- <http://webpathology.com/>
- 3- <http://www.pathologyoutlines.com/>
- 4- <https://www.med.illinois.edu/m2/pathology/pathatlasf/titlepage.html>
- 5- <https://www.geisingermedicallabs.com/lab/resources.shtml#textbook>
- 6- <https://thepathologist.com/subspecialties/histology>

## X. Course Policies: (Based on the Uniform Students' By law (2007))

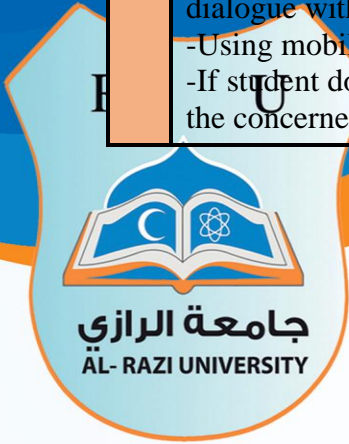
<b>1</b>	<p><b>Class Attendance:</b></p> <ul style="list-style-type: none"> <li>-Student has an obligation to be present all lectures of the course regularly.</li> <li>-If student is unable to attend classes for at least 75% and fail to bring class excuse due to unavoidable circumstances such as illness, his/her absence can result in course dismissal and expulsion.</li> </ul>
<b>2</b>	<p><b>Tardiness:</b></p> <ul style="list-style-type: none"> <li>-Students should arrive to the classroom punctually.</li> <li>-Tardy students should not be allowed to enter the classroom after 15 minutes late.</li> </ul>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <ul style="list-style-type: none"> <li>- Students should arrive to the exam hall punctually.</li> <li>- Late students should not be allowed to enter the exam hall after 15 minutes of the commencement of the examination.</li> <li>- Student is not allowed to leave the exam hall temporarily or otherwise for any reason before 30 minutes of the commencement of the examination.</li> <li>- If the student fails to take the exam and brings sufficient reason for his absence from the exam, he should be given another chance to take the exam of total marks.</li> </ul> <p>Student who fails to appear in the day of exam shall be deemed to have failed the course.</p>

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Assoc.Prof. Mohammed Al-Awar	Dr. Yaser Aiesh	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





4	<b>Assignments &amp; Projects:</b> Students should do the following: - They should be punctual to handover their assignments to their professor as required. - Assignments & projects should have clear outline for their content. If the students fail to handover their assignments on time and fail to bring sufficient reason for their tardiness, assignments should be declined.
5	<b>Cheating:</b> - Cheating is a bad behavior and the university takes a serious view of it. - If student is suspected of cheating, the university has full right to take any disciplinary action against the student such as suspension or expulsion. - Student who cheats in the exam is liable to be expelled from three courses for cheating. If student cheats more than once, he is liable to be expelled from the university.
6	<b>Forgery and Impersonation:</b> Plagiarism is an unlawful act and the offender should be penalized depending on the situation of plagiarism.
7	<b>Other policies:</b> -Students have to show tolerance of dissent and flexibility during discussions and teamwork. -They should be committed to the principles of good argument and constructive dialogue with others. -Using mobiles is not permitted in the classroom and exam hall. -If student does acts of academic or non-academic misconduct, he will be referred to the concerned authority to take the deserved punishment against him.





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**Pathology**  
Course code (MSC226)

I. Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Assoc.Prof. Mohammed Al-Awar	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

2022

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## II. Course Description:

Pathology is defined as the study of disease. The aim of the course is to provide the students with a basic education about the general pathology which is concerned about the basic abnormal alterations in the cells and tissues as a result of diseases. To understand the etiology, pathogenesis and structural changes (gross pathology and histopathology) of pathological lesions of different and common diseases. Each lecture lasts 1 hour and is illustrated with macroscopic and microscopic photographs. On the laboratory practical sessions the students can learn the basic macroscopic and microscopic skills and ability to recognize the pathologic lesions and describe them. To help the students to find the lesions on their own slides the lecturer will demonstrate the slides with the data show and power point slides. The students will have an opportunity to make drawings and notes of the slides. The topics of the practical study match the lectures.

## III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies.

### Alignment CILOs to PILOs

#### PILOs

#### CILOs

#### A: Knowledge and understanding: upon completion of the course, students will be able to:

a1: Understand the basic mechanisms of tissue (aetiology and pathogenesis) and body reactions ( course and outcomes ) to injury

a2: Understand the normal and altered morphology (gross & microscopy) of different organ systems of the human body

#### B: Intellectual skills: upon completion of the course, students will be able to:

b1. Recognize the difference between neoplastic and non-neoplastic lesions based on morphological and clinical characteristic features.

b2: Able to solve pathological problems

#### C: Professional and practical skills: upon completion of the course, students will be able to:

c1: Diagnose and fully describe the pathologic picture of a disease based on morphology, clinical data and laboratory investigations

c2: Differentiate between benign and malignant tumors by their morphology

#### D: Transferable Skills: upon completion of the course, students will be able to:

d1: Make computer search and use the library to search for information

d2: Work effectively as an individual and as a member of a team

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<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1	Understand the basic mechanisms of tissue (aetiology and pathogenesis) and body reactions ( course and outcomes ) to injury	<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Seminars</li> <li>- Discussion</li> <li>- Case Study</li> <li>- Office Hours</li> <li>- Self learning</li> <li>- Power point slides</li> <li>- Data show.</li> <li>- White board</li> <li>- Markers,</li> </ul>	<ul style="list-style-type: none"> <li>- Oral discussion</li> <li>- Written and oral Quiz by the end of the lecture</li> <li>- Research</li> </ul>
a2	Understand the normal and altered morphology (gross & microscopy) of different organ systems of the human body		
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Recognize the difference between neoplastic and non-neoplastic lesions based on morphological and clinical characteristic features	<ul style="list-style-type: none"> <li>-Lectures</li> <li>- Seminars</li> <li>- Discussion</li> <li>- Case Study</li> <li>- Brain storm</li> </ul>	<ul style="list-style-type: none"> <li>- Oral discussion</li> <li>- Written and oral Quiz by the end of the lecture</li> <li>- Research</li> <li>- Homework</li> </ul>
b2	Able to solve pathological problems		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Diagnose and fully describe the pathologic picture of a disease based on morphology, clinical and laboratory investigations	<ul style="list-style-type: none"> <li>-Lectures</li> <li>- Discussion</li> <li>- Laboratory sessions ( gross specimens, microscopic histopathological slides),</li> <li>- Case Study</li> <li>- Brain storm</li> </ul>	<ul style="list-style-type: none"> <li>- Oral discussion</li> <li>- Written and oral Quiz by the end of lecture</li> <li>- Lab <i>Practical Quiz</i></li> </ul>
c5	Differentiate between benign and malignant tumors by their morphology		
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			

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Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Make computer search and use the library to search for information	-Lectures - Seminars - Research, - Discussion - Case Study - Self Learning - Presentation	- Quizzes - Discussion - Teamwork - Research - Homework
d2	Work effectively as an individual and as a member of a team	- Case study - Discussion	Self and independent learning Solve the cases studies Individual and collective discussion

XXIV. Course Content:					
B – Theoretical Aspect: (if any)					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
1	<b>Introduction to pathology</b>	-Definitions -The core aspects of diseases in pathology -Diagnostic methods used in pathology -Causes of diseases -Course of diseases -Outcomes & consequences of diseases -Clinical & biologic death	2	4	a1, b1, c1, d1
2	<b>Cellular Reactions to Injury</b>	-Response of cells to injury -Ultrastructural changes in injured cell -Types of cellular adaptation and disturbances of growth -Reversible cellular changes & accumulations -Cell death (Necrosis and Apoptosis) -Pathologic calcification	3	6	a1, a2, b1, c2, d1
3	<b>Inflammation</b>	-Definitions -Causes of inflammation -Types of inflammation -Acute inflammation -Cells of acute inflammation	2	4	a1, b2, c1, d2

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		<ul style="list-style-type: none"> <li>-Events in acute inflammation</li> <li>-General changes in acute inflammation</li> <li>-Cardinal signs and symptoms of acute inflammation</li> <li>-Increased blood flow and edema</li> <li>-Outcome of acute inflammation</li> <li>-Chronic inflammation</li> <li>-Cells of chronic inflammation</li> <li>-Types of chronic inflammation</li> <li>-Systemic effects of inflammation</li> </ul>			
4	<b>Healing</b>	<ul style="list-style-type: none"> <li>-Definition of healing</li> <li>-Processes of healing</li> <li>- Molecular control of healing process</li> <li>-Wound healing</li> <li>-Factors that influence wound healing</li> <li>-Complications of wound healing</li> <li>-Fracture healing</li> </ul>	1	2	a1, a2, b1, c2, d1
5	<b>Midterm-Exam</b>		1	2	
6	<b>Tumors (Neoplasia)</b>	<ul style="list-style-type: none"> <li>-Definition</li> <li>-Types of tumors</li> <li>-Characteristics of Neoplasms</li> <li>-Molecular Basis of Cancer (Carcinogenesis)</li> <li>-Clinical Features of Neoplasms</li> <li>-Laboratory Diagnosis of Cancer</li> <li>-Cancer spreads</li> <li>-Tumor nomenclature</li> </ul>	2	4	a2, b1, b2, c1, d2
7	<b>Metabolic Diseases</b>	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Diabetes Mellitus</li> <li>-Gout</li> </ul>	2	4	a1, a2, b2, c2, d1
8	<b>Hemodynamic Disorders</b>	<ul style="list-style-type: none"> <li>-Introduction</li> <li>-Edema</li> <li>-Hyperemia &amp; congestion</li> <li>-Hemorrhage</li> <li>-Hemostasis</li> <li>-Thrombosis</li> </ul>	2	4	a1, b1, b2, c1, c2, d2

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		-Embolism -Infarction -Shock -Disseminated Intravascular Coagulation (DIC)			
9	<b>Immunopathology</b>	-Hypersensitivity Reactions -Immunologic Tolerance -Autoimmune Diseases -Immunodeficiency Diseases	2	4	a1,a2, b1, c1, d1
11	Final – Exam		1	2	
TOTAL			18	36	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	2 Units	

#### V. Teaching Strategies of the Course:

- Lectures
- Seminars
- Discussion
- Case Study
- Laboratory sessions (Gross specimens and microscopic histopathological slides)
- Brain storm
- Faculty library
- Office Hours
- Self learning
- Presentation
- Power point slides
- Data show.
- White board
- Markers

#### VI. Assessment Methods of the Course:

- Assignments (Participation and attendance, Presentation on----- Research topic based on---)
- Quizzes
- Mid-term Exam (Essay questions, MCQs)
- Final Written Exam (Essay questions, MCQs)
- Final Practical Exam
- Final Oral Exam
- Oral discussion.
- Homework
- Teamwork

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VII. Assignments:				
No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Participation and attendance	Weekly	5	a1, a2, b1, b2, c1, c2, d1, d2
2	Presentation on----- Research topic based on---	Week 7,14	5	c1, c2d1, d2
<b>Total</b>			<b>10</b>	

VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and Attitude	14th week	5	5%	a1, a2, b1, b2, c1, c2, d1, d2
2	Assignments	Weekly, week 7,14	10	10%	a1, a2, b1, b2, c1, c2, d1, d2
3	Quizzes 1 & 2	Week 6,12	5	5%	a1, a2, b1, b2, c1, c2
4	Mid-Term Theoretical Exam	Week 8	20	20%	a1, a2, b1, b2
5	Final Theoretical Exam	Week 16	60	60%	a1, a2, b1, b2
<b>Total</b>			<b>100</b>	<b>100%</b>	

IX. Learning Resources:
<b>1- Required Textbook(s) ( maximum two ):</b>
5- Essentials of Pathology by Dr: Mohammed Sadeg Al-Awar, Al-Razi university.
<b>2- Essential References:</b>
2- Rubin, Emanuel; Reisner, Howard M, 2009, Essentials of Rubin's Pathology, 5th Edition, Lippincott Williams, Lippincott Williams and Wilkins, USA, Printed in USA.

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- 3- Liang Cheng and David G. Bostwick, 2006, Essentials of anatomic pathology, 2nd Edition,  
Humana Press, Totowa, NJ, Printed in the USA.
- 6- Pathological Basis of Disease by Kumar, Cortan and Robbins, 7thEd., W.B. Saunders.
- 7- Clinical Pathology Interpretations by A. H. Nagi Vinay Kumar, Abul K Abbas, and Jon C Aster, 2013, Robbins Basic Pathology, 9th Edition, Elsevier Saunders, Printed in Canada
- 8- Rubin, Strayer, and Rubin, 2011, Clinicopathologic Foundations of Medicine, 6th edition, Lippincott Williams and Wilkins, USA, Printed in the USA.
6. Ursus-NikolausRiede, Martin Werner: Color Atlas of Pathology: Pathologic Principles• Associated Diseases; Thieme Stuttgart• New York 2004
7. Basic Pathology, 9th ed., V. Kumar, A. K. Abbas, J. C. Aster (eds.) Saunders / Elsevier, 2012.

### 3- Electronic Materials and Web Sites etc.:

- 1- <https://webpath.med.utah.edu/>
- 2- <http://webpathology.com/>
- 3- <http://www.pathologyoutlines.com/>
- 4- <https://www.med.illinois.edu/m2/pathology/pathatlasf/titlepage.html>
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- 6- <https://thepathologist.com/subspecialties/histology>

## X. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<p><b>Class Attendance:</b></p> <p>-Student has an obligation to be present all lectures of the course regularly.</p> <p>-If student is unable to attend classes for at least 75% and fail to bring class excuse due to unavoidable circumstances such as illness, his/her absence can result in course dismissal and expulsion.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>-Students should arrive to the classroom punctually.</p> <p>-Tardy students should not be allowed to enter the classroom after 15 minutes late.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>- Students should arrive to the exam hall punctually.</p>

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	<ul style="list-style-type: none"> <li>- Late students should not be allowed to enter the exam hall after 15 minutes of the commencement of the examination.</li> <li>- Student is not allowed to leave the exam hall temporarily or otherwise for any reason before 30 minutes of the commencement of the examination.</li> <li>- If the student fails to take the exam and brings sufficient reason for his absence from the exam, he should be given another chance to take the exam of total marks.</li> </ul> <p>Student who fails to appear in the day of exam shall be deemed to have failed the course.</p>
4	<p><b>Assignments &amp; Projects:</b></p> <p>Students should do the following:</p> <ul style="list-style-type: none"> <li>- They should be punctual to handover their assignments to their professor as required.</li> <li>- Assignments &amp; projects should have clear outline for their content.</li> </ul> <p>If the students fail to handover their assignments on time and fail to bring sufficient reason for their tardiness, assignments should be declined.</p>
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6	<p><b>Forgery and Impersonation:</b></p> <p>Plagiarism is an unlawful act and the offender should be penalized depending on the situation of plagiarism.</p>
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACOGNOSY-I**  
Course No. (PHG224)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmacognosy-I			
2	Course Code & Number:	PHG224			
3	Credit Hours: 3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHG216			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Salwa Raweh			
13	Date of Approval:	2022			

II. Course Description:
<p>The course provides the student with fundamental knowledge in plants as a natural source of drugs. It focuses on the principles and procedures applied for cultivation, collection and processing of plants as crude drugs and the methods used for detection of active constituents and discovering adulteration of medicinal plants. It also provides detailed knowledge on identification features and medical uses of leaves, barks, roots and rhizomes that have scientific-based evidences to be used as complementary and alternative medicines. The practical part of the course provides the student with skills to handle and prepare of plant samples for morphological and microscopical identification tests.</p>

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
30. Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
<b>A2</b> Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and	<b>a1.</b> Explicit the methods used for detection of active constituents and discovering adulteration of medicinal plants. <b>a2.</b> Discuss the principles and procedures applied for cultivation, collection and processing of plants as crude drugs.

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	biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy	<b>a3.</b> Identify the botanical origin, morphological and microscopical characteristics of common medicinal leaves, barks, roots and rhizomes.
		<b>a4.</b> Determine the active constituents and therapeutic use of medicinal leaves, barks, roots and rhizomes.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	<b>a5.</b> Describe his/her role as pharmacist in identification and evaluation of medicinal plants
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<b>b1.</b> Express with drawings the morphology and key microscopical features of medicinal plants
		<b>b2.</b> Differentiate between medicinal leaves, barks, roots and rhizomes based on morphological and microscopical features.
<b>B5</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b3.</b> Classify active constituents in medicinal plants.
		<b>b4.</b> Select standard operation procedures to identify medicinal plants and crude drugs
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
		<b>c2.</b> Operate the instruments (Evaporator, Grinder, Dryer) and perform experiments successfully in the laboratory.
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c3.</b> Prepare plant samples and investigate the morphological and microscopical features in medicinal leaves, barks, roots and rhizomes





<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c4.</b> Search efficiently for information using documented and electronic sources of information.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice	<b>d3.</b> Demonstrate the skills of time management and self-learning.

<b>31. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explicit the methods used for detection of active constituents and discovering adulteration of medicinal plants.	Active Lecture	Written exams
<b>a2.</b> Discuss the principles and procedures applied for cultivation, collection and processing of plants as crude drugs.		
<b>a3.</b> Identify the botanical origin, morphological and microscopical characteristics of common medicinal leaves, barks, roots and rhizomes.		
<b>a4.</b> Determine the active constituents and therapeutic use of medicinal leaves, barks, roots and rhizomes.		
<b>a5.</b> Describe his/her role as pharmacist in identification and evaluation of medicinal plants		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

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<b>b1.</b> Express with drawings the morphology and key microscopical features of medicinal plants	Active Lecture, laboratory practice	Written exam, lab. term work, final practical exam
<b>b2.</b> Differentiate between medicinal leaves, barks, roots and rhizomes based on morphological and microscopical features.	laboratory practice	lab. term work, final practical exam
<b>b4.</b> Select standard operation procedures to identify medicinal plants and crude drugs		
<b>b3.</b> Classify active constituents in medicinal plants.	Active Lecture, feed-back learning	Written exams quizzes

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term work, final practical exam
<b>c2.</b> Operate the instruments (Evaporator, Grinder, Dryer) and perform experiments successfully in the laboratory.		
<b>c3.</b> Prepare plant samples and investigate the morphological and microscopical features in medicinal leaves, barks, roots and rhizomes		
<b>c4.</b> Search efficiently for information using documented and electronic sources of information.	Feed-back learning, Group-project	Assignments

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice Feed-back learning	Lab. term work, final practical exam, Assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.		

**XXXV. Course Content:**

A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction</b>	a1, a2, a4, b4	<ul style="list-style-type: none"> <li>Definition, importance, and function, brief history</li> <li>Crude, official and unofficial drugs.</li> </ul>	6	

			<ul style="list-style-type: none"> <li>• Nomenclature of crude drugs (botanical, geographical and commercial sources of drugs)</li> <li>• Classification of crude drugs (alphabetical, taxonomical, morphological, pharmacological and chemical)</li> <li>• Cultivation (Disadvantages of collecting wild plants and advantages of cultivation, factors affecting cultivation).</li> <li>• Collection (Time of the year, time of the day, stage of the development of the plant and general rules of collection).</li> <li>• Post-collection processing of crude drugs: Drying (Natural methods, artificial methods, changes occurring after drying), Preservation and protection of crude drugs (deterioration during storage, physicochemical factors, biological factors, methods to destroy and control of insects)</li> <li>• Adulteration (sophistication, substitution, admixture and deterioration, determination of adulteration.)</li> </ul>		12
<b>MID-TERM EXAM</b>				1	2
3	<b>Medicinal leaves</b>	a1, a3, a4, a5, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>• Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal leaves: Digitalis, Senna, Stramonium, Belladonna, Hyoscymus, Bucho, Boldo, Coca, Jaborandi, Henna.</li> </ul>	3	6
4	<b>Medicinal barks</b>	a1, a3, a4, a5, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>• Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal barks: Cinchona, Cinnamon,</li> </ul>	2	4

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			Frangula, Quillaia, Pomegranate, Hamamelis and Galls.		
5	<b>Medicinal roots and rhizomes</b>	a1, a2, a4, a5, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal roots and rhizomes: Liquorice, Ipecacuanha, Rauwolfia, Senega, Ginger, Colchicum, Squill, Ginseng, Rhubarb, Curcuma, Podophyllum, Aconite, Veratrum, Sasaparilla, Kava-kava</li> </ul>	2	4
	<b>Course Review</b>	a1, a2, a3, a4, a5, b1, b2, b3, b4	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>5 Units</b>

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1	preparation of hard parts of plant (e.g., roots, seeds), for investigation: drying, grinding, treating with reagents, etc	c1, c2, d1, d2	1	2
2	preparation of soft parts of plant (e.g., leaves, flowers), for investigation: drying, grinding, treating with reagents, etc.	c1, c2, c3, d2, d3	1	2
3	microscopical Detection of types of calcium oxalate in plant	c1, c2, d1, d2	1	2
4	microscopical Detection of types of starch in plant	c1, c4, d2, d3	1	2
5	morphology and microscopical determination of medicinal leaves: senna leaves	c2, c3, d2, d3	1	2

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6	morphology and microscopical determination of medicinal leaves: Henna leaves	c2, c3, d1, d3	1	2
7	morphology and microscopical determination of medicinal barks: cinnamon bark	c1, c4, d1, d2	1	2
8	morphology and microscopical determination of medicinal barks: pomegranate bark	c1, c2, d3	1	2
9	morphology and microscopical determination of medicinal roots & rhizomes: Ginger	c1, c2, d1, d2	1	2
10	morphology and microscopical determination of medicinal roots & rhizomes: licorice	c2, c4, d1, d2	1	2
12	Review	c1, c2, c3, c4, d1, d2, d3	1	2
PRACTICAL EXAM		c1, c2, c3, d1, d3	1	2
Total			12	24
Number of Weeks				12

#### XXVI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

#### IX. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search on the pharmaceutical products available in the drug market of one plant drug studied in the course.	c4, d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to do search report for	c4, d2, d3	14	2

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	adulteration of one crude drug studied in the course.			
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### X. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)	7	10	10	a1, a2, a3, a4, a5, b1, b3, b4	
3	Final exam (written exam)	16	50	50	a1, a2, a3, a4, a5, b1, b3, b4	
TOTAL			70	70 %	70	

Practical part assessment						
No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Lab. Term Works	Attitude	1-12	5	5	c1, c2, c3, c4, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d3
Total				30	30%	

XI. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
1. <u>Michael Heinrich</u> , <u>Joanne Barnes</u> , et al. Fundamentals of Pharmacognosy and Phytotherapy, 2018, Elsevier.
<b>2- Essential References.</b>
1. <u>Biren Shah</u> and <u>Avinash Seth</u> ·Textbook of Pharmacognosy and Phytochemistry. 2018, Elsevier - Health Sciences Division.
<b>3- Electronic Materials and Web Sites etc.</b>
1. <a href="https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&amp;%20Phytochemistry-I.pdf">https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&amp;%20Phytochemistry-I.pdf</a>
2. <a href="https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf">https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf</a>

### XXXIII. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b>
	Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.

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2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.







Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**Pharmacognosy I**  
Course Code No. (PHG224)

I. - Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Salwa Raweh	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

III. Course Description:
<p>The course provides the student with fundamental knowledge in plants as a natural source of drugs. It focuses on the principles and procedures applied for cultivation, collection and processing of plants as crude drugs and the methods used for detection of active constituents and discovering adulteration of medicinal plants. It also provides detailed knowledge on identification features and medical uses of leaves, barks, roots and rhizomes that have scientific-based evidences to be used as complementary and alternative medicines. The practical part of the course provides the student with skills to handle and prepare of plant samples for morphological and microscopical identification tests.</p>

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### III. Intended learning outcomes of the course (CILOs)

#### 32. Alignment CILOs

**A: Knowledge & understanding:** Upon successful completion of the course, students will be able to:

**a1.** Explicit the methods used for detection of active constituents and discovering adulteration of medicinal plants.

**a2.** Discuss the principles and procedures applied for cultivation, collection and processing of plants as crude drugs.

**a3.** Identify the botanical origin, morphological and microscopical characteristics of common medicinal leaves, barks, roots and rhizomes.

**a4.** Determine the active constituents and therapeutic use of medicinal leaves, barks, roots and rhizomes.

**a5.** Describe his/her role as pharmacist in identification and evaluation of medicinal plants

**B: Intellectual skills:** Upon successful completion of the course, students will be able to:

**b1.** Express with drawings the morphology and key microscopical features of medicinal plants

**b2.** Differentiate between medicinal leaves, barks, roots and rhizomes based on morphological and microscopical features.

**b3.** Classify active constituents in medicinal plants.

**b4.** Select standard operation procedures to identify medicinal plants and crude drugs

**C: Professional & practical skills:** Upon successful completion of the course, students will be able to:

**c1.** Handle efficiently and safely the chemical materials and tools used in the laboratory

**c2.** Operate the instruments (Evaporator, Grinder, Dryer) and perform experiments successfully in the laboratory.

**c3.** Prepare plant samples and investigate the morphological and microscopical features in medicinal leaves, barks, roots and rhizomes

**c4.** Search efficiently for information using documented and electronic sources of information.

**D: Transferable skills:** Upon successful completion of the course, students will be able to:

**d1.** Communicate effectively and behave in discipline with colleagues.

**d2.** Participate efficiently with his colleagues in a team work.

**d3.** Demonstrate the skills of time management and self-learning.

#### 33. Alignment CILOs to teaching strategies and assessment strategies

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explicit the methods used for detection of active constituents and discovering adulteration of medicinal plants.	Active Lecture	Written exams
<b>a2.</b> Discuss the principles and procedures applied for cultivation, collection and processing of plants as crude drugs.		
<b>a3.</b> Identify the botanical origin, morphological and microscopical		



characteristics of common medicinal leaves, barks, roots and rhizomes.		
a4. Determine the active constituents and therapeutic use of medicinal leaves, barks, roots and rhizomes.		
a5. Describe his/her role as pharmacist in identification and evaluation of medicinal plants		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Express with drawings the morphology and key microscopical features of medicinal plants	Active Lecture, laboratory practice	Written exam, lab. term work, final practical exam
b2. Differentiate between medicinal leaves, barks, roots and rhizomes based on morphological and microscopical features.	laboratory practice	lab. term work, final practical exam
b4. Select standard operation procedures to identify medicinal plants and crude drugs		
b3. Classify active constituents in medicinal plants.	Active Lecture, feed-back learning	Written exams quizzes
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term work, final practical exam
c2. Operate the instruments (Evaporator, Grinder, Dryer) and perform experiments successfully in the laboratory.		
c3. Prepare plant samples and investigate the morphological and microscopical features in medicinal leaves, barks, roots and rhizomes		
c4. Search efficiently for information using documented and electronic sources of information.	Feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice Feed-back learning	Lab. term work, final practical exam,
d2. Participate efficiently with his colleagues in a team work.		Assignments
d3. Demonstrate the skills of time management and self-learning.		

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XXVI. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introducti on</b>	a1, a2, a4, b4	<ul style="list-style-type: none"> <li>• Definition, importance, and function, brief history</li> <li>• Crude, official and unofficial drugs.</li> <li>• Nomenclature of crude drugs (botanical, geographical and commercial sources of drugs)</li> <li>• Classification of crude drugs (alphabetical, taxonomical, morphological, pharmacological and chemical)</li> <li>• Cultivation (Disadvantages of collecting wild plants and advantages of cultivation, factors affecting cultivation).</li> <li>• Collection (Time of the year, time of the day, stage of the development of the plant and general rules of collection).</li> <li>• Post-collection processing of crude drugs: Drying (Natural methods, artificial methods, changes occurring after drying), Preservation and protection of crude drugs (deterioration during storage, physicochemical factors, biological factors, methods to destroy and control of insects)</li> <li>• Adulteration (sophistication, substitution, admixture and deterioration, determination of adulteration.)</li> </ul>	6	12
<b>MID-TERM EXAM</b>				1	2
3	<b>Medicinal leaves</b>	a1, a3, a4, a5, b1, b2, b3,b4	<ul style="list-style-type: none"> <li>• Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal leaves: Digitalis, Senna, Stramonium,</li> </ul>	3	6

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			Belladonna, Hyoscymus, Bucho, Boldo, Coca, Jaborandi, Henna.		
4	<b>Medicinal barks</b>	a1, a3, a4, a5, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal barks: Cinchona, Cinnamon, Frangula, Quillaia, Pomegranate, Hamamelis and Galls.</li> </ul>	2	4
5	<b>Medicinal roots and rhizomes</b>	a1, a2, a4, a5, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal roots and rhizomes: Liquorice, Ipecacuanha, Rauwolfia, Senega, Ginger, Colchicum, Squill, Ginseng, Rhubarb, Curcuma, Podophyllum, Aconite, Veratrum, Sasaparilla, Kava-kava</li> </ul>	2	4
	<b>Course Review</b>	a1, a2, a3, a4, a5, b1, b2, b3, b4	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>5 Units</b>

B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1	preparation of hard parts of plant (e.g., roots, seeds), for investigation: drying, grinding, treating with reagents, etc	c1, c2, d1, d2	1	2
2	preparation of soft parts of plant (e.g., leaves, flowers), for investigation: drying, grinding, treating with reagents, etc.	c1, c2, c3, d2, d3	1	2

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3	microscopical Detection of types of calcium oxalate in plant	c1, c2, d1, d2	1	2
4	microscopical Detection of types of starch in plant	c1, c4, d2, d3	1	2
5	morphology and microscopical determination of medicinal leaves: senna leaves	c2, c3, d2, d3	1	2
6	morphology and microscopical determination of medicinal leaves: Henna leaves	c2, c3, d1, d3	1	2
7	morphology and microscopical determination of medicinal barks: cinnamon bark	c1, c4, d1, d2	1	2
8	morphology and microscopical determination of medicinal barks: pomegranate bark	c1, c2, d3	1	2
9	morphology and microscopical determination of medicinal roots & rhizomes: Ginger	c1, c2, d1, d2	1	2
10	morphology and microscopical determination of medicinal roots & rhizomes: licorice	c2, c4, d1, d2	1	2
12	Review	c1, c2, c3, c4, d1, d2, d3	1	2
PRACTICAL EXAM		c1, c2, c3, d1, d3	1	2
Total			12	24
Number of Weeks				12

### XXVII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

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<b>XIII. Assignments:</b>				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to do a search on the pharmaceutical products available in the drug market of one plant drug studied in the course.	c4, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to do search report for adulteration of one crude drug studied in the course.	c4, d2, d3	14	2

<b>XIV. Schedule of Assessment Tasks for Students During the Semester</b>						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, a5, b1, b3, b4
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b3, b4
TOTAL				70	70 %	70

Practical part assessment						
No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term Works	Attitude	1-12	5	5	c1, c2, c3, c4, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d3
Total				30	30%	

<b>XV. Learning Resources:</b>
<b>1- Required Textbook(s) (maximum two ).</b>
2. <u>Michael Heinrich</u> , <u>Joanne Barnes</u> , et al. Fundamentals of Pharmacognosy and Phytotherapy, 2018, Elsevier.
<b>2- Essential References.</b>
2. <u>Biren Shah</u> and <u>Avinash Seth</u> ·Textbook of Pharmacognosy and Phytochemistry. 2018, Elsevier - Health Sciences Division.
<b>3- Electronic Materials and Web Sites etc.</b>

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3. [https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM\\_2Y\\_4S\\_405T\\_Pharmacognosy%20&%20Phytochemistry-I.pdf](https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&%20Phytochemistry-I.pdf)
4. <https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf>

#### XXXIV. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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المعهد العالي للدراسات والبحوث  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

# **Medicinal Chemistry I**

Course No. (31)

Course Code No. (PHM227)

**2022**



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Course Specification

**MEDICINAL CHEMISTRY I**

XVII. Course Identification and General Information:							
1	Course Title:	MEDICINAL CHEMISTRY I					
2	Course Code & Number:	PHM227					
3	Credit hours:	C.H				TOTAL	
		Theoretical			P		Tr.
		L.	Tut.	S.			
3	-	-	1	-	4		
4	Study level/ semester at which this course is offered:	<i>(Second) Year – (2<sup>nd</sup>) semester</i>					
5	Pre –requisite (if any):	--					
6	Co –requisite (if any):	Co: PHC228 (Pharmacology I)					
7	Program (s) in which the course is offered:	Pharmacy Bachelor					
8	Study System:	Semester based System					
9	Mode of delivery:	Full Time					
10	Language of teaching the course:	ENGLISH					
11	Location of teaching the course:	AT THE UNIVERSITY FACILITY					
12	Prepared By:	Dr. Ahmed Al-Ghani					
13	Date of Approval:	2022					

**XVIII. Course Description:**

This course is the first among (Medicinal chemistry) courses which are designed to provide knowledge and skills in chemistry of medicinal agents (drugs). The first part of the course deals with an introduction to drug design, stereochemistry and chemistry of drug metabolism while the second part deals with the physicochemical properties, chemical synthesis, structure activity relationship (SAR), pharmacophore molecules and metabolism of drugs affecting autonomic nervous system and autacoids. The practical part provides the student the skill to identify the physicochemical, spectroscopic, chromatographic specification of the drugs under study The course is co-requisite with (Pharmacology I) as both deals with the same medicinal agents.

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### III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies

#### 1. Alignment CILOs to PILOs

PILOs		CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs affecting autonomic nervous system, autacoids and respiratory system.
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a2.</b> Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacist in chemical synthesis of drugs.
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body	<b>b1.</b> Interpret the rules of structure-activity relationship to construct pharmacophore of drugs affecting autonomic nervous system, autacoids and respiratory system. <b>b2.</b> Express molecular structure, synthesis and reactions of drugs with hand-drawing
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b3.</b> Classify, chemically, the drugs affecting autonomic nervous system, autacoids and respiratory system. <b>b4.</b> Compare between chemically related drugs based on their chemical structure
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication	<b>b5.</b> Design newer drugs affecting autonomic nervous system, autacoids and

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	errors and solving encountered pharmaceutical problems	respiratory system using structure activity relationship rules.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c3.</b> Perform synthesis of some autonomic nervous system, autocoid and antihistamine drugs. <b>c4.</b> Determine the quantitative analysis of some autonomic nervous system, autocoid and antihistamine drugs.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Demonstrate the skills of time management and self-learning. <b>d3.</b> Participate efficiently with his colleagues in a team work
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d4.</b> Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)

## 2. Alignment CILOs to teaching strategies and assessment strategies

### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs affecting autonomic nervous system, autacoids and respiratory system.	Active Lecture	Written exams



a2. Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.		
a3. Describe the role of pharmacist in chemical synthesis of drugs.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret the rules of structure-activity relationship to construct pharmacophore of drugs affecting autonomic nervous system, autacoids and respiratory system.	Active Lecture, feedback learning	Written exams, quizzes
b2. Express molecular structure, synthesis and reactions of drugs with hand-drawing	Active Lecture	Written exams
b3. Classify, chemically, the drugs affecting autonomic nervous system, autacoids and respiratory system.		
b4. Compare between chemically related drugs based on their chemical structure		
b5. Design newer drugs affecting autonomic nervous system, autacoids and respiratory system using structure activity relationship rules.	Group-project	Assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory		
c3. Perform synthesis of some autonomic nervous system, autocoid and antihistamine drugs.		
c4. Perform the quantitative analysis of some autonomic nervous system, autocoid and antihistamine drugs.	Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Lab. term works, assignment

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d3. Participate efficiently with his colleagues in a team work.		
d2. Demonstrate the skills of time management and self-learning.	laboratory practice	Lab. term works, final practical exam
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)		

XXVII. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Part I: Introduction to medicinal chemistry</b>					
1	<b>Medicinal chemistry roles and concepts</b>	a1, a2, a3, b1	<ul style="list-style-type: none"> <li>definitions, brief history, roles in pharmacy</li> <li>Basics of combinatorial chemistry and drug design: patent burst, synthesis of fragments, etc.</li> <li>Pharmacophore and Physicochemical properties in relation to biological activity (structure-activity relationship "SAR").</li> </ul>	2	6
2	<b>Drug-receptor interaction &amp; Stereochemistry of drugs</b>	a1, a2, b2	<ul style="list-style-type: none"> <li>binding and drug-receptor interaction: chemical bonding and biological activity</li> <li>stereochemical aspects of drug action</li> <li>isosterism and bioisosterism</li> </ul>	2	6
3	<b>chemistry of Drug metabolism</b>	a1, a3, b1	<ul style="list-style-type: none"> <li>phase I reactions</li> <li>phase II reactions</li> <li>Metabolites: inactive, active, more active</li> </ul>	2	6
<b>Mid-term exam</b>				1	2
<b>Part II: Chemistry of drugs affecting autonomic systems and skeletal muscles</b>					
4	<b>Drugs acting on the autonomic nervous system</b>	a1, a2, b1, b2, b4	<b>Physicochemical properties, synthesis, purification, structure-activity relationship, metabolism of drugs acting on sympathetic system</b> <ul style="list-style-type: none"> <li>Directly sympathomimetic drugs</li> <li>Indirectly sympathomimetic drugs: adrenergic blocking agents</li> <li>Sympatholytic drugs: (<math>\alpha</math>- adrenergic blocking agents)</li> </ul>	3	9

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			<ul style="list-style-type: none"> <li>Sympatholytic drugs: (<math>\beta</math>- adrenergic blocking agents)</li> </ul>		
		a1, a2, b1, b2, b4	<p><b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of drugs acting on parasympathetic system</b></p> <ul style="list-style-type: none"> <li>Directly parasympathomimetic</li> <li>Indirectly parasympathomimetic: cholinergic agonists.</li> <li>Solanaceous alkaloids parasympatholytic drugs</li> <li>Synthetic sympatholytic drugs: cholinergic blocking agents.</li> <li><b>Drugs acting on autonomic ganglia:</b> Ganglionic stimulants, ganglionic</li> <li><b>Neuromuscular blocking agents.</b></li> </ul>	2	6
5	<b>Drugs affecting autacoids</b>	a1, b1, b3, b5	<p><b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of drugs acting on parasympathetic system</b></p> <ul style="list-style-type: none"> <li>Antihistamines</li> <li>Serotonin agonists and antagonists</li> </ul>	3	9
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	46
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: adrenergic agonist: adrenaline	c1, c2, d1, d2, d4	1	2
2	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: adrenergic blockers: atenolol.	c1, c2, c3, c4, d1,d2, d3,d4	1	2
3	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: Parasympathomimetic: neostigmine	c1, c2, d1,d2, d4	1	2
4	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy	c1, c2, c3, d1,d2, d3,d4	1	2

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	identification of: cholinergic blockers: atropine			
5	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: skeletal muscle relaxants suxamethonium	c1, c2, c4, d3,d4	1	2
6	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: drugs affecting autacoids disorders: chlorpheniramine.	c1, c3, c4, d3,d4	1	2
7	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: drugs serotonin: ondansetron	c1, c2, c3, c4, d1,d2, d3,d4	1	2
8	Synthesis of drugs (Aspirin)	c1, c2, c3, d1,d2, d4	2	4
9	Crystallization and Purification of drugs. (Ibuprofen)	c1, c2, c4, d1, d3	1	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2	1	2
<b>Total</b>			<b>11</b>	<b>22</b>

#### **XVIII. Teaching strategies of the course:**

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

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<b>XVI. Assignments:</b>			
No	Assignments	Aligned CILOs	Week Due
1	<b>Group:</b> each group of students will be assigned to hypothetically design newer drugs form a studied patent drug using SAR principles	b5, c3, c4, d1, d3, d4	8

<b>XVII. Schedule of Assessment Tasks for Students During the Semester</b>						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b5, c3, c4, d1, d3, d4
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d2
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d2
TOTAL				70	70 %	70

<b>Practical part assessment</b>						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d4
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, c4, d1, d2
Total				30	30	30

<b>XVIII. Learning Resources</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
23. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, Copyright © 2020 by Lippincott Williams & Wilkins, a Wolters Kluwer business.	
24. Foy's Principles of medicinal chemistry, seventh edition, Copyright © 2017 Lippincott Williams & Wilkins, a Wolters Kluwer business	
25. Gareth Thomas, Medicinal chemistry: an introduction, third edition, Copyright © 2011 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.	

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## 2- Essential References.

1. Munendra Mohan Varshney & Asif Husain . A textbook of medicinal chemistry. 2015, I.K. International Publishing House Pvt. Limited

## 3- Electronic Materials and Web Sites etc.

- 1- <https://pubs.acs.org/journal/jmcmr>
- 2- <https://benthamscience.com/journals/medicinal-chemistry/>
- 3- [https://www.slideserve.com/richard\\_edik/introduction-to-medicinal-chemistry](https://www.slideserve.com/richard_edik/introduction-to-medicinal-chemistry)

## XIX. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة



Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**Medicinal chemistry I**  
Course No. (31)

XII.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
<p>This course is the first among (Medicinal chemistry) courses which are designed to provide knowledge and skills in chemistry of medicinal agents (drugs). The first part of the course deals with an introduction to drug design, stereochemistry and chemistry of drug metabolism while the second part deals with the physicochemical properties, chemical synthesis, structure activity relationship (SAR), pharmacophore molecules and metabolism of drugs affecting autonomic nervous system and autacoids. The practical part provides the student the skill to identify the physicochemical, spectroscopic, chromatographic specification of the drugs under study The course is co-requisite with (Pharmacology &amp; Therapeutics I) as both deals with the same medicinal agents.</p>

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<b>III. Intended learning outcomes of the course (CILOs)</b>
<b>1. Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
<b>a1.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs affecting autonomic nervous system, autacoids and respiratory system.
<b>a2.</b> Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.
<b>a3.</b> Describe the role of pharmacist in chemical synthesis of drugs.
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:
<b>b1.</b> Interpret the rules of structure-activity relationship to construct pharmacophore of drugs affecting autonomic nervous system, autacoids and respiratory system.
<b>b2.</b> Express molecular structure, synthesis and reactions of drugs with hand-drawing
<b>b3.</b> Classify, chemically, the drugs affecting autonomic nervous system, autacoids and respiratory system.
<b>b4.</b> Compare between chemically related drugs based on their chemical structure
<b>b5.</b> Design newer drugs affecting autonomic nervous system, autacoids and respiratory system using structure activity relationship rules.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>c2.</b> Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory
<b>c3.</b> Perform synthesis of some autonomic nervous system, autocoid and antihistamine drugs.
<b>c4.</b> Determine the quantitative analysis of some autonomic nervous system, autocoid and antihistamine drugs.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
<b>d2.</b> Demonstrate the skills of time management and self-learning.
<b>d3.</b> Participate efficiently with his colleagues in a team work
<b>d4.</b> Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)

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<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies.</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs affecting autonomic nervous system, autacoids and respiratory system.	Active Lecture	Written exams
<b>a2.</b> Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.		
<b>a3.</b> Describe the role of pharmacist in chemical synthesis of drugs.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret the rules of structure-activity relationship to construct pharmacophore of drugs affecting autonomic nervous system, autacoids and respiratory system.	Active Lecture, feed-back learning	Written exams, quizzes
<b>b2.</b> Express molecular structure, synthesis and reactions of drugs with hand-drawing		
<b>b3.</b> Classify, chemically, the drugs affecting autonomic nervous system, autacoids and respiratory system.		
<b>b4.</b> Compare between chemically related drugs based on their chemical structure	Active Lecture	Written exams
<b>b5.</b> Design newer drugs affecting autonomic nervous system, autacoids and respiratory system using structure activity relationship rules.		
<b>b5.</b> Design newer drugs affecting autonomic nervous system, autacoids and respiratory system using structure activity relationship rules.	Group-project	Assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory		
<b>c3.</b> Perform synthesis of some autonomic nervous system, autocoid and antihistamine drugs.		
<b>c4.</b> Perform the quantitative analysis of some autonomic nervous system, autocoid and antihistamine drugs.	Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Lab. term works, assignment
d3. Participate efficiently with his colleagues in a team work.		
d2. Demonstrate the skills of time management and self-learning.	laboratory practice	Lab. term works, final practical exam
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)		

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Part I: Introduction to medicinal chemistry</b>					
1	Medicinal chemistry roles and concepts	a1, a2, a3,b1	<ul style="list-style-type: none"> <li>definitions, brief history, roles in pharmacy</li> <li>Basics of combinatorial chemistry and drug design: patent burst, synthesis of fragments, etc.</li> <li>Pharmacophore and Physicochemical properties in relation to biological activity (structure-activity relationship "SAR").</li> </ul>	2	4
2	Drug-receptor interaction & Stereochemistry of drugs	a1, a2,b2	<ul style="list-style-type: none"> <li>binding and drug-receptor interaction: chemical bonding and biological activity</li> <li>stereochemical aspects of drug action</li> <li>isosterism and bioisosterism</li> </ul>	2	4
3	chemistry of Drug metabolism	a1, a3,b1	<ul style="list-style-type: none"> <li>phase I reactions</li> <li>phase II reactions</li> <li>Metabolites: inactive, active, more active</li> </ul>	2	5
Mid-term exam				1	2
<b>Part II: Chemistry of drugs affecting autonomic systems and skeletal muscles</b>					
4	Drugs acting on the autonomic nervous system	a1, a2, b1, b2, b4	Physicochemical properties, synthesis, purification, structure-activity relationship, metabolism of drugs acting on sympathetic system	3	

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			<ul style="list-style-type: none"> <li>Indirectly sympatholytic drugs</li> <li>Directly sympatholytic drugs: adrenergic blocking agents</li> <li>Indirectly sympatholytic drugs</li> <li>Directly sympatholytic drugs: adrenergic blocking agents</li> </ul>		6
		a1, a2, b1, b2, b4	<p><b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of drugs acting on parasympathetic system</b></p> <ul style="list-style-type: none"> <li>Indirectly parasympathomimetics</li> <li>Direct parasympathomimetics : cholinergic agonists</li> <li>Indirectly parasympatholytic drugs</li> <li>Directly sympatholytic drugs: cholinergic blocking agents</li> <li><b>Drugs acting on autonomic ganglia:</b> Ganglionic stimulants, ganglionic</li> <li><b>Neuromuscular blocking agents</b></li> </ul>	2	4
5	<b>Drugs affecting autacoids</b>	a1, b1, b3, b5	<p><b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of drugs acting on parasympathetic system</b></p> <ul style="list-style-type: none"> <li>Antihistamines</li> <li>Serotonin agonists and antagonists</li> </ul>	3	6
FINAL – EXAM				1	2
TOTAL				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	5 Units

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: adrenergic agonist: adrenaline	c1, c2, d1, d2, d4	1	2
2.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: adrenergic blockers: atenolol	c1, c2, c3, c4, d1, d2, d3, d4	1	2
3.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy	c1, c2, d1, d2, d4	1	2

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	identification of: Parasympathomimetics: neostigmine			
4.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: cholinergic blockers: atropine	c1, c2, c3, d1,d2, d3,d4	1	2
5.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: skeletal muscle relaxants suxamethonium.	c1, c2, c4, d3,d4	1	2
6.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: drugs affecting autacoids disorders: chlorpheniramine.	c1, c3, c4, d3,d4	1	2
7.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: drugs serotonin: ondansetron	c1, c2, c3, c4, d1,d2, d3,d4	1	2
8.	Synthesis of drugs (Aspirin)	c1, c2, c3, d1,d2, d4	2	4
9.	Crystallization and Purification of drugs. (Ibuprofen)	c1, c2, c4, d1, d3	1	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2	1	2
Total			11	22

#### V. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

#### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Group</b> : each group of students will be assigned to hypothetically	b5, c3, c4, d1, d3, d4	8

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design newer drugs form a studied patent drug using SAR principles			
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### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b5, c3, c4, d1, d3, d4
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d2
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d2
TOTAL				70	70 %	70

#### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d4
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, c4, d1, d2
Total				30	30 %	

### VIII. Learning Resources:

#### 1- Required Textbook(s) (maximum two).

- Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, Copyright © 2020 by Lippincott Williams & Wilkins, a Wolters Kluwer business.
- Foy's Principles of medicinal chemistry, seventh edition, Copyright © 2017 Lippincott Williams & Wilkins, a Wolters Kluwer business
- Gareth Thomas, Medicinal chemistry: an introduction, third edition, Copyright © 2011 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.

#### 2- Essential References.

Munendra Mohan Varshney & Asif Husain . A textbook of medicinal chemistry. 2015, I.K. International Publishing House Pvt. Limited

#### 3- Electronic Materials and Web Sites etc.

- <https://pubs.acs.org/journal/jmcmr>
- <https://benthamsience.com/journals/medicinal-chemistry/>
- [https://www.slideserve.com/richard\\_edik/introduction-to-medicinal-chemistry](https://www.slideserve.com/richard_edik/introduction-to-medicinal-chemistry)

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IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

# **PHARMACOLOGY I**

Course Code No. (PHP228)

2022



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Course Specification

**PHARMACOLOGY I**

I. Course Identification and General Information:					
1	Course Title:	Pharmacology I			
2	Course Code & Number:	PHP228			
3	Credit Hours: 2	Credit Hours	Theory Hours		Lab. Hours
			L	P	
		2	2	--	---
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Anatomy and histology, Physiology			
6	Co –Requisite (if any):	PHM227			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Nabil Albaser			
13	Date of Approval:	2022			

**VIII. Course Description:**

This course will go through the crucial ideas that students should understand on the pharmacological underpinnings of therapeutics and the basis of drug action. The course's first section will cover fundamental pharmacological concepts like pharmacodynamics and pharmacokinetics. The second section will be devoted to systemic pharmacology and will address important medication classes in relation to various organ systems or significant pathophysiological illnesses. Autonomic medications and cardiovascular drugs are among the subjects.

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IX. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
34. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions. <b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions. <b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C5</b>	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use <b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice. <b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.

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<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Demonstrate time management and decision-making skills.
		<b>d2.</b> Work effectively in a team in a variety of health care settings.
		<b>d3.</b> Interact effectively with patients, the public and health care professionals

<b>35. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.		
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	Active lecture	Written exams
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.		

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c3. Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age related factors.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate time management and decision-making skills.	Feed-back learning	Assignments
d2. Work effectively in a team in a variety of health care settings.		
d3. Interact effectively with patients, the public and health care professionals		

<b>XVIII. Course Content:</b>					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>General pharmacology</b>	a2, a3, b1, c1, d3	<ul style="list-style-type: none"> <li>Introduction Pharmacology</li> <li>Definitions, Sources of drugs, Drug nomenclature, Routes of administration</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacokinetics</li> <li>Absorption, Distribution</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacokinetics</li> <li>Metabolism, Excretion</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacodynamics</li> <li>Mechanisms of drug actions, drug/response curves, types of drugs (agonists, antagonists)</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacodynamics, adverse drug effects, drug-drug interactions, pharmacovigilance and ADRs reporting</li> </ul>	1	2
2	<b>Drugs acting on the autonomic nervous system</b>	a1,a2, a3, b1, b2, c2,d3	<ul style="list-style-type: none"> <li>Introduction to ANS, Divisions of ANS, functions, neurotransmitters, receptors</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Parasympathomimetics, direct-acting drugs, indirect-acting drugs, toxicity with organophosphorous compounds pesticides and war gases</li> </ul>	1	2
			<b>Mid-term exam</b>	1	2

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			• Parasympatholytics	1	2
			• Sympathomimetics, direct acting drugs (selective, non-selective), indirect acting drugs, dualist drugs	1	2
			• Sympatholytics: alpha-blockers, beta-blockers, adrenergic neuron depressants	1	2
3	Cardiovascular system	a1, a2, a3, b1, c3, d3	• Antihypertensive agents & diuretics	1	2
			• Vasodilators & treatment of angina pectoris	1	2
			• Drugs used in heart failure	1	2
			• Agents used in cardiac arrhythmias	1	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	3 Units

#### XXIX. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

#### XXIV. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g., CVS patients, renal failure patients, etc.	b1, c1, d1	6-12

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VII. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	b1, c1, d1
2	Mid-term exam (written exam)		7	20	20	a1, a2, a3, b1
3	Final exam (written exam)		16	60	60	a1, a2, a3, b1
TOTAL				100	100%	

XXXV. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
26. Katzung, Bertram G.. Basic & clinical pharmacology. 14th New York: McGraw-Hill, 2018. Electronic Resource"	
27. "Rang, H.P., Dale, M.M., Ritter, J.M., Flower, R.J. and Henderson, G., 2012. Rang and Dale's pharmacology. 10 <sup>th</sup> ed. 2019.	
<b>2- Essential References.</b>	
1. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13e Brunton LL, Hilal-Dandan R, Knollmann BC. Brunton L.L., & Hilal-Dandan R, & Knollmann B.C.(Eds.),Eds. Laurence L. Brunton, et al.	
2. Tripathi, K. D. (2018). Essentials of medical pharmacology (8th ed.). Jaypee Brothers Medical.	
3. Richard A. Harvey. Lippincott's pharmacology, 8 <sup>th</sup> ed. 2022, Lippincott William and Wilkins.	
<b>3- Electronic Materials and Web Sites etc.</b>	
Access Pharmacy: <a href="http://accesspharmacy.mhmedical.com/">http://accesspharmacy.mhmedical.com/</a> <a href="https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4">https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4</a> <a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611">https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611</a> <a href="https://clinicalgate.com/principles-of-drug-action/">https://clinicalgate.com/principles-of-drug-action/</a> <a href="https://libguides.tulane.edu/pharm">https://libguides.tulane.edu/pharm</a>	

XXXVI. Course Policies: (Based on the Uniform Students' By law (2007)	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.

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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification

Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**PHARMACOLOGY I**  
Course Code No. ()

XIII.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Nabil Albaser	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

X. Course Description:
<p>This course will go through the crucial ideas that students should understand on the pharmacological underpinnings of therapeutics and the basis of drug action. The course's first section will cover fundamental pharmacological concepts like pharmacodynamics and pharmacokinetics. The second section will be devoted to systemic pharmacology and will address important medication classes in relation to various organ systems or significant pathophysiological illnesses. Autonomic medications and cardiovascular drugs are among the subjects.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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<b>XI. Intended learning outcomes of the course (CILOs)</b>	
<b>36. Alignment CILOs</b>	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.	
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	
<b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	
<b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
<b>d1.</b> Demonstrate time management and decision-making skills.	
<b>d2.</b> Work effectively in a team in a variety of health care settings.	
<b>d3.</b> Interact effectively with patients, the public and health care professionals	

<b>37. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.		

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a3. Describe the role of pharmacist in providing correct information on rational use of medications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	Active lecture	Written exams
b2. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
c2. Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.		
c3. Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age related factors.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate time management and decision-making skills.	Feed-back learning	Assignments
d2. Work effectively in a team in a variety of health care settings.		
d3. Interact effectively with patients, the public and health care professionals		

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XXIX. Course Content:					
Order	Units/ Topics List	CILO s	Sub Topics List	No. of Week s	contact hours
1	General pharmacolog y	a2, a3, b1, c1, d3	<ul style="list-style-type: none"> <li>Introduction Pharmacology</li> <li>Definitions, Sources of drugs, Drug nomenclature, Routes of administration</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacokinetics</li> <li>Absorption, Distribution</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacokinetics</li> <li>Metabolism, Excretion</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacodynamics</li> <li>Mechanisms of drug actions, drug/response curves, types of drugs (agonists, antagonists)</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Pharmacodynamics, adverse drug effects, drug-drug interactions, pharmacovigilance and ADRs reporting</li> </ul>	1	2
2	Drugs acting on the autonomic nervous system	a1,a2, a3, b1, b2, c2,d3	<ul style="list-style-type: none"> <li>Introduction to ANS, Divisions of ANS, functions, neurotransmitters, receptors</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Parasympathomimetics, direct-acting drugs, indirect-acting drugs, toxicity with organophosphorous compounds pesticides and war gases</li> </ul>	1	2
			<b>Mid-term exam</b>	1	2
			<ul style="list-style-type: none"> <li>Parasympatholytics</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Sympathomimetics, direct acting drugs (selective, non-selective), indirect acting drugs, dualist drugs</li> </ul>	1	2
3	Cardiovascul ar system	a1, a2, a3, b1, c3, d3	<ul style="list-style-type: none"> <li>Antihypertensive agents &amp; diuretics</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Vasodilators &amp; treatment of angina pectoris</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Drugs used in heart failure</li> </ul>	1	2
			<ul style="list-style-type: none"> <li>Agents used in cardiac arrhythmias</li> </ul>	1	2

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FINAL – EXAM	1	2
TOTAL	16	32
Number of Weeks /and Units Per Semester	16 weeks	3 Units

### XXX. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### XXV. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g., CVS patients, renal failure patients, etc.	b1, c1, d1	6-12

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	b2
		Assignments	7, 12	10	b1, c1, d1
2	Mid-term exam (written exam)	7	20	20	a1, a2, a3, b1
3	Final exam (written exam)	16	60	60	a1, a2, a3, b1
TOTAL			100	100%	

### XXXVII. Learning Resources:

1- Required Textbook(s) ( maximum two ).

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28. Katzung, Bertram G.. Basic & clinical pharmacology. 14th New York: McGraw-Hill, 2018.  
Electronic Resource"  
29. "Rang, H.P., Dale, M.M., Ritter, J.M., Flower, R.J. and Henderson, G., 2012. Rang and  
Dale's pharmacology. 10<sup>th</sup> ed. 2019.

### 2- Essential References.

4. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13e Brunton LL, Hilal-Dandan R, Knollmann BC. Brunton L.L., & Hilal-Dandan R, & Knollmann B.C.(Eds.),Eds. Laurence L. Brunton, et al.  
5. Tripathi, K. D. (2018). Essentials of medical pharmacology (8th ed.). Jaypee Brothers Medical.  
6. Richard A. Harvey. Lippincott's pharmacology, 8<sup>th</sup> ed. 2022, Lippincott William and Wilkins.

### 3- Electronic Materials and Web Sites etc.

Access Pharmacy: <http://accesspharmacy.mhmedical.com/>  
[https://link.springer.com/chapter/10.1007/978-981-32-9779-1\\_4](https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4)  
<https://accessmedicine.mhmedical.com/content.aspx?bookid=371&sectionid=41587611>  
<https://clinicalgate.com/principles-of-drug-action/>  
<https://libguides.tulane.edu/pharm>

## XXXVIII. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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السنة الثالثة

الفصل الأول

THIRD level ( 1 <sup>st</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr	Cr. hr	
1	Medical parasitology	طفيليات طبية	MSC313	2	2	3	Pre: PHT225
2	Pharmaceutics II	صيدلانيات 2	PHT312	2	2	3	Pre: PHT222
3	Medicinal Chemistry II	كيمياء دوائية 2	PHM311	3	2	4	Pre: PHM225; Co: PHP315
4	Pharmacology II	علم الأدوية 2	PHP316	2	-	2	Pre: PHP228
5	Pharmacognosy II	علم العقاقير 2	PHG315	2	2	3	Pre: PHG224
6	Pathophysiology	علم الأعضاء المرضي	PHC314	2	-	2	
7	Pharmaceutical analytical chemistry II	كيمياء تحليلية صيدلانية 2	PHM317	2	2	3	Pre: PHM223
8	First aid	اسعافات أولية	MSC318	2	-	2	
Total				17	10	22	



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
جامعة الرازي  
كلية الطب والعلوم الصحية  
قسم الصيدلة  
Faculty of Medical Sciences  
Department of Pharmacy  
Bachelor Program of Pharmacy

Course Specification of  
Medical parasitology  
Course Code No. (MSC313)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.

Prepared by:

Dr. Nabila Shaief

Reviewed by:

Head of the Department:

Dean:





## Course Specification **MEDICAL PARASITOLOGY**

Course Identification and General Information:							
1	Course Title:	MEDICAL PARASITOLOGY					
2	Course Code & Number:	MSC313					
3	Credit hours:	C.H			TOTAL		
		Theoretical		P		Tr.	
		L.	Tut.		S.		
		2	-	-	1	-	3
4	Study level/ semester at which this course is offered:	(THIRD) Year – (1 <sup>ST</sup> ) semester					
5	Pre –requisite (if any):	General biology. Pharmaceutical microbiology.					
6	Co –requisite (if any):	None					
7	Program (s) in which the course is offered:	All BC programs offered by the university					
8	Language of teaching the course:	ENGLISH					
9	Location of teaching the course:	In The Alrazi University					
10	Prepared By:	Dr. Nabila Shaief					
11	Date of Approval	10/2014					

<b>Course Description:</b>
The course deals with the study of pathogenic parasites commonly infecting humans. The study concerns with mode of infections, general characters, morphology, life cycle, pathogenesis, diagnosis, prevention and control of those parasites.

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies.	
Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Identify and describe the microscopical /morphological features of common pathogenic parasites including protozoa , Helminthes and arthropods. a2. Determine life cycle, pathogenicity, diagnosis, management of spread and treatment of common pathogenic parasites.
A3. Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a3. Discuss the principles and technologies of parasitology applied for sampling and diagnosis of common pathogenic parasites infections.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
B5. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	b1. Differentiate between similar parasites using morphological and microscopical techniques. b2. Classify pathogenic parasites. b3. Relate the severity of parasitic infections to its affecting factors such as immunity.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
C1. Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP and cGMP guidelines.	c1. Handle efficiently the tools and chemicals used in parasitology Lab. c2. Operate successfully the instruments used in parasitology Lab.
	c3 . Perform effectively the experiments and practical tasks in microbiology Lab. including



C2. Practice extraction/synthesis and analysis of pharmaceutical potential agents.	microscopical investigation using standard procedures.
	c4 .Take the required safety criteria during performing different types of practical and professional pharmacy works.
<b>D: Transferable Skills: upon completion of the course, students will be able to:</b>	
D1. Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Share successfully in team-work.
	d2. Show respect to life.
	d3. Communicate effectively with his/her colleagues.

Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Identify and describe the microscopical/morphological features of common pathogenic parasites including protozoa, Helminthes and arthropods.	laboratory practice, Lecture	Practical assessment (Lab. attendance, accomplishment, reporting, oral/written exam, practical exam), Written exam, Attendance.
a2. Determine life cycle, pathogenicity, diagnosis, management of spread and treatment of common pathogenic parasites.	Lecture	Written exam, Attendance.
a3. Discuss the principles and technologies of parasitology applied for sampling and diagnosis of common pathogenic parasites infections.	Lecture	Written exam, Attendance, quizzes.
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Differentiate between similar parasites using morphological and microscopical techniques	Lecture laboratory practice	Written exam, Attendance Practical assessment (Lab. attendance,
b2 .Classify pathogenic parasites.		accomplishment, oral/written exam , practical exam), quizzes
b3. Relate the severity of parasitic infections to its affecting factors such as immunity.	Lecture	Written exam , Attendance

(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently the tools and chemicals used in parasitology Lab.	laboratory practice	Practical assessment (Lab. attendance, accomplishment, attitude, practical exam)
<b>c2.</b> Operate successfully the instruments used in parasitology Lab.	feed-back learning, Group-project	Assignments
<b>c3 .</b> Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation using standard procedures.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, reporting, practical exam) Assignments
<b>c4 .</b> Take the required safety criteria during performing different types of practical and professional pharmacy works		
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skillsto Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Share successfully in team-work.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam) Assignments
<b>d2.</b> Show respect to life.	Lecture	Written exam , Attendance
<b>d3.</b> Communicate effectively with his/her colleagues.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, accomplishment, practical exam) Assignments

Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction to medical parasitology</b>	a1, a2, b1, b2, b3, d2	<input type="checkbox"/> Definition of parasitology <input type="checkbox"/> Types of parasite (Ecto, endo ,obligate ,facultative ) <input type="checkbox"/> Types of host(Mechanical and biological ) and Host parasites relationship <input type="checkbox"/> Effect of parasite on the host (Mechanical effect, effect on cell ,invasion and destruction	4	



			,inflammatory reaction to the parasite or production ,competition for host nutrient and toxic effect) <input type="checkbox"/> Types of vector (obligate ,facultative ) <input type="checkbox"/> Source of infection (food& drink, soil and water, vector ,direct contact and congenial) <input type="checkbox"/> Mode of infection <input type="checkbox"/> Classification of parasites (protozoa, Helminthes, arthropods) classes and example for all class.		8
2	<b>Techniques for sampling and detection of parasites -</b>	a3, b1,b2	<input type="checkbox"/> Type of specimens (urine, stool, blood, etc.) <input type="checkbox"/> Collection, transport and preservation of samples. <input type="checkbox"/> Microscopic examination <input type="checkbox"/> Direct Smear Method	1	2
3	<b>Protozoa</b> (introduction + Amoeba)	a1, a2, a3, b1, b2, b3, d2	General characteristic of protozoa(morphology, biological feature, multiplication ,nutrient, and locomotion ) <input type="checkbox"/> Classification (amoebae ,ciliate, flagellate, sporozoa) <input type="checkbox"/> Amoebae o Entamobeahistolytica ( Morphology ,life cycle, pathogenesis, Diagnosis, prevention and control) o Difference between Entamobeahistolytica and Entamoeba. Coli	1	2
<b>MID-TERM EXAM</b>				1	2
3	<b>Protozoa</b> (Ciliate)		Bantium coli ( Morphology ,life cycle, pathogenesis Diagnosis, prevention and control)	1	2
	<b>Protozoa</b> (intestinal and genital Flagellates)	a1, a2, a3, b1, b2, b3, d2	Intestinal flagellates: Giardia lamblia ( Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control Genital : Trichomonasvaginalis Morphology ,life cycle,	1	2



			pathogenesis ,Diagnosis, prevention and control		
	<b>Protozoa</b> (blood Flagellates)	a1, a2, a3, b1, b2, b3, d2	Leishmanias (Visceral and cutaneous) Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control Trypanosoma (all types Morphology ,life cycle, pathogenesis ,diagnosis, prevention and control	1	2
	<b>Protozoa</b> (Sporozoa)	a1, a2, a3, b1, b2, b3, d2	Malaria parasites (Plasmodium falciparum, vivax, ovali , malareae ) Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control	1	2
4	<b>Helminthes</b>	a1, a2, a3, b1, b2, b3, d2	Classification of helminthes (common worms (Nematodes), schistosoma, tape worms (Trematodes ), filariasis. Morphology ,life cycle, pathogenesis, Diagnosis, prevention and control of helminthes from each class.	2	4
5	<b>Arthropods</b>	a1, a2, a3, b1, b2, b3, d2	classification, morphology, life cycle, pathogenicity, prevention and treatment	1	2
	<b>Course Review</b>	a1, a2, a3, b1, b2, b3, d2	Review of the course topics by discussion session.	1	2
<b>FINAL - EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	5 Units

B - Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Intended Learning Outcomes CILOs
1	investigation of Enatamopeahistolytica & Enatamopea coli	1	2	c1, c2, d1, d3,
2	investigation of Giardia	1	2	c1, c2, d1, d3,
3	investigation of Trichomonas	1	2	c2, c4, d1, d2
4	investigation of Leishmania	1	2	c2, c4, d1, d2



5	investigation of Malaria spp (with preparation of blood smear)	1	2	c1, c3, d2, d3
6	investigation of Ascaris&Anchyllostoma	1	2	c1, c4, d1, d2
7	investigation of Teaniaspp	1	2	c2, c3, d1, d3
8	investigation of H. nana	1	2	c2, c4, d1, d3
9	investigation of schistosoma	1	2	c3, c4, d1, d2
10	investigation of Arthropodes	1	2	c2, c4, d1, d2
PRACTICAL EXAM		1	2	
Total		12	24	
Number of Weeks			12	

### Teaching strategies of the course:

#### Lecture:

It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

#### Laboratory practice:

students doing experiments in labs individually or in small groups

#### Feed-back learning:

students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

#### Group projects:

students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a summary report on one of the studied pathogenic parasite.	c1, c2, d3	4-13	3
2	<b>Group</b> : each group of students will be assigned to make a letter of education to community about infection of one of the studied parasite.	c3, c4, d1, d2, d3	14	2

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### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	2	2	a1, a2 , b1, , b2, b3, , , d2
2	Assignments (1 + 2)	4-13, 14	5	5	a3, b2, d1, d3
3	Quiz 1 + Quiz 2	7, 12	3	3	a3, b1
4	Mid-semester exam of theoretical part ( written exam)	7	10	10	a1, a2,a3 , b1, ,b2, b3 , d2
5	Final exam of theoretical part ( written exam)	17	40	40	a1, a2, a3, , b1, , b2, b3 , d2
TOTAL			60	60 %	60

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Practical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Attendance	Weekly	5	5	c1, c2, d1, d3
2	Lab. Attitude	weekly	2	2	c1, c3, d1, d2
3	Lab. Accomplishments	weekly	5	5	c2, c4, d1
4	Lab. Reporting	weekly	3	3	c3, c2, d1, d3
5	Exam of practice theory (written exam or oral exam)	14	5	5	c3, c4, d1, d2
6	Practical exam (practical)	14	20	20	c1, c2, c3, c4, d1, d2, d3
Total			40	40 %	

### Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

Kayser, Medical Microbiology & parasitology, 2005 Thieme

#### 2- Essential References.

Michael j. Cuomo. Diagnosing medical parasites: a public health officers guide to assisting laboratory and medical officers, USAF  
Chatterjee. Parastology  
Parija. Text book of medical parastology W. B. Hugo: pharmaceutical microbiology, 1998, Black well science LTD.

#### 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

### Course Policies:

1	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.



### Course Plan (Syllabus) of MEDICAL PARASITOLOGY

<b>- Information about Faculty Member Responsible for the Course:</b>							
<b>Name of Faculty Member</b>	Dr. Nabila Shaief	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>	771245748	<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>Course Description:</b>
The course deals with the study of pathogenic parasites commonly infecting humans. The study concerns with mode of infections, general characters, morphology, life cycle, pathogenesis, diagnosis, prevention and control of those parasites

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Nabila Shaief	Dr. Yaser Aiesh	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

### III. Intended learning outcomes of the course (CILOs):

#### Alignment CILOs

A: Knowledge and understanding: upon completion of the course, students will be able to:

**a1.** Identify and describe the microscopical/morphological features of common pathogenic parasites including protozoa , helminthes and arthropods.

**a2.** Determine life cycle, pathogenicity, diagnosis, management of spread and treatment of common pathogenic parasites.

**a3.** Discuss the principles and technologies of parasitology applied for sampling and diagnosis of common pathogenic parasites infections

B: Intellectual skills: upon completion of the course, students will be able to:

**b1.** Differentiate between similar parasites using morphological and microscopical techniques

**b2.** Classify pathogenic parasites.

**b3.** Relate the severity of parasitic infections to its affecting factors such as immunity.

C: Professional and practical skills: upon completion of the course, students will be able to:

**c1.** Handle efficiently the tools and chemicals used in parasitology Lab.

**c2.** Operate successfully the instruments used in parasitology Lab.

**c3.** Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation using standard procedures.

**c4.** Take the required safety criteria during performing different types of practical and professional pharmacy works.

D: Transferable Skills: upon completion of the course, students will be able to:

**d1.** Share successfully in team-work.

**d2.** Show respect to life.

**d3.** Communicate effectively with his/her colleagues.

#### Alignment CILOs to teaching strategies and assessment strategies

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify and describe the microscopical/morphological features of common pathogenic parasites including protozoa , Helminthes and arthropods.	laboratory practice, Lecture	Practical assessment (Lab. attendance, accomplishment, reporting, oral/written exam , practical exam), Written exam , Attendance
<b>a2.</b> Determine life cycle, pathogenicity, diagnosis, management of spread and treatment of common pathogenic parasites.	Lecture	Written exam , Attendance



a3. Discuss the principles and technologies of parasitology applied for sampling and diagnosis of common pathogenic parasites infections	Lecture	Written exam , Attendance, quizzes
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Differentiate between similar parasites using morphological and microscopical techniques	Lecture laboratory practice	Written exam , Attendance Practical assessment (Lab. attendance, accomplishment, oral/written exam , practical exam), quizzes
b2. Classify pathogenic parasites.		
b3. Relate the severity of parasitic infections to its affecting factors such as immunity.	Lecture	Written exam , Attendance
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently the tools and chemicals used in parasitology Lab.	laboratory practice	Practical assessment (Lab. attendance, accomplishment, attitude, practical exam)
c2. Operate successfully the instruments used in parasitology Lab.	feed-back learning, Group-project	Assignments
c3. Perform effectively the experiments and practical tasks in microbiology Lab. including microscopical investigation using standard procedures.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, reporting, practical exam) Assignments
c4. Take the required safety criteria during performing different types of practical and professional pharmacy works.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam) Assignments
d2. Show respect to life.	Lecture	Written exam , Attendance
d3. Communicate effectively with his/her colleagues.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, accomplishment, practical exam) Assignments



Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction to medical parasitology</b>	a1, a2, b1, b2, b3, d2	<ul style="list-style-type: none"> <li>- Definition of parasitology</li> <li>- Types of parasite (Ecto, endo ,obligate ,facultative )</li> <li>- Types of host(Mechanical and biological ) and Host parasites relationship</li> <li>- Effect of parasite on the host (Mechanical effect, effect on cell ,invasion and destruction ,inflammatory reaction to the parasite or production ,competition for host nutrient and toxic effect)</li> <li>- Types of vector (obligate ,facultative ).</li> <li>- Source of infection (food&amp; drink, soil and water, vector ,direct contact and congenial)</li> <li>- Mode of infection</li> <li>- Classification of parasites (protozoa, helminthes , arthropods) classes and example for all class</li> </ul>	4	8
2	<b>Techniques for sampling and detection of parasites -</b>	a3,b1,b2	<ul style="list-style-type: none"> <li>- Type of specimens (urine, stool, blood, etc.)</li> <li>- Collection, transport and preservation of samples.</li> <li>- Microscopic examination</li> <li>- Direct Smear Method</li> </ul>	1	2
3	<b>Protozoa (introduction + Amoeba)</b>	a1, a2, a3, b1, b2, b3, d2	<p>General characteristic of protozoa(morphology, biological feature, multiplication ,nutrient, and locomotion )</p> <ul style="list-style-type: none"> <li>- Classification (amoebae ,ciliate, flagellate, sporozoa)</li> <li>- Amoebae</li> <li>-Entamobeahistolytica ( Morphology ,life cycle, pathogenesis, Diagnosis, prevention and control)</li> </ul>	1	2

			- Difference between Entamoeba histolytica and Entamoeba coli		
<b>MID-TERM EXAM</b>				1	2
<b>3</b>	<b>Protozoa (Ciliate)</b>		Bacterium coli ( Morphology ,life cycle, pathogenesis Diagnosis, prevention and control)	1	2
	<b>Protozoa (intestinal and genital Flagellates)</b>	a1, a2, a3, b1, b2, b3, d2	Intestinal flagellates: Giardia lamblia ( Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control Genital : Trichomonas vaginalis Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control	1	2
	<b>Protozoa (blood Flagellates)</b>	a1, a2, a3, b1, b2, b3, d2	Leishmanias (Visceral and cutaneous) Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control Trypanosoma (all types Morphology ,life cycle, pathogenesis ,diagnosis, prevention and control	1	2
	<b>Protozoa (Sporozoa)</b>	a1, a2, a3, b1, b2, b3, d2	Malaria parasites (Plasmodium falciparum, vivax, ovali , malareae ) Morphology ,life cycle, pathogenesis ,Diagnosis, prevention and control	1	2
<b>4</b>	<b>Helminthes</b>	a1, a2, a3, b1, b2, b3, d2	Classification of helminthes (common worms (Nematodes), schistosoma, tape worms : Taenia, H. nana (Trematodes ), filariasis. Morphology ,life cycle, pathogenesis, Diagnosis, prevention and control of helminthes from each class.).	2	4
<b>5</b>	<b>Arthropods</b>	a1, a2, a3, b1, b2, b3, d2	classification, morphology, life cycle, pathogenicity, prevention and treatment	1	2
	<b>Course Review</b>	a1, a2, a3, b2, b3, d2	Review of the course topics by discussion session.	1	2
<b>FINAL - EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>5 Units</b>

B - Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Intended Learning Outcomes CILOs
	investigation of Enatamopeahistolytica &Enatamopea coli	1	2	c1, c2, d1, d3,
	investigation of Giardia	3	2	c1, c2, d1, d3,
	investigation of Trichomonas	1	2	c2, c4, d1, d2
	investigation of Leishmania	1	2	c2, c4, d1, d2
	investigation of Malaria spp (with preparation of blood smear)	1	2	c1, c3, d2, d3
	investigation of Ascaris &Anchylostoma	1	2	c1, c4, d1, d2
	investigation of Taeniaspp	1	2	c2, c3, d1, d3
	investigation of H. nana	1	2	c2, c4, d1, d3
	investigation of schistosoma	1	2	c3, c4, d1, d2
	investigation of Arthropodes	1	2	c2, c4, d1, d2
PRACTICAL EXAM		1	2	
Total		12	24	
Number of Weeks			12	

Teaching strategies of the course:
<p><b>Lecture :</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student`s brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Laboratory practice:</b> students doing experiments in labs individually or in small groups</p>
<p><b>Feed-back learning:</b> students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>
<p><b>Group projects:</b> students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &amp;for promoting team work skills</p>

Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark



1	<b>Individual:</b> every student is assigned to do a summary report on one of the studied pathogenic parasite.	c1, c2, d3	4-13	3
2	<b>Group :</b> each group of students will be assigned to make a letter of education to community about infection of one of the studied parasite.	c3, c4, d1, d2, d3	14	2

### VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	2	2	a1, a2 , b1, , b2, b3, , , d2
2	Assignments (1 + 2)	4-13, 14	5	5	a3, b2, d1, d3
3	Quiz 1 + Quiz 2	7, 12	3	3	a3, b1
4	Mid-semester exam of theoretical part ( written exam	7	10	10	a1, a2,a3 , b1, ,b2, b3 , d2
5	Final exam of theoretical part ( written exam)	17	40	40	a1, a2, a3, , b1, , b2, b3 , d2
<b>TOTAL</b>			<b>60</b>	<b>60 %</b>	<b>60</b>

### Practical part assessment

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Attendance	Weekly	5	5	c1, c2, d1, d3
2	Lab. Attitude	weekly	2	2	c1, c3, d1, d2
3	Lab. Accomplishments	weekly	5	5	c2, c4, d1
4	Lab. Reporting	weekly	3	3	c3, c2, d1, d3
5	Exam of practice theory (written exam or oral exam)	14	5	5	c3, c4, d1, d2
6	Practical exam (practical)	14	20	20	c1, c2, c3, c4, d1, d2, d3
<b>Total</b>			<b>40</b>	<b>40 %</b>	

### Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

Kayser, Medical Microbiology & parasitology, 2005 Thieme

#### 2- Essential References.

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Chatterjee. Parastology  
Parija. Text book of medical parastology W. B. Hugo: pharmaceutical microbiology, 1998, Black well science LTD.

### 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

### Course Policies:

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3	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
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5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.



المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICS II**  
Course No. (PHT312)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutics II			
2	Course Code & Number:	PHT312			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Third Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHT222			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ameen Alwossabi			
13	Date of Approval:	2022			

II. Course Description:
<p>This course is the second part of “Pharmaceutics “courses that are intended to provide the student with knowledge in preformulation, formulation and preparation of pharmaceutical dosage forms. The course deals with designing of semisolid dosage forms (ointments, creams, pastes and gels), suppositories, and pharmaceutical ophthalmic preparation. The practical part provides the student with skills to prepare those dosage forms in pharmaceutics Lab.</p>

III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies		
5. Alignment CILOs to PILOs		
	PILOs	CILOs
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
A2.	Explain the essential knowledge about design, isolation, extraction, preparation, formulation,	a1. Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin

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	manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a2.</b> Describe the advantages and disadvantages, types, classification of pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)
<b>A3.</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Describe the stages of designing pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository)
		<b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical ophthalmic preparation and semisolid dosage forms (Ointments, paste, cream, gel, suppository)
<b>A1.</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a5.</b> Recognize the different additives used in manufacturing of pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository)
<b>A4.</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a6.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)
<b>Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B2.</b>	<b>B2.</b> Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Classify pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, and suppository).
		<b>b2.</b> Compare between various types of pharmaceutical ophthalmic preparations and semisolid dosage form in particular between old and current dosage forms(Ointments, paste, cream, gel, suppository)
		<b>b3.</b> Design pharmaceutical ophthalmic preparations and semisolid dosage form(Ointments, paste, cream, gel, suppository).
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		



C1.	C1. Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	c1. Exercise professional good laboratory practice (GLP) during practical sessions and operate machinery used properly.
		c2. Employ the relevant way to prepare pharmaceutical ophthalmic preparations and semisolid dosage form. (Ointments, paste, cream, gel, suppository)
		c3. Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>Transferable skills :</b> Upon successful completion of the course, students will be able to:		
D1.	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	d1. Participate efficiently with his colleagues in a teamwork.
		d2. Demonstrate the skills of time management and self-learning.
		d3. Communicate effectively and behave in discipline with colleagues.

6. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin	Active Lecture	Written exams
a2. Describe the advantages and disadvantages, types, classification of pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)		
a3. Describe the stages of designing pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository)		
a4. Describe the role of pharmacist in formulation of pharmaceutical ophthalmic preparation and semisolid dosage forms (Ointments, paste, cream, gel, suppository)		
a5. Recognize the different additives used in manufacturing of pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository)		
a6. Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' pharmaceutical ophthalmic preparations and		

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semisolid dosage forms. (Ointments, paste, cream, gel, suppository)		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Classify pharmaceutical ophthalmic preparations, semisolid preparations and suppositories.	Active Lecture , Feed-back learning	Written exams, quizzes
<b>b2.</b> Compare between various types of pharmaceutical ophthalmic preparations, semisolid preparations and suppositories.		
<b>b3.</b> Design pharmaceutical ophthalmic preparations, semisolid preparations and suppositories.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Exercise professional good laboratory practice (GLP) during practical sessions and operate machinery used properly.	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Employ the relevant way to prepare pharmaceutical ophthalmic preparations and semisolid dosage form. (Ointments, paste, cream, gel, suppository)		
<b>c5.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.	Feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	Laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d2.</b> Participate efficiently with colleagues in a team work		
<b>d2.</b> Demonstrate the skills of time management and self-learning	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

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<b>XL. Course Content:</b>					
<b>A. Theoretical Aspect:</b>					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Semisolid dosage forms: Introduction</b>	<ul style="list-style-type: none"> <li><b>introduction:</b> definitions , advantages, disadvantages, types, anatomical features and targets of the skin, Classification of semisolid preparation</li> </ul>	1	2	a1, a2, b1, b2
2	<b>Semisolid dosage forms: (1) Ointments and pastes</b>	<ul style="list-style-type: none"> <li><b>Ointments:</b> definitions, advantages, disadvantages, classification based on type of ointment base, formulation considerations, method of preparation</li> <li><b>Pastes:</b> definitions, advantages, disadvantages, classification based on type of ointment base</li> </ul>	4	8	a1, a2, a3, a5, a6, b1, b2, b3
3	<b>Semisolid dosage forms: (2) Creams and gels</b>	<ul style="list-style-type: none"> <li><b>Creams</b> definitions, advantages, disadvantages, classification, formulation considerations, method of preparation</li> <li><b>Gels</b> definitions, advantages, disadvantages, classification, formulation , considerations, method of preparation</li> </ul>	3	6	a1, a2, a3, a4, b2, b3
<b>Mid-term Exam</b>			1	2	
4	<b>Suppositories</b>	<ul style="list-style-type: none"> <li><b>Suppositories</b> definitions, advantages, disadvantages, classification (rectal, vaginal) formulation, types of suppository bases, method of preparation</li> </ul>	3	6	a2, a3, a5, a6, b2, b3
5	<b>Pharmaceutical Ophthalmic preparations</b>	<ul style="list-style-type: none"> <li>Anatomical features of the eye</li> <li>Types of ophthalmic preparations</li> <li>Formulation considerations</li> <li>Sterilization and preservation.</li> <li>Package</li> <li>Quality evaluation</li> </ul>	2	4	a1, a3, a4, a5, b1, b2
6	<b>Course Review</b>	Review of the course topics: discussion session.	1	2	a1- a6, b1, b2, b3
<b>FINAL EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16	3 Units	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ameen Alwossabi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



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Dr. Ameen Alwossabi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

B. Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Aligned Course Intended Outcomes Learning CILOs
25.	Preparation of salicylic acid 2 % ointment in simple ointment base	1	2	b1, c1,c2, d1, d2
26.	Preparation of hydrophilic ointment USP	1	2	b2, c1,c2, c3, d2, d3
27.	Preparation of Polyethylene glycol ointment base.	1	2	b3, c2, c3, d1, d3
28.	Preparation of o/ w creams: vanishing cream base	1	2	b3, c1, c2, c3, d2, d3
29.	Preparation of w/o creams: cold cream base	1	2	b2, c1,c2, c3, d1, d2
30.	Preparation of hydrophilic gel base : Carbomer or Carboxy methyl cellulose gel	1	2	b3, c1,c2, c3, d1, d3
31.	Preparation of Aspirin in cocoa butter base suppositories.	1	2	b3, c1,c2, c3, d1, d2, d3
32.	Preparation of Glycerin suppositories.	1	2	b3, c2, c3, d1, d3
33.	Preparation of paracetamol in polyethylene glycol suppositories.	1	2	b1, c1,c2, d1, d2, d3
34.	Preparation of tetracycline eye ointment 1%	1	2	b2, c1 , c2, d1, d3
Practical Exam		1	2	
Total		11	22	
XXXI. Teaching strategies of the course:				
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student`s brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>				
<p><b>Laboratory practice</b>: students doing experiments in labs individually or in small groups</p>				
<p><b>Feedback learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>				
<p><b>Group projects</b>: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &amp;for promoting team work skills</p>				

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XXVI. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied dosage forms	c1, c3, d2	4-13	3
2	<b>Group:</b> every group is assigned to present illustrating videos on lab. and industrial preparation of 3 types of studies dosage forms.	c2, c3, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	c1, c2, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam)		7	10	10	a1, a2, a3, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, a6, b1, b2, b3
TOTAL				70	70 %	

Practical part assessment						
No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d1, d2, d3
Total				30	30 %	

XXXIX. Learning Resources
1- Required Textbook(s) ( maximum two ).

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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- 1 Aulton's Pharmaceutics The Design and Manufacture of Medicines, 2018, Elsevier Ltd
- 2 Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK

### 2- Essential References.

- 1 Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA
- 2 United States pharmacopeia (USP-41, NF 36), 2018, the United States Pharmacopoeial Convention.

### 3- Electronic Materials and Web Sites etc.

Article from:

www.emedicine.com  
www.sciencedirect.com  
www.blackwell.com  
www.ovid.com  
www.pubmed.com  
<https://slideplayer.com/slide/5276569/>  
<https://slideplayer.com/slide/4217360/>  
<https://slideplayer.com/slide/3621826/>

## XL. Course Policies: (Based on the Uniform Students'

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>7</b>	<b>Other policies:</b>



R

The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



جامعة الرازي  
AL-RAZI UNIVERSITY

الجمهورية اليمنية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**PHARMACEUTICS II**  
Course code (**PHT312**)

II. Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Ameen Alwossabi	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

III. Course Description:
This course is the second part of “Pharmaceutics “courses that are intended to provide the student with knowledge in preformulation, formulation and preparation of pharmaceutical dosage forms. The course deals with designing of semisolid dosage forms (ointments, creams, pastes and gels), suppositories, and pharmaceutical ophthalmic preparation. The practical part provides the student with skills to prepare those dosage forms in pharmaceutics Lab.

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<b>IV. The Course Intended Learning Outcomes (CILOs)</b>
<b>7. Alignment CILOs</b>
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
<b>a1.</b> Describe the advantages and disadvantages, types, classification of pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)
<b>a2.</b> Describe the advantages and disadvantages, types, classification of pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)
<b>a3.</b> Describe the stages of designing pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository).
<b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical ophthalmic preparation and semisolid dosage forms (Ointments, paste, cream, gel, suppository)
<b>a5.</b> Recognize the different additives used in manufacturing of pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository).
<b>a6.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)
<b>Intellectual skills :</b> Upon successful completion of the course, students will be able to:
<b>b1.</b> Classify pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, and suppository).
<b>b2.</b> Compare between various types of pharmaceutical ophthalmic preparations and semisolid dosage form in particular between old and current dosage forms (Ointments, paste, cream, gel, suppository)
<b>b3.</b> Design pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository).
<b>Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
<b>c1.</b> Exercise professional good laboratory practice (GLP) during practical sessions and operate machinery used properly.
<b>c2.</b> Employ the relevant way to prepare pharmaceutical ophthalmic preparations and semisolid dosage form. (Ointments, paste, cream, gel, suppository).
<b>c3.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>Transferable skills :</b> Upon successful completion of the course, students will be able to:
<b>d1.</b> Participate efficiently with his colleagues in a teamwork.
<b>d2.</b> Demonstrate the skills of time management and self-learning.
<b>d3.</b> Communicate effectively and behave in discipline with colleagues.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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<b>8. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Recognize the anatomy and physiology of skin and factors affects diffusion of drugs through skin .	Active Lecture	Written exams
<b>a2.</b> Describe the advantages and disadvantages, types, classification of pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository).		
<b>a3.</b> Describe the stages of designing pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository).		
<b>a4.</b> Describe the role of pharmacist in formulation of pharmaceutical ophthalmic preparation and semisolid dosage forms (Ointments, paste, cream, gel, suppository).		
<b>a5.</b> Recognize the different additives used in manufacturing of pharmaceutical ophthalmic preparations and semisolid dosage form (Ointments, paste, cream, gel, suppository)		
<b>a6.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' pharmaceutical ophthalmic preparations and semisolid dosage forms. (Ointments, paste, cream, gel, suppository)		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify pharmaceutical ophthalmic preparations, semisolid preparations and suppositories.	Active Lecture , Feed-back learning	Written exams, quizzes
<b>b2.</b> Compare between various types of pharmaceutical ophthalmic preparations, semisolid preparations and suppositories.		
<b>b3.</b> Design pharmaceutical ophthalmic preparations, semisolid preparations and suppositories.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	

c3. Employ the relevant way to prepare extemporaneous semisolid preparations and suppositories		Lab. term works, final practical exam
c3. Present and report his/her works correctly using appropriate writing rules and technologies media.	Feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	Laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d3. Participate efficiently with colleagues in a team work		
d2. Demonstrate the skills of time management and self-learning	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

<b>XLI. Course Content:</b>					
<b>C. Theoretical Aspect:</b>					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Semisolid dosage forms: Introduction</b>	<ul style="list-style-type: none"> <li><b>introduction:</b> definitions , advantages, disadvantages, types, anatomical features and targets of the skin, Classification of semisolid preparation</li> </ul>	1	2	a1, a2, b1, b2
2	<b>Semisolid dosage forms: (1) Ointments and pastes</b>	<ul style="list-style-type: none"> <li><b>Ointments:</b> definitions, advantages, disadvantages, classification based on type of ointment base, formulation considerations, method of preparation</li> <li><b>Pastes:</b> definitions, advantages, disadvantages, classification based on type of ointment base</li> </ul>	4	8	a1, a2, a3, a5, a6, b1, b2, b3
3	<b>Semisolid dosage forms:</b>	<ul style="list-style-type: none"> <li><b>Creams</b> definitions, advantages, disadvantages, classification,</li> </ul>	3	6	a1, a2, a3, a4, b2, b3

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	(2) Creams and gels	formulation considerations, method of preparation • <b>Gels</b> definitions, advantages, disadvantages, classification, formulation, considerations, method of preparation			
<b>Mid-term Exam</b>			1	2	
4	<b>Suppositories</b>	• <b>Suppositories</b> definitions, advantages, disadvantages, classification (rectal, vaginal) formulation, types of suppository bases, method of preparation	3	6	a2, a3, a5, a6, b2, b3
5	<b>Pharmaceutical Ophthalmic preparations</b>	• Anatomical features of the eye • Types of ophthalmic preparations • Formulation considerations • Sterilization and preservation. • Package • Quality evaluation	2	4	a1, a3, a4, a5, b1, b2
6	<b>Course Review</b>	Review of the course topics: discussion session.	1	2	a1- a6, b1, b2, b3
<b>FINAL EXAM</b>			1	2	
<b>TOTAL</b>			<b>16</b>	<b>32</b>	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	3 Units	

D. Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	Aligned Course Intended Learning Outcomes CILOs
35.	Preparation of salicylic acid 2 % ointment in simple ointment base	1	2	b1, c1,c2, d1, d2
36.	Preparation of hydrophilic ointment USP	1	2	b2, c1,c2, c3, d2, d3
37.	Preparation of Polyethylene glycol ointment base.	1	2	b3, c2, c3, d1, d3
38.	Preparation of o/ w creams: vanishing cream base	1	2	b3, c1, c2, c3, d2, d3
39.	Preparation of w/o creams: cold cream base	1	2	b2, c1,c2, c3, d1, d2
40.	Preparation of hydrophilic gel base : Carbomer or	1	2	b3, c1,c2, c3, d1, d3

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	Carboxy methyl cellulose gel			
41.	Preparation of Aspirin in cocoa butter base suppositories.	1	2	b3, c1,c2, c3, d1, d2, d3
42.	Preparation of Glycerin suppositories.	1	2	b3, c2, c3, d1, d3
43.	Preparation of paracetamol in polyethylene glycol suppositories.	1	2	b1, c1,c2, d1, d2, d3
44.	Preparation of tetracycline eye ointment 1%	1	2	b2, c1 , c2, d1, d3
Practical Exam		1	2	
Total		11	22	

### XXXII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### XVII. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied dosage forms	c1, c3, d2	4-13	3
2	<b>Group</b> : every group is assigned to present illustrating videos on lab. and	c2, c3, d1, d2, d3	14	2



industrial preparation of 3 types of studies dosage forms.			
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VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	c4, c5, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam)		7	10	10	a1, a2, a3, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, a6, b1, b2, b3
TOTAL				70	70 %	

Practical part assessment						
No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d1, d2, d3
Total				30	30 %	

XLI. Learning Resources	
<b>1- Required Textbook(s) ( maximum two ).</b>	
3	Aulton's Pharmaceutics The Design and Manufacture of Medicines, 2018, Elsevier Ltd
4	Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK
<b>2- Essential References.</b>	
3	Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ameen Alwossabi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



4 United States pharmacopeia (USP-41, NF 36), 2018, the United States Pharmacopoeial Convention.

### 3- Electronic Materials and Web Sites etc.

Article from:

[www.emedicine.com](http://www.emedicine.com)

[www.sciencedirect.com](http://www.sciencedirect.com)

[www.blackwell.com](http://www.blackwell.com)

[www.ovid.com](http://www.ovid.com)

[www.pubmed.com](http://www.pubmed.com)

<https://slideplayer.com/slide/5276569/>

<https://slideplayer.com/slide/4217360/>

<https://slideplayer.com/slide/3621826/>

## XLII. Course Policies: (Based on the Uniform Students' By law (2007))

	<b>Class Attendance:</b>
1	Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
	<b>Tardiness:</b>
2	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
	<b>Exam Attendance/Punctuality:</b>
3	No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
	<b>Assignments &amp; Projects:</b>
4	Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
	<b>Cheating:</b>
5	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
	<b>Forgery and Impersonation:</b>
6	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
	<b>Other policies:</b>
7	The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ameen Alwossabi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**Medicinal Chemistry II**  
Course No. (33)

Course Code No. (PHM311)

**2022/202**



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**Course Specification**  
**MEDICINAL CHEMISTRY II**

XIX. Course Identification and General Information:							
36.	Course Title:	MEDICINAL CHEMISTRY II					
37.	Course Code & Number:	PHM311					
38.	Credit hours:	C.H				TOTAL	
		Theoretical			P		Tr.
		L.	Tut.	S.			
3	-	-	2	-	4		
39.	Study level/ semester at which this course is offered:	3 <sup>rd</sup> Level – 1 <sup>st</sup> Semester					
40.	Pre –requisite (if any):	Pre: PHM227(Medicinal Chemistry I)					
41.	Co –requisite (if any):	--					
42.	Program (s) in which the course is offered:	Pharmacy Bachelor					
43.	Study System:	Semester based System					
44.	Mode of delivery:	Full Time					
45.	Language of teaching the course:	ENGLISH					
46.	Location of teaching the course:	AT THE UNIVERSITY FACILITY					
47.	Prepared By:	Dr. Ahmed Al-Ghani					
48.	Date of Approval:	2022					

**L: lecturing; Tut: Tutorial, S: seminar; P: practical; Tr.: training**

XX. Course Description:
This course is the second one among (Medicinal chemistry) courses which are designed to provide knowledge and skills in chemistry of medicinal agents (drugs). It deals with the physicochemical properties, chemical synthesis, quantitative structure activity relationship (SAR), qualitative structure activity relationship (QSAR), pharmacophore molecules, mechanism of action, and metabolism of drugs used for cardiovascular system, blood, central nervous system and endocrine system disorders. Also, there are practical part concerns with <b>Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of some CVS drugs.</b>

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
3. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation,	<b>a1.</b> Explain the correlation between the chemical and therapeutic

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Nabil Albaseer	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



	formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	properties of drugs to their molecular structure.
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a2.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacist in chemical synthesis of drugs.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body	<b>b1.</b> Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.
		<b>b2.</b> Express molecular structure, synthesis and reactions of drugs with hand-drawing
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b3.</b> Classify, chemically, drugs affecting, drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.
		<b>b4.</b> Compare between chemically related drugs based on their chemical structure
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems	<b>b5.</b> Design newer drugs used for cardiovascular system, blood and endocrine disorders.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		

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<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c3.</b> Perform synthesis of some cardiovascular system, blood, CNS and endocrine disorders.
		<b>c4.</b> Determine the quantitative analysis of some cardiovascular system, blood, CNS and endocrine disorders.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
		<b>d2.</b> Demonstrate the skills of time management and self-learning.
		<b>d3.</b> Participate efficiently with his colleagues in a team work.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d4.</b> Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)

#### 4. Alignment CILOs to teaching strategies and assessment strategies

##### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.	Active Lecture-discussion	Written exams
<b>a2.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.		

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a3. Describe the role of pharmacist in chemical synthesis of drugs.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.	Active Lecture-discussion, feed-back learning	Written exams, quizzes
b2. Express molecular structure, synthesis and reactions of drugs with hand-drawing	Active Lecture-discussion	Written exams
b3. Classify, chemically, drugs affecting drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.		
b4. Compare between chemically related drugs based on their chemical structure		
b5. Design newer drugs used for cardiovascular system, blood, CNS and endocrine disorders.	Group-project	Assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory		
c3. Perform synthesis of some cardiovascular system, blood, CNS and endocrine disorders.	Group-project	Assignments
c4. Determine the quantitative analysis of some cardiovascular system, blood, CNS and endocrine disorders.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Lab. term works, assignment

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d3. Participate efficiently with his colleagues in a team work.		
d2. Demonstrate the skills of time management and self-learning.	laboratory practice	Lab. term works, final practical exam
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)		

LII. Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of drugs</b>					
1	<b>Cardiovascular, blood, endocrine systems disorders drugs</b>	a1, a2, a3, b1, b2, b3, b4, d1, d2	<ul style="list-style-type: none"> <li>Drugs for ischemic heart diseases</li> <li>Anti-anginal drugs</li> <li>Anti-arrhythmic drugs</li> <li>Class-I, class-II, class-III, class-IV</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Anti-hypertensive drugs</li> <li>ACE-inhibitors, AR-blockers, Ca-channel blockers, ...etc.</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Management of congestive heart failure</li> <li>Cardiac glycosides, nitro-vasodilators, ...etc.</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Drugs affecting blood coagulation</li> <li>Anti-platelet drugs, anti-coagulants, thrombolytics</li> <li>Drugs used for hyperlipidemia</li> <li>Statins, fibrates, resins, ...etc.</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Drugs affecting kidney</li> <li>Diuretics (high efficacy, medium efficacy, adjuvant drugs)</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Hypoglycemic drugs (Sulphonylurea derivatives, Biguanides, ...etc)</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Pituitary, hypothalamic, thyroid &amp; parathyroid hormones</li> <li>GH, FSH, LH, ACTH, TSH, ..etc, T<sub>3</sub>, T<sub>4</sub>, calcitonin,</li> </ul>	1	3

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			parathormone, anti-thyroid drugs		
<b>Mid-term exam</b>				1	2
2	<b>Drugs for Central Nervous systems disorders</b>	a1, a2, a3, b1, b2, b3, b4, d3, d4	<ul style="list-style-type: none"> <li>Central nervous Systems stimulants drugs (amphetamine and related compounds, Tricyclic antidepressant and analeptics.</li> </ul>	2	6
			<ul style="list-style-type: none"> <li>Central nervous Systems depressants Anaesthesia drugs</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Central nervous Systems depressants Sedative and Hypnotics Drugs</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Central nervous Systems depressants Antipsychotic drugs</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Central nervous Systems depressants Anticonvulsants and Antiepileptic's drugs</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Non-steroidal anti-inflammatory drugs</li> </ul>	1	3
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>46</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>2 Units</b>

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: furosemide	c1, c2, c3, c4, d1, d2, d3	1	2
2	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: amlodipine	c1, c2, c3, c4, d1, d2, d3	1	2
3	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: candesartan	c1, c2, c3, c4, d1, d2, d3	1	2
4	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: digoxin	c1, c2, c3, c4, d1, d2, d3	1	2
5	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: blood drugs: warfarin	c1, c2, c3, c4, d1, d2, d3	1	2

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6	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: endocrine drugs: glibenclamide	c1, c2, c3, c4, d1, d2	1	2
7	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CNSD drugs: Diazepam	c1, c2, c3, c4, d2, d3	1	2
8	pharmacopeial physicochemical properties, identification of CNS depressant drugs: Carbamazepine	c1, c2, c3, c4, d1, d2, d3, d4	1	2
9	Synthesis of drugs (Nitroglycerin)	c1, c2, c4, d1, d3	2	4
10	Crystallization and Purification of drugs. (Glipizide)	c1, c2, c3, d1, d4	1	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2	1	2
Total			12	24
Number of Weeks			12	

### XXIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XX. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Group</b> : each group of students will be assigned to hypothetically design newer drugs form a studied patent drug using SAR principles	b5, c3, c4, d1, d3, d4	8

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

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No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b5, c3, c4, d1, d3
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d2
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d2
<b>TOTAL</b>				<b>70</b>	<b>70 %</b>	<b>70</b>

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, c4, d1, d2
<b>Total</b>				<b>30</b>	<b>30 %</b>	

### XLIII. Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

30. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, Copyright © 2020 by Lippincott Williams & Wilkins, a Wolters Kluwer business.
31. Foy's Principles of medicinal chemistry, seventh edition, Copyright © 2017 Lippincott Williams & Wilkins, a Wolters Kluwer business
32. Gareth Thomas, Medicinal chemistry: an introduction, third edition, Copyright © 2011 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.

#### 2- Essential References.

1. AshutochKar. Medicinal chemistry, new age international publisher
2. Rajie. Pharmaceutical chemistry
3. Wermuth. The practice of medicinal chemistry

#### 3- Electronic Materials and Web Sites etc.

1. <https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300>
2. <https://slideplayer.com/slide/7330128/>

### XLIV. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.

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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة







Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of :  
**MEDICINAL CHEMISTRY II**  
Course Code No. (PHM311)

XIV.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ahmed Al-Ghani	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

XV. Course Description:
<p>This course is the third one among (Medicinal chemistry) courses which are designed to provide knowledge and skills in chemistry of medicinal agents (drugs). It deals with the physicochemical properties, chemical synthesis, quantitative structure activity relationship (SAR), qualitative structure activity relationship (QSAR), pharmacophore molecules, mechanism of action, and metabolism of drugs used for cardiovascular system, blood, central nervous system and endocrine system disorders. Also, there are practical part concerns with <b>Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of some CVS drugs.</b></p>

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<b>XVI. Intended learning outcomes of the course (CILOs)</b>	
<b>1. Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.	
a2. Explain the principles of synthesis, purification and metabolic reactions of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.	
a3. Describe the role of pharmacist in chemical synthesis of drugs.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.	
b2. Express molecular structure, synthesis and reactions of drugs with hand-drawing	
b3. Classify, chemically, drugs affecting drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.	
b4. Compare between chemically related drugs based on their chemical structure	
b5. Design newer drugs used for cardiovascular system, blood and endocrine disorders.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory	
c3. Perform synthesis of some cardiovascular system, blood, CNS and endocrine disorders.	
c4. Determine the quantitative analysis of some cardiovascular system, blood, CNS and endocrine disorders.	
<b>Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Communicate effectively and behave in discipline with colleagues.	
d2. Demonstrate the skills of time management and self-learning.	
d3. Participate efficiently with his colleagues in a team work.	
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)	

<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.	Active Lecture-discussion	Written exams
a2. Explain the principles of synthesis, purification and metabolic reactions of drugs used for cardiovascular system,		

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blood, central nervous system and endocrine disorders.		
a3. Describe the role of pharmacist in chemical synthesis of drugs.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.	Active Lecture-discussion, feed-back learning	Written exams, quizzes
b2. Express molecular structure, synthesis and reactions of drugs with hand-drawing	Active Lecture-discussion	Written exams
b3. Classify, chemically, drugs affecting drugs used for cardiovascular system, blood, central nervous system and endocrine disorders.		
b4. Compare between chemically related drugs based on their chemical structure		
b5. Design newer drugs used for cardiovascular system, blood, CNS and endocrine disorders.	Group-project	Assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory		
c3. Perform synthesis of some cardiovascular system, blood, CNS and endocrine disorders.	Group-project	Assignments
c4. Determine the quantitative analysis of some cardiovascular system, blood, CNS and endocrine disorders.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

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d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Lab. term works, assignment
d3. Participate efficiently with his colleagues in a team work.		
d2. Demonstrate the skills of time management and self-learning.	laboratory practice	Lab. term works, final practical exam
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)		

XVII. Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of drugs</b>					
1	<b>Cardiovascular, blood endocrine systems disorders Drugs</b>	a1, a2, a3, b1, b2, b3, b4, d1, d2	<ul style="list-style-type: none"> <li>Drugs for ischemic heart diseases</li> <li>Anti-anginal drugs</li> <li>Anti-arrhythmic drugs</li> <li>Class-I, class-II, class-III, class-IV</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Anti-hypertensive drugs</li> <li>ACE-inhibitors, AR-blockers, Ca-channel blockers, ...etc.</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Management of congestive heart failure</li> <li>Cardiac glycosides, nitrovasodilators, ...etc</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Drugs affecting blood coagulation</li> <li>Anti-platelet drugs, anti-coagulants, thrombolytics</li> <li>Drugs used for hyper-lipidemia</li> <li>Statins, fibrates, resins, ...etc</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Drugs affecting kidney</li> <li>Diuretics (high efficacy, medium efficacy, adjuvant drugs)</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Hypoglycemic drugs (Sulphonylurea derivatives, Biguinide, ...etc</li> </ul>	1	3
			<ul style="list-style-type: none"> <li>Pituitary, hypothalamic, thyroid &amp; parathyroid hormones</li> <li>GH, FSH, LH, ACTH, TSH, ..etc, T<sub>3</sub>, T<sub>4</sub>, calcitonin, parathormone, anti-thyroid drugs</li> </ul>	1	3
		<b>Mid-term exam</b>			

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2	<b>Drugs for Central Nervous systems disorders</b>	a1, a2, a3, b1, b2, b3, b4, d3, d4	• Central nervous Systems stimulants drugs (amphetamine and related compounds, Tricyclic antidepressant and analeptics.	2	6
			• Central nervous Systems depressants Anaesthesia drugs	1	3
			• Central nervous Systems depressants Sedative and Hypnotics Drugs	1	3
			• Central nervous Systems depressants Antipsychotic drugs	1	3
			• Central nervous Systems depressants Anticonvulsants and Antiepileptic's drugs	1	3
			• Non-steroidal anti-inflammatory drugs	1	3
FINAL – EXAM				1	2
TOTAL				16	46
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	2 Units

B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: furosemide	c1, c2, c3, c4, d1, d2, d3	1	2
2.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: amlodipine	c1, c2, c3, c4, d1, d2, d3	1	2
3.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: candesartan	c1, c2, c3, c4, d1, d2, d3	1	2
4.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CVS drugs: digoxin	c1, c2, c3, c4, d1, d2, d3	1	2
5.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: blood drugs: warfarin	c1, c2, c3, c4, d1, d2, d3	1	2
6.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: endocrine drugs: glibenclamide	c1, c2, c3, c4, d1, d2	1	2
7.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: CNSD drugs: Diazepam	c1, c2, c3, c4, d2, d3	1	2

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Dr. Ahmed Al-Ghani	Dr. Nabil Albaseer	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



8.	pharmacopeial physicochemical properties, identification of CNS depressant drugs: Carbamazepine	c1, c2, c3, c4, d1, d2, d3, d4	1	2
9.	Synthesis of drugs (Nitroglycerin)	c1, c2, c4, d1, d3	2	4
10.	Crystallization and Purification of drugs. (Glipizide)	c1, c2, c3, d1, d4	1	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2	1	2
Total			12	24
Number of Weeks			12	

### XVIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XIX. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Group</b> : each group of students will be assigned to hypothetically design newer drugs form a studied patent drug using SAR principles	b5, c3, c4, d1, d3, d4	8

### XX. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b5, c3, c4, d1, d3
2	Mid-semester exam (written exam)	7	10	10	a1, a2, a3, b1, b2, b3, b4, d2	
3	Final exam (written exam)	16	50	50	a1, a2, a3, b1, b2, b3, b4, d2	
TOTAL			70	70%		

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Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term work	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d4
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, c4, d1, d2
Total				30	30%	

XXI. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, Copyright © 2020 by Lippincott Williams & Wilkins, a Wolters Kluwer business. 2. Foy's Principles of medicinal chemistry, seventh edition, Copyright © 2017 Lippincott Williams & Wilkins, a Wolters Kluwer business 3. Gareth Thomas, Medicinal chemistry: an introduction, third edition, Copyright © 2011 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.	
<b>2- Essential References.</b>	
1. AshutochKar. Medicinal chemistry, New age international publisher 2. Rajie. Pharmaceutical chemistry 3. Wermuth. The practice of medicinal chemistry	
<b>3- Electronic Materials and Web Sites etc.</b>	
1. <a href="https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300">https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300</a> 2. <a href="https://slideplayer.com/slide/7330128/">https://slideplayer.com/slide/7330128/</a>	

XXII. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

## **PHARMACOLOGY II**

Course Code No. (PHP316)

2022



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Course Specification

**PHARMACOLOGY II**

<b>I. Course Identification and General Information:</b>				
1	Course Title:	PHARMACOLOGY II		
2	Course Code & Number:	PHP316		
3	Credit Hours: 2	Credit Hours	Theory Hours	Lab. Hours
			Lecture	
		2	2	---
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 1 <sup>st</sup> Semester		
5	Pre –Requisite (if any):	HP228 Pharmacology I		
6	Co –Requisite (if any):	Co: PHM311		
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy		
8	Language of Teaching the Course:	English		
9	Study System:	Semester based System		
10	Mode of Delivery:	Full Time		
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences		
12	Prepared by:	Dr. Nabil Albaser		
13	Date of Approval:	2022		

<b>II. Course Description:</b>
<p>This course is one of the main requirements for pharmacy students, this course builds on and consolidates the information learned in Pharmacology-I and is meant to teach students about the individual pharmacological processes. It focuses on the research of the pharmacokinetics, pharmacodynamics, clinical use, and toxicities of medications that affect the endocrine and blood systems, as well as analgesics, general and local anesthetics, and the gastrointestinal system.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
38. Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
<b>A3</b> Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions. <b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.
<b>A4</b> Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
<b>B2</b> Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Classify drugs used for disorders of central nervous system and gastrointestinal tract disorders. <b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
<b>C5</b> Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use <b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice. <b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
<b>D1</b> Demonstrate leadership, time management, critical thinking, problem	<b>d1.</b> Demonstrate time management and decision-making skills.

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solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d2.</b> Interact effectively with patients, the public and health care professionals
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<b>39. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.		
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	Active lecture	Written exams
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Active lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.		
<b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate time management and decision-making skills.	Feed-back learning	Assignments

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d2. Interact effectively with patients, the public and health care professionals

<b>LIII. Course Content:</b>					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Drugs acting on the blood</b>	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Agents used in Hyperlipidemia	1	2
			• Drugs used in disorders of coagulation	1	2
2	<b>Endocrine pharmacology</b>	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Introduction to endocrinology	1	2
			• Pituitary & Hypothalamic hormones	1	2
			• Thyroid & Ant-thyroid drugs	1	2
			• Adrenocorticosteroids & Adrenocortical Antagonists	1	2
			• The Gonadal Hormones & Inhibitors	1	2
			• Pancreatic Hormones & Antidiabetic drugs	1	2
			<b>Mid-terms exam</b>	<b>1</b>	<b>2</b>
3	<b>Analgesics, general and local anesthetics</b>	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Narcotic analgesics	1	2
			• Natural opium alkaloids, synthetic opiates	1	2
			• Non-narcotic analgesics: NSAIDs	1	2
			• General anesthetics	1	2
			• General anesthesia, preanaesthetic medication	1	2
			• Local anesthetics, general anesthetic and pre-anesthetic medications	1	2
4	<b>GIT pharmacology</b>	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Drugs for peptic ulcer and hyperacidity	1	2
			• Antacids, H <sub>2</sub> receptor blockers, proton pump inhibitors, ...etc	1	2
			• Drugs for constipation, Purgative drugs	1	2
			• Drugs for diarrhea, Anti-diarrheal drugs, rehydration therapy	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>2 Units</b>

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## V. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

## VI. Assignments:

No	Assignments	Aligned CIOs	Week Due
1	<b>Individual</b> : every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g., CVS patients, renal failure patients, etc.	a1, a3, b1, c1, c2, c3, d1, d2	6-12

## VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CLOs)	
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	a1, a3, b1, c1, c2, c3, d1, d2
2	Mid-term exam (written exam)	7	20	20	a1, a2, a3, b1, d1	
3	Final exam (written exam)	16	60	60	a1, a2, a3, b1, d1	
TOTAL			100	100%		

## VIII. Learning Resources:

### 1- Required Textbook(s) ( maximum two ).

33. Katzung, Bertram G.. Basic & clinical pharmacology. 14th New York: McGraw-Hill, 2018. Electronic Resource"

34. Rang, H.P., Dale, M.M., Ritter, J.M., Flower, R.J. and Henderson, G., 2012. Rang and Dale's pharmacology. 10<sup>th</sup> ed. 2019.

### 2- Essential References.

7. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13e Brunton LL, Hilal-Dandan R, Knollmann BC. Brunton L.L., & Hilal-Dandan R, & Knollmann B.C.(Eds.),Eds. Laurence L. Brunton, et al.

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8. Tripathi, K. D. (2018). Essentials of medical pharmacology (8th ed.). Jaypee Brothers Medical.
9. Richard A. Harvey. Lippincott's pharmacology, 8<sup>th</sup> ed. 2022, Lippincott William and Wilkins.

### 3- Electronic Materials and Web Sites etc.

Access Pharmacy: <http://accesspharmacy.mhmedical.com/>  
[https://link.springer.com/chapter/10.1007/978-981-32-9779-1\\_4](https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4)  
<https://accessmedicine.mhmedical.com/content.aspx?bookid=371&sectionid=41587611>  
<https://clinicalgate.com/principles-of-drug-action/>  
<https://libguides.tulane.edu/pharm>

## IX. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة







Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of

**PHARMACOLOGY II**

Course No. ()

<b>I. - Information about Faculty Member Responsible for the Course:</b>							
<b>Name of Faculty Member</b>	Dr. Nabil Albaseer	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
One of the main requirements for pharmacy students, this course builds on and consolidates the information learned in Pharmacology-I and is meant to teach students about the individual pharmacological processes. It focuses on the research of the pharmacokinetics, pharmacodynamics, clinical use, and toxicities of medications that affect the endocrine and blood systems, as well as analgesics, general and local anesthetics, and the gastrointestinal system.

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### III. Intended learning outcomes of the course (CILOs)

#### 40. Alignment CILOs

**A: Knowledge & understanding:** Upon successful completion of the course, students will be able to:

**a1.** Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.

**a2.** Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.

**a3.** Describe the role of pharmacist in providing correct information on rational use of medications.

**B: Intellectual skills:** Upon successful completion of the course, students will be able to:

**b1.** Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.

**b2.** Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.

**C: Professional & practical skills:** Upon successful completion of the course, students will be able to:

**c1.** Advise the patient and healthcare professional to optimize medicine use

**c2.** Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.

**c3.** Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.

**D: Transferable skills:** Upon successful completion of the course, students will be able to:

**d1.** Demonstrate time management and decision-making skills.

**d2.** Interact effectively with patients, the public and health care professionals

#### 41. Alignment CILOs to teaching strategies and assessment strategies

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.		
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.		

(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:

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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	Active lecture	Written exams
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Active lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.		
<b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Demonstrate time management and decision-making skills.	Feed-back learning	Assignments
<b>d2.</b> Interact effectively with patients, the public and health care professionals		

<b>LIV. Course Content:</b>					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Drugs acting on the blood</b>	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Agents used in Hyperlipidemia	1	2
			• Drugs used in disorders of coagulation	1	2
2	<b>Endocrine pharmacology</b>	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Introduction to endocrinology	1	2
			• Pituitary & Hypothalamic hormones		
			• Thyroid & Ant-thyroid drugs	1	2
			• Adrenocorticosteroids & Adrenocortical Antagonists	1	2

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			• The Gonadal Hormones & Inhibitors	1	2
			• Pancreatic Hormones & Antidiabetic drugs	1	2
			Mid-terms exam	1	2
			• Agents That Affect Bone Mineral Homeostasis	1	2
3	Analgesics, general and local anesthetics	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Narcotic analgesics	1	2
			• Natural opium alkaloids, synthetic opiates		
			• Non-narcotic analgesics: NSAIDs	1	2
			• General anesthetics • General anesthesia, preanaesthetic medication	1	2
4	GIT pharmacology	a1, a2, a3, b1, b2, c1, c2, c3, d1, d2	• Drugs for peptic ulcer and hyperacidity	1	2
			• Antacids, H <sub>2</sub> receptor blockers, proton pump inhibitors, ...etc		
			• Drugs for constipation, Purgative drugs • Drugs for diarrhea, Anti-diarrheal drugs, rehydration therapy	1	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	2 Units

## VI. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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X. Assignments:				
No	Assignments	Aligned CIOs	Week Due	
1	<b>Individual:</b> every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g., CVS patients, renal failure patients, etc.	a1, a3, b1, c1, c2, c3, d1, d2	6-12	

XI. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CIOs)
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	a1, a3, b1, c1, c2, c3, d1, d2
2	Mid-term exam (written exam)		7	20	20	a1, a2, a3, b1, d1
3	Final exam (written exam)		16	60	60	a1, a2, a3, b1, d1
TOTAL				100	100%	

XII. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
1. Katzung, Bertram G.. Basic & clinical pharmacology. 14th New York: McGraw-Hill, 2018. Electronic Resource" 2. Rang, H.P., Dale, M.M., Ritter, J.M., Flower, R.J. and Henderson, G., 2012. Rang and Dale's pharmacology. 10 <sup>th</sup> ed. 2019.	
<b>2- Essential References.</b>	
1. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13e Brunton LL, Hilal-Dandan R, Knollmann BC. Brunton L.L., & Hilal-Dandan R, & Knollmann B.C.(Eds.),Eds. Laurence L. Brunton, et al. 2. Tripathi, K. D. (2018). Essentials of medical pharmacology (8th ed.). Jaypee Brothers Medical. 3. Richard A. Harvey. Lippincott's pharmacology, 8 <sup>th</sup> ed. 2022, Lippincott William and Wilkins.	
<b>3- Electronic Materials and Web Sites etc.</b>	
Access Pharmacy: <a href="http://accesspharmacy.mhmedical.com/">http://accesspharmacy.mhmedical.com/</a> <a href="https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4">https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4</a> <a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611">https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611</a> <a href="https://clinicalgate.com/principles-of-drug-action/">https://clinicalgate.com/principles-of-drug-action/</a> <a href="https://libguides.tulane.edu/pharm">https://libguides.tulane.edu/pharm</a>	

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<b>XIII. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of

**PHARMACOGNOSY-II**

Course No. (PHG315)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmacognosy-II			
2	Course Code & Number:	PHG315			
3	Credit Hours: 3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Third Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHG224			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Salwa Raweh			
13	Date of Approval:	2022			

II. Course Description:	
<p>This course is the complement of a previous course (Pharmacognosy I) and both are designed to provide the student with basic knowledge in medicinal plants as a natural source of drugs. This course deals with botanical origin, morphological, microscopical features and medical uses of flowers, seeds, fruits, herbs and unrecognized plant parts that are evidence-based proved to be used as complementary and alternative medicines. The practical part provide the student with skills to prepare plant samples and perform their morphological and microscopical identification in Pharmacognosy Lab.</p>	

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**42. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<p><b>a1.</b> Explicit the methods used for detection of active constituents and discovering adulteration of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.</p> <p><b>a2.</b> Discuss the principles and procedures applied for cultivation, collection and processing of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts. as crude drugs.</p>
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy	<p><b>a3.</b> Identify the botanical origin, morphological and microscopical characteristics of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.</p> <p><b>a4.</b> Determine the active constituents and therapeutic use of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.</p>
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	<b>a5.</b> Describe his/her role as pharmacist in identification and evaluation of medicinal plants
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<p><b>b1.</b> Express with drawings the morphology and key microscopical features of medicinal plants</p> <p><b>b2.</b> Differentiate between medicinal flowers, seeds, fruits, herbs and unrecognized plant parts based on morphological and microscopical features.</p>
<b>B5</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<p><b>b3</b> Classify active constituents in medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.</p> <p><b>b4.</b> Select standard operation procedures to identify medicinal plants and crude drugs.</p>

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**C: Professional and practical skills: upon completion of the course, students will be able to:**

<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory <b>c2.</b> Operate the instruments (Evaporator, Grinder, Dryer and others) and perform experiments successfully in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c3.</b> Screen drugs in medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c4. Search</b> efficiently for information using documented and electronic sources of information.

**D: Transferable skills: upon completion of the course, students will be able to:**

<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice	<b>d3.</b> Demonstrate the skills of time management and self-learning.

**43. Alignment CILOs to teaching strategies and assessment strategies**

**(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explicit the methods used for detection of active constituents and discovering adulteration of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	Active Lecture	Written exams
<b>a2.</b> Discuss the principles and procedures applied for cultivation, collection and processing of medicinal flowers, seeds,		



fruits, herbs and unrecognized plant parts. as crude drugs.		
a3. Identify the botanical origin, morphological and microscopical characteristics of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.		
a4. Determine the active constituents and therapeutic use of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.		
a5. Describe his/her role as pharmacist in identification and evaluation of medicinal plants		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Express with drawings the morphology and key microscopical features of medicinal plants	Active Lecture, laboratory practice	Written exam, lab. term work, final practical exam
b2. Differentiate between medicinal flowers, seeds, fruits, herbs and unrecognized plant parts based on morphological and microscopical features.	laboratory practice	lab. term work, final practical exam
b4. Select standard operation procedures to identify medicinal plants and crude drugs.		
b3. Classify active constituents in medicinal plants.	Active Lecture, feed-back learning	Written exams quizzes
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term work, final practical exam
c2. Operate the instruments (Evaporator, Grinder, Dryer and Others) and perform experiments successfully in the laboratory		
c3. Prepare plant samples and investigate the morphological and microscopical features in medicinal leaves, barks, roots and rhizomes		
c4. Search efficiently for information using documented and electronic sources of information.	Feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

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d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice Feed-back learning	Lab. term work, final practical exam, Assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.		

XLV. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Medicinal flowers	a1,a2,a3, a4,a5,b, b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal flowers: Clove, Chamomile, Pyrethrum, Tilia, Santonica, Lavender and Saffron.</li> </ul>	3	6
2	Medicinal seeds	a1,a2,a3, a4,a5,b, b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, active constituents and medical uses of the following medicinal bark seeds: Cardamom, Colchicine, nux vomica, Linseed, Nutmeg, Black and White Mustard, Fenugreek, Clabar and Nigella.</li> </ul>	3	6
<b>Mid-term exam</b>				1	2
3	Medicinal fruits	a1,a2,a3, a4,a5,b, b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, active constituents and medical uses of the following medicinal fruits</li> <li>Ammi vinaga, Anise, Fennel, Caraway, Capsicum, star Anise, Coriander, Vanilla</li> </ul>	3	6
4	Medicinal herbs	a1,a2,a3, a4,a5,b, b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, active constituents and medical uses of the following medicinal herbs: Ergot, Indian hemp, Catharanthus, Lobelia, Peppermint, Thyme, Passiflora and Ephedra</li> </ul>	2	4
5	Unrecognize plant drugs	a1,a2,a3, a5,b,b3, b4	<ul style="list-style-type: none"> <li>Definition, classification, chemical and physical properties</li> <li>Study of medicinal resin and resin combinations: Colophony, Myrrh, Tolu Peru, Tolu Balsam, Olibanum and Benzoin</li> </ul>	2	4

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			• Medicinal gums, juices and extracts		
<b>Course Review</b>	a1,a2,a3, a4,a5,b, b3,b4	Review of the course topics by discussion session.		1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	5 Units

<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	morphology and microscopical investigation of medicinal flowers: clove	c1, c2, c3, d1, d2, d3	1	2
2	morphology and microscopical investigation of medicinal flowers: Saffron	c1, c2, c3, d1, d2, d3	1	2
3	morphology and microscopical investigation of medicinal seeds cardamom	c1, c2, c3, d1, d2, d3	1	2
4	morphology and microscopical investigation of medicinal seeds Black & white mustard	c1, c2, c3, d1, d2, d3	1	2
5	morphology and microscopical investigation of medicinal fruits Anise	c1, c2, c3, d1, d2, d3	1	2
6	morphology and microscopical investigation of medicinal fruits Fennel	c1, c2, c3, d1, d2, d3	1	2
7	morphology and microscopical investigation of medicinal fruits Capsicum	c1, c2, c3, d1, d2, d3	1	2
8	morphology and microscopical determination of medicinal herbs: Peppermint	c1, c2, c3, d1, d2, d3	1	2
9	morphology and microscopical investigation of medicinal herbs: Thyme	c1, c2, c3, d1, d2, d3	1	2
10	investigation of medicinal resin: Myrrh	c1, c2, c3, d1, d2, d3	1	2
11	investigation of medicinal gum	c1, c2, c3, d1, d2, d3	1	2
<b>PRACTICAL EXAM</b>		c1, c2, c3, d1, d3	1	2
<b>Total</b>			12	24
<b>Number of Weeks</b>				12





#### XXIV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

#### XXI. Assignments:

No	Assignments	Aligned CIOS	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search on the pharmaceutical products available in the drug market of one plant drug studied in the course.	c4, d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to do search report for adulteration of one crude drug studied in the course.	c4, d2, d3	14	2

#### VII. Schedule of Assessment Tasks for Students During the Semester

##### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOS)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, a5, b1, b3, b4
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b3, b4
TOTAL				70	70 %	70

##### Practical part assessment

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No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CLOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
	Final exam (practical)		12	20	20	c1, c2, c3, d1, d3
Total				30	30%	

<b>XLV. Learning Resources:</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. <u>Michael Heinrich</u> , <u>Joanne Barnes</u> , et al. Fundamentals of Pharmacognosy and Phytotherapy, 2018, Elsevier.	
<b>2- Essential References.</b>	
1. <u>Biren Shah</u> and <u>Avinash Seth</u> ·Textbook of Pharmacognosy and Phytochemistry. 2018, Elsevier - Health Sciences Division.	
<b>3- Electronic Materials and Web Sites etc.</b>	
1. <a href="https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&amp;%20Phytochemistry-I.pdf">https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&amp;%20Phytochemistry-I.pdf</a>	
2. <a href="https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf">https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf</a>	

<b>XLVI. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Salwa Raweh	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



7

**Other policies:**

The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**PHARMACOGNOSY II**  
Course Code No. (PHG 315)

XXIII.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Salwa Raweh	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

XXIV. Course Description:
<p>This course is the complement of a previous course (Pharmacognosy I) and both are designed to provide the student with basic knowledge in medicinal plants as a natural source of drugs. This course deals with botanical origin, morphological, microscopical features and medical uses of flowers, seeds, fruits, herbs and unrecognized plant parts that are evidence-based proved to be used as complementary and alternative medicines. The practical part provides the student with skills to prepare plant samples and perform their morphological and microscopical identification in Pharmacognosy Lab.</p>

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III. Intended learning outcomes of the course (CILOs)	
<b>44. Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Explicit the methods used for detection of active constituents and discovering adulteration of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	
a2. Discuss the principles and procedures applied for cultivation, collection and processing of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts. as crude drugs.	
a3. Identify the botanical origin, morphological and microscopical characteristics of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	
a4. Determine the active constituents and therapeutic use of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	
a5. Describe his/her role as pharmacist in identification and evaluation of medicinal plants	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Express with drawings the morphology and key microscopical features of medicinal plants	
b2. Differentiate between medicinal flowers, seeds, fruits, herbs and unrecognized plant parts based on morphological and microscopical features.	
b3. Classify active constituents in medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	
b4. Select standard operation procedures to identify medicinal plants and crude drugs.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments (Evaporator, Grinder, Dryer and others) and perform experiments successfully in the laboratory	
c3. Screen drugs in medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	
c4. Search efficiently for information using documented and electronic sources of information.	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Communicate effectively and behave in discipline with colleagues.	
d2. Participate efficiently with his colleagues in a team work.	
d3. Demonstrate the skills of time management and self-learning.	

45. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explicit the methods used for detection of active constituents and discovering adulteration of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.	Active Lecture	Written exams
a2. Discuss the principles and procedures applied for cultivation, collection and		

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processing of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts. as crude drugs.		
<b>a3.</b> Identify the botanical origin, morphological and microscopical characteristics of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.		
<b>a4.</b> Determine the active constituents and therapeutic use of medicinal flowers, seeds, fruits, herbs and unrecognized plant parts.		
<b>a5.</b> Describe his/her role as pharmacist in identification and evaluation of medicinal plants		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Express with drawings the morphology and key microscopical features of medicinal plants	Active Lecture, laboratory practice	Written exam, lab. term work, final practical exam
<b>b2.</b> Differentiate between medicinal flowers, seeds, fruits, herbs and unrecognized plant parts based on morphological and microscopical features.	laboratory practice	lab. term work, final practical exam
<b>b4.</b> Select standard operation procedures to identify medicinal plants and crude drugs.		
<b>b3.</b> Classify active constituents in medicinal plants.	Active Lecture, feed-back learning	Written exams quizzes
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term work, final practical exam
<b>c2.</b> Operate the instruments (Evaporator, Grinder, Dryer and Others) and perform experiments successfully in the laboratory		
<b>c3.</b> Prepare plant samples and investigate the morphological and microscopical features in medicinal leaves, barks, roots and rhizomes		
<b>c4.</b> Search efficiently for information using documented and electronic sources of information.	Feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice Feed-back learning	Lab. term work, final practical exam, Assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.		

XLVI. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Medicinal flowers	a1,a2,a3, a4,a5,b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, cultivation, adulteration detection, active constituents and medical uses of the following medicinal flowers: Clove, Chamomile, Pyrethrum, Tilia, Santonica, Lavender and Saffron.</li> </ul>	3	6
2	Medicinal seeds	a1,a2,a3, a4,a5,b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, active constituents and medical uses of the following medicinal bark seeds: Cardamom, Colchicine, nux vomica, Linseed, Nutmeg, Black and White Mustard, Fenugreek, Clabar and Nigella.</li> </ul>	3	6
<b>Mid-term exam</b>				1	2
3	Medicinal fruits	a1,a2,a3, a4,a5,b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, active constituents and medical uses of the following medicinal fruits</li> <li>Ammi vinaga, Anise, Fennel, Caraway, Capsicum, star Anise, Coriander, Vanilla</li> </ul>	3	6
4	Medicinal herbs	a1,a2,a3, a4,a5,b3,b4	<ul style="list-style-type: none"> <li>Study of botanical origin, microscopical features, active constituents and medical uses of the following medicinal herbs: Ergot, Indian hemp, Catharanthus, Lobelia, Peppermint, Thyme, Passiflora and Ephedra</li> </ul>	2	4
5	Unrecognized plant drugs	a1,a2,a3, a5,b3,b4	<ul style="list-style-type: none"> <li>Definition, classification, chemical and physical properties</li> </ul>	2	4

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		<ul style="list-style-type: none"> <li>Study of medicinal resin and resin combinations: Colophony, Myrrh, Tolu Peru, Tolu Balsam, Olibanum and Benzoin</li> <li>Medicinal gums, juices and extracts</li> </ul>		
<b>Course Review</b>	a1-a5 b3,b4	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>			1	2
<b>TOTAL</b>			16	32
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	5 Units

B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	morphology and microscopical investigation of medicinal flowers: clove	c1, c2, c3, d1, d2, d3	1	2
2	morphology and microscopical investigation of medicinal flowers: Saffron	c1, c2, c3, d1, d2, d3	1	2
3	morphology and microscopical investigation of medicinal seeds cardamom	c1, c2, c3, d1, d2, d3	1	2
4	morphology and microscopical investigation of medicinal seeds Black & white mustard	c1, c2, c3, d1, d2, d3	1	2
5	morphology and microscopical investigation of medicinal fruits Anise	c1, c2, c3, d1, d2, d3	1	2
6	morphology and microscopical investigation of medicinal fruits Fennel	c1, c2, c3, d1, d2, d3	1	2
7	morphology and microscopical investigation of medicinal fruits Capsicum	c1, c2, c3, d1, d2, d3	1	2
8	morphology and microscopical determination of medicinal herbs: Peppermint	c1, c2, c3, d1, d2, d3	1	2
9	morphology and microscopical investigation of medicinal herbs: Thyme	c1, c2, c3, d1, d2, d3	1	2
10	investigation of medicinal resin: Myrrh	c1, c2, c3, d1, d2, d3	1	2
11	investigation of medicinal gum	c1, c2, c3, d1, d2, d3	1	2
<b>PRACTICAL EXAM</b>		c1, c2, c3, d1, d3	1	2
<b>Total</b>			12	24
<b>Number of Weeks</b>				12

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### XXXV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XXII. Assignments:

No	Assignments	Aligned CIOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to do a search on the pharmaceutical products available in the drug market of one plant drug studied in the course.	c4, d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to do search report for adulteration of one crude drug studied in the course.	c4, d2, d3	14	2

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOs)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, a5, b1, b3, b4
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b3, b4
TOTAL				70	70 %	70

#### Practical part assessment

No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOs)
1	Lab. Term	Attitude	1-12	5	5	

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2	works	Accomplishments		5	5	c1, c2, c3, d1, d2, d3
	Final exam (practical)		12	20	20	c1, c2, c3, d1, d3
Total				30	30%	

<b>XLVII. Learning Resources:</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. <u>Michael Heinrich</u> , <u>Joanne Barnes</u> , et al. Fundamentals of Pharmacognosy and Phytotherapy, 2018, Elsevier.	
<b>2- Essential References.</b>	
1. <u>Biren Shah</u> and <u>Avinash Seth</u> ·Textbook of Pharmacognosy and Phytochemistry. 2018, Elsevier - Health Sciences Division.	
<b>3- Electronic Materials and Web Sites etc.</b>	
3. <a href="https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&amp;%20Phytochemistry-I.pdf">https://annamalaiuniversity.ac.in/studport/download/engg/pharm/resources/BPHARM_2Y_4S_405T_Pharmacognosy%20&amp;%20Phytochemistry-I.pdf</a>	
4. <a href="https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf">https://jru.edu.in/studentcorner/lab-manual/dpharm/1st-year/Pharmacognosy.pdf</a>	

<b>XLVIII.Course Policies: (Based on the Uniform Students' By law (2007))</b>	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of

## **PATHOPHYSIOLOGY**

Course No. (PHC314)

2022



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Course Specification

**PATHOPHYSIOLOGY**

XXI. Course Identification and General Information:							
1	Course Title:	PATHOPHYSIOLOGY					
2	Course Code & Number:	PHC314					
3	Credit hours:	C.H				TOTAL	
		Theoretical			P.		Tr.
		L.	Tut.	S.			
2	-	-	-	-	2		
4	Study level/ semester at which this course is offered:	( <i>THIRD</i> ) Year –( <i>1<sup>ST</sup></i> ) semester					
5	Pre –requisite (if any):	<ul style="list-style-type: none"> <li>• General biology</li> <li>• Anatomy &amp; histology</li> <li>• Physiology I &amp; II</li> <li>• Pathology</li> </ul>					
6	Co –requisite (if any):	Pharmacology II					
7	Program (s) in which the course is offered:	All BC programs offered by the university					
8	Language of teaching the course:	ENGLISH					
9	Location of teaching the course:	IN THE UNIVERSITY					
10	Prepared By:	Dr. Hussein Gumaih					
11	Date of Approval	10/2014					

**L: lecturing ; Tut: Tutorial , S: seminar ; P: practical ; Tr.: training**

XXII. Course Description:
<p>The course concerns with the study of etiology, mechanisms , phases and changes in physiological functions, risk factors , investigations and complications of common types of diseases. This course is regarded as a complementary course for the pathology and physiology which have been studied by the students in the previous semesters and also a support for pharmacology and pharmacotherapy courses.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
46. Alignment CILOs to PILOs	
No.	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Identify the causes (etiology) of diseases and risk factors that predisposing or exacerbating of common type of diseases.
	a2. Determine how of common type of diseases are progressed and their eventual complications.
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:	
B1. Predict the drug properties from molecular structure that effect on pharmacokinetic parameters and interaction with targets in the body.	b1. Differentiate between causes and risk factors of common type of diseases.
	b2. Interpret investigational data of common type of diseases.
	b3. Relate between investigational data
	b4. Predict complications of common type of diseases.
B5. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	b5 . Assess the stage of disease progress.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
C6. Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	c1 .Search efficiently for information using documented and electronic sources of information.
	c2. Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills :</b> Upon successful completion of the course, students will be able to:	
D1. Demonstrate leadership, time management, critical thinking,	d1. Share successfully in team-work.
	d2. Show respect to life.

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problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d3.</b> Communicate effectively with his/her colleagues.
	<b>d4.</b> Demonstrate time management and self-learning during performing practical and professional works and assignments.

47. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge& understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Identify the causes (etiology) of diseases and risk factors that predisposing or exacerbating of common type of diseases.	Lecture	Written exam , Attendance
a2. Determine how of common type of diseases are progressed and their eventual complications.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Differentiate between causes and risk factors of common type of diseases.	Lecture, feed-back learning	Written exam , Attendance, quizzes
b2. Interpret investigational data of common type of diseases.		
b3. Relate between investigational data	Lecture	Written exam , Attendance, quizzes
b4. Predict complications of common type of diseases.		
b5 . Assess the stage of disease progress.	Lecture , feed-back learning	Written exam , Attendance
(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1 .Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments
c2. Present and report his/her works correctly using appropriate writing rules and technologies media.		
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Share successfully in team-work.	Feed-back learning	Assignments
d2. Show respect to life.		

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d3. Communicate effectively with his/her colleagues.	Lecture	Written exam , Attendance
d4. Demonstrate time management and self-learning during performing practical and professional works and assignments.	Feed-back learning	Assignments

Course Content:					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
Etiology, risk factors, progress , stages , clinical features , investigation and complications of the following diseases					
1	Alimentary system diseases/ disorders	vomiting, diarrhoea , Peptic ulcer, , irritable-bowel syndrome, hepatic failure	2	4	a1, a2, b1, b2,d1
2	respiratory system diseases/ disorders	Bronchial asthma , cough	2	4	a1, a2, b1, b3,d2
3	CVS system diseases/ disorders	hypertension , angina, arrhythmia, congestive heart failure.	2	4	a1, b1, b3, b4, d3
MID-TERM EXAM			1	2	
4	Renal system diseases/ disorders	renal failure, patients on haemodialysis	2	4	a1, a2,b1, b3, b4,d3
5	Endocrinologic diseases/ disorders	diabetes mellitus, thyroid disorders, infertility	2	4	a1, a2,b1, b4, b5,d4
6	Neurological diseases/ disorders	epilepsy, depression , psychosis	1	2	a1, a2,b1, b5,d3
7	Infective diseases/ disorders	bacteremia , septicemia, AIDS	2	4	a1, a2,b1, b2, b3,d2
Course Review		Review and discussion session of the studied topics.	1	2	a1, a2,b1, b2,b3,b4, b5, d2
FINAL - EXAM			1	2	
TOTAL			16	32	
Number of Weeks /and Units Per Semester			16 weeks	7 Units	

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## XXVI. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Field training**: each 2-3 students are commissioned to do certain assignments in a real field entity such as drug factory, hospitals, pharmacies under supervision of both the field principle and an academic supervisor

## XVIII. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to provide a search-based report on investigational lab. Report of one of the studied disease.	c1, c2, d4	4	6
2	<b>Group</b> : each group of students will be assigned to provide a pathophysiologic search-based report on a disease that was not included in the studied topics e.g. <ul style="list-style-type: none"> <li>• Thrombocytosis</li> <li>• Hemorrhage</li> <li>• Parkinsonism</li> <li>• Skin fungal infections</li> <li>• Dingu fever</li> </ul>	c1, c2, d1, d3, d4	14	4

## XVI. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, b1, b2, b3, b4, b5, d2
2	Assignments (1 +2)	4, 14	10	10	c1, c2, d1, d3, d4
3	Quiz 1 + Quiz 2	7, 12	5	5	b4, b5, b6, b3, b4

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4	Mid-semester exam of theoretical part ( written exam)	7	20	20	a1, a2, b1, b2, b3, b4, b5, d2
5	Final exam of theoretical part ( written exam)	17	60	60	a1, a2, b1, b2, b3, b4, b5, d2
TOTAL			100	100 %	100

#### XLIX. Learning Resources:

##### 1- Required Textbook(s) ( maximum two ).

35. Martin M. Zadnaovich , essentials of pathophysiology for pharmacy, 2003, CRC press.

##### 2- Essential References.

36. Valentina L. Brashers, Clinical Applications of Pathophysiology: Assessment, Diagnostic Reasoning, and Management

##### 3- Electronic Materials and Web Sites etc.

[www.en.wikipedia.org/](http://www.en.wikipedia.org/)

#### XV. Course Policies:

21.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
22.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
23.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
24.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**PATHOPHYSIOLOGY**  
Course Code No. (PHC314)

**Course Plan (Syllabus) of : PATHOPHYSIOLOGY**

XXV.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Hussein Gumaih	Office Hours					
Location & Telephone No.	Pharmacy department	SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
The course concerns with the study of etiology, mechanisms , phases and changes in physiological functions, risk factors , investigations and complications of common types of diseases. This course is regarded as a complementary course for the pathology and physiology which have been studied by the students in the previous semesters and also as a supporting for pharmacology and pharmacotherapy courses.

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**1. Alignment CILOs to PILOs**

**A: Knowledge & understanding:** Upon successful completion of the course, students will be able to:

**a1.** Identify the causes (etiology) of diseases and risk factors that predisposing or exacerbating of common type of diseases.

**a2.** Determine how of common type of diseases are progressed and their eventual complications.

**B: Intellectual skills :** Upon successful completion of the course, students will be able to:

**b1.** Differentiate between causes and risk factors of common type of diseases.

**b2.** Interpret investigational data of common type of diseases.

**b3.** Relate between investigational data

**b4.** Predict complications of common type of diseases.

**b5 .** Assess the stage of disease progress.

**C: Professional & practical skills:** Upon successful completion of the course, students will be able to:

**c1 .** Search efficiently for information using documented and electronic sources of information.

**c2.** Present and report his/her works correctly using appropriate writing rules and technologies media.

**D: Transferable skills :** Upon successful completion of the course, students will be able to:

**d1.** Share successfully in team-work.

**d2.** Show respect to life.

**d3.** Communicate effectively with his/her colleagues.

**d4.** Demonstrate time management and self-learning during performing practical and professional works and assignments.

**48. Alignment CILOs to teaching strategies and assessment strategies**

(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Identify the causes (etiology) of diseases and risk factors that predisposing or exacerbating of common type of diseases.	Lecture	Written exam , Attendance
a2. Determine how of common type of diseases are progressed and their eventual complications.		

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(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Differentiate between causes and risk factors of common type of diseases.	Lecture, feed-back learning	Written exam , Attendance, quizzes
b2. Interpret investigational data of common type of diseases.		
b3. Relate between investigational data	Lecture	Written exam , Attendance, quizzes
b4. Predict complications of common type of diseases.		
b5 . Assess the stage of disease progress.	Lecture , feed-back learning	Written exam , Attendance
(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1 .Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments
c2. Present and report his/her works correctly using appropriate writing rules and technologies media.		
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Share successfully in team-work.	Feed-back learning	Assignments
d2. Show respect to life.		
d3. Communicate effectively with his/her colleagues.	Lecture	Written exam , Attendance
d4. Demonstrate time management and self-learning during performing practical and professional works and assignments.	Feed-back learning	Assignments

Course Content:					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
Etiology, risk factors, progress , stages , clinical features , investigation and complications of the following diseases					
1	Alimentary system diseases/ disorders	vomiting, diarrhoea , Peptic ulcer, , irritable-bowel syndrome, hepatic failure	2	4	a1, a2, b1, b2,d1

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2	respiratory system diseases/ disorders	Bronchial asthma , cough	2	4	a1, a2, b1, b3,d2
3	CVS system diseases/ disorders	hypertension , angina, arrhythmia, congestive heart failure.	2	4	a1, b1, b3, b4, d3
<b>MID-TERM EXAM</b>			1	2	
4	Renal system diseases/ disorders	renal failure, patients on haemodialysis	2	4	a1, a2,b1, b3, b4,d3
5	Endocrinologic diseases/ disorders	diabetes mellitus, thyroid disorders, infertility	2	4	a1, a2,b1, b4, b5,d4
6	Neurological diseases/ disorders	epilepsy, depression , psychosis	1	2	a1, a2,b1, b5,d3
7	Infective diseases/ disorders	bacteremia , septicemia, AIDS	2	4	a1, a2,b1, b2, b3,d2
Course Review		Review and discussion session of the studied topics.	1	2	a1, a2,b1, b2,b3,b4, b5, d2
<b>FINAL - EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	7 Units	

## V. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Field training**: each 2-3 students are commissioned to do certain assignments in a real field entity such as drug factory, hospitals, pharmacies under supervision of both the field principle and an academic supervisor

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.Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to provide a search-based report on investigational lab. Report of one of the studied disease.	c1, c2, d4	4	6
2	<b>Group :</b> each group of students will be assigned to provide a pathophysiologic search-based report on a disease that was not included in the studied topics e.g. <ul style="list-style-type: none"> <li>• Thrombocytosis</li> <li>• Hemorrhage</li> <li>• Parkinsonism</li> <li>• Skin fungal infections</li> <li>• Dingu fever</li> </ul>	c1, c2, d1, d3, d4	14	4

XVII. Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, b1, b2, b3, b4, b5, d2
2	Assignments (1 +2)	4, 14	10	10	c1, c2, d1, d3, d4
3	Quiz 1 + Quiz 2	7, 12	5	5	b4, b5, b6, b3, b4
4	Mid-semester exam of theoretical part ( written exam)	7	20	20	a1, a2, b1, b2, b3, b4, b5, d2
5	Final exam of theoretical part ( written exam)	17	60	60	a1, a2, b1, b2, b3, b4, b5, d2
TOTAL			100	100 %	100

VIII. Learning Resources:
<b>1- Required Textbook(s) ( maximum two ).</b>
1. Martin M. Zadnaovich , essentials of pathophysiology for pharmacy, 2003, CRC press.
<b>2- Essential References.</b>
2. Valentina L. Brashers, Clinical Applications of Pathophysiology: Assessment, Diagnostic Reasoning, and Management
<b>3- Electronic Materials and Web Sites etc.</b>
<a href="http://www.en.wikipedia.org/">www.en.wikipedia.org/</a>

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IX. Course Policies:	
1.	<b>Class Attendance:</b> At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2.	<b>Tardy:</b> any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3.	<b>Exam Attendance/Punctuality:</b> any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4.	<b>Assignments &amp; Projects:</b> Assignments and projects will be assessed individually unless the teacher request for group work
5.	<b>Cheating:</b> Cheating by any means will cause the student failure and he/she must re-study the course
6.	<b>Plagiarism:</b> Plagiarism by any means will cause the student failure in the course . Other disciplinary procedures will be according to the college rules.

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المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL ANALYTICAL CHEMISTRY II**  
Course Code No. (PHM317)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Analytical Chemistry II			
2	Course Code & Number:	PHM317			
3	Credit Hours: 3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Third Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHM223			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

XXIII. Course Description:
<p>The course is the second part of Pharmaceutical Analytical chemistry courses which provides the student with basic knowledge of principles, instrumentation and applications of basic analytical techniques analysis and also instrumentation of electro, optical and thermal analytical methods such as potentiometry, conductometry, polarography, polarimetry, thermal methods and how they might be employed to analyze drugs in dosage forms. The practical part of the course provides the student the skills to safely handle chemicals, prepare analytical samples and perform those types of analysis using effectively the related instruments.</p>

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
3. Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon completion this course, students will be able to:	
<p><b>A3</b> Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic</p>	<p><b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis</p>

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	agents as well as the complementary therapies including phytotherapy	
A2	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	a2. Describe the principles of thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	a3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.
<b>B: Intellectual skills:</b> Upon completion this course, students will be able to:		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	b1. Interpret data obtained by thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques
		b2. Select appropriate standard operating procedure for optical and thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b3. Design a suitable optical and thermal analysis and UV-visible spectrophotometry method based on the substance physicochemical properties.
B5	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	b4. Calculate the content % of a material in a sample using UV-visible spectrophotometry method
<b>C: Professional &amp; practical skills:</b> Upon completion this course, students will be able to:		
C1	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	c1. Handle efficiently and safely the chemical materials and tools used in the laboratory
C2	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	c2. Operate the instruments and perform experiments successfully in the laboratory

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		c3. Practice pharmaceutical analysis of drugs by potentiometric titration, <b>Polarographic, polarimetric analysis and others analysis methods.</b>
<b>D: Transferable skills:</b> Upon completion this course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D3</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate the skills of time management and self-learning.

1. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exams
<b>a2.</b> Describe the principles of thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques		
<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret data obtained by thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques	Active Lecture, laboratory practice, Feedback learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Select appropriate standard operating procedure for optical and thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques		
<b>b3.</b> Design a suitable optical and thermal analysis and UV-visible spectrophotometry method based on the substance physicochemical properties.		
<b>b4.</b> Calculate the content % of a material in a sample using UV-visible spectrophotometry method		

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<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory		
<b>c3.</b> Practice pharmaceutical analysis of drugs by potentiometric titration, <b>Polarographic, polarimetric analysis and others analysis methods.</b>		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
<b>No.</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
<b>1</b>	<b>Introduction to instrumental analysis</b>	<ul style="list-style-type: none"> <li>Advantages of instrumental analysis over classical manual analysis</li> <li>Requirements to operate a machine</li> <li>Source of errors and how to avoid</li> <li>Analyzing of data: types of data, accuracy, precision.</li> <li>Classification of instrumental analytical techniques</li> </ul>	1	2	a1, a2, a3, b2, b4
<b>2</b>	<b>Electrochemical methods</b>	<ul style="list-style-type: none"> <li>Potentiometry: Principles, methods and application.</li> <li>Ion selective electrodes.</li> </ul>	3	6	

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		<ul style="list-style-type: none"> <li>Conductometry: experimental details of conductometric titration and applications.</li> </ul>	1	2	a2, a3, b1, b2, b3, b4, d1, d2, d3
		<ul style="list-style-type: none"> <li>Electrogravimetry</li> </ul>	2	4	
		<ul style="list-style-type: none"> <li>Voltammetry</li> <li>Polarography</li> <li>Application of polarography</li> </ul>	2	4	
		<ul style="list-style-type: none"> <li>Amperometry: theory and technique of amperometric titration with dropping mercury electrode, high frequency titration, its applications.</li> </ul>	1	2	
3	Mid-Term Exam		1	2	a1, a2, a3, b1, b2, b3, b4, d3
4	Introduction to thermal chemistry	<ul style="list-style-type: none"> <li>Thermogravimetry: principle, instrumentation, temperature, verification, verification of electrobalance, procedures</li> </ul>	1	2	a2, a3, b1, b2, b3, b4, d1, d2
5	Thermal Techniques	<ul style="list-style-type: none"> <li>Experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence</li> <li>Advantage and disadvantages</li> <li>Pharmaceutical applications</li> </ul>	2	4	a2, a3, b1, b2, b3, b4, d1, d2, d3
6	Optical instrumental analysis	<ul style="list-style-type: none"> <li>Polarimetry: Determination of optical and specific optical rotation: Principle, purpose, apparatus, procedures,</li> <li>Determination of refractive index: Principle, purpose, apparatus, procedures</li> </ul>	2	4	a2, a3, b1, b2, b3, b4, d1, d2, d3
7	Final Exam		1	2	a1, a2, a3, b1, b2, b3, b4, d3
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

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B. Case Studies and Practical Aspect:				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	introduction to pharmaceutical instrumental analysis Lab.: safety requirements, list of experiments, how to report, etc.	c1, c2, c3, d1, d2, d3	1	2
2	Potentiometric titration of HCl + NaOH	c1, c2, c3, d1, d2, d3	1	2
3	Potentiometric titration of CH <sub>3</sub> COOH + NaOH	c1, c2, c3, d1, d3	1	2
4	Assay of Ketoprofen using Potentiometric titration	c1, c2, c3, d2, d3	1	2
5	Polarographic analysis	c1, c2, c3, d1, d2	1	2
6	Conductivity analysis	c1, c2, c3, d2, d3	1	2
7	Melting point analysis	c1, c2, c3, d2, d3	1	2
8	Determination of Distillation Range	c1, c2, c3, d1, d3	1	2
9	Polarimetric analysis of specific rotation	c1, c2, c3, d1, d2,	1	2
10	Thermal analysis (thermogram)	c1, c2, c3, d1, d2	1	2
11	Final exam	c1, c2, c3, d3	1	2
Number of Weeks /and Units Per Semester			11	22

XXVII. Teaching strategies of the course:
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.</p> <p>The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student's brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Laboratory practice</b>: students doing experiments in labs individually or in small groups</p>
<p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>
<p><b>Group projects</b>: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &amp;for promoting team work skills</p>

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XXX. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provides the students with problems related to the studied topics. Every student is assigned to solve some of those problems individually.	c3, d1, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to do a search report on pharmaceutical applications of one method of the studied titrimetric analysis.	c3, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	c3, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d3
TOTAL				70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, d3
Total				30	30%	

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<b>L. Learning Resources:</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
1. David Harvey. Analytical Chemistry 2.1. 2016, DePauw University 2. D.A.skoog, D.M.west ,F.J holler and S.R. crouch , "Fundamentals of analytical chemistry", 8 th edition , book/cole-thomson learning, inc.(2004).	
<b>2- Essential References.</b>	
1. Leslie G Chatten: Deans analytical chemistry handbook, 2013, McGraw Hill 2. G. D. Christian and J. E. Oreilly, "Instrumental analysis", Ally and Bacon, inc.	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://dpuadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf">http://dpuadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf</a> <b>Websites:</b> <a href="http://ull.chemistry.uakron.edu/analytical/">http://ull.chemistry.uakron.edu/analytical/</a>	

<b>VI. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**Pharmaceutical Analytical Chemistry II**  
Course code No. (PHM317)

XXVI.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
<p>This course is the second part of Pharmaceutical Analytical chemistry courses which provides the student with basic knowledge of principles, instrumentation and applications of basic analytical techniques analysis and instrumentation of electro, optical and thermal analytical methods such as potentiometry, conductometry, polarography, polarimetry, thermal methods and how they might be employed to analyze drugs in dosage forms. The practical part of the course provides the student the skills to safely handle chemicals, prepare analytical samples and perform those types of analysis using effectively the related instruments.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs)	
<b>4. Alignment CILOs</b>	
<b>A: Knowledge &amp; understanding:</b> Upon completion this course, students will be able to:	
a1. Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	
a2. Describe the principles of thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques	
a3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.	
<b>B: Intellectual skills:</b> Upon completion this course, students will be able to:	
b1. Interpret data obtained by thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques	
b2. Select appropriate standard operating procedure for optical and thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques	
b3. Design a suitable optical and thermal analysis and UV-visible spectrophotometry method based on the substance physicochemical properties.	
b4. Calculate the content % of a material in a sample using UV-visible spectrophotometry method	
<b>C: Professional &amp; practical skills:</b> Upon completion this course, students will be able to:	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments and perform experiments successfully in the laboratory	
c3. Practice pharmaceutical analysis of drugs by potentiometric titration, <b>Polarographic, polarimetric analysis and others analysis methods.</b>	
<b>D: Transferable skills:</b> Upon completion this course, students will be able to:	
d1. Communicate effectively and behave in discipline with colleagues.	
d2. Participate efficiently with his colleagues in a team work.	
d3. Demonstrate the skills of time management and self-learning.	

2. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exam s
a2. Describe the principles of thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques		
a3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		

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**(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret data obtained by thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Select appropriate standard operating procedure for optical and thermal, optical methods and UV-visible and fluorescence spectrophotometry techniques		
<b>b3.</b> Design a suitable optical and thermal analysis and UV-visible spectrophotometry method based on the substance physicochemical properties.		
<b>b4.</b> Calculate the content % of a material in a sample using UV-visible spectrophotometry method		

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory		
<b>c3.</b> Practice pharmaceutical analysis of drugs by potentiometric titration, <b>Polarographic, polarimetric analysis and others analysis methods.</b>		

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments





IV. Course Contents:				
A. Theoretical Aspect:				
Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
Introduction to instrumental analysis	<ul style="list-style-type: none"> <li>Advantages of instrumental analysis over classical manual analysis</li> <li>Requirements to operate a machine</li> <li>Source of errors and how to avoid</li> <li>Analyzing of data: types of data, accuracy, precision.</li> <li>Classification of instrumental analytical techniques</li> </ul>	1	2	a1, a2, a3, b2, b4
Electrochemical methods	<ul style="list-style-type: none"> <li>Potentiometry: Principles, methods and application.</li> <li>Ion selective electrodes.</li> </ul>	3	6	a2, a3, b1, b2, b3, b4, d1, d2, d3
	<ul style="list-style-type: none"> <li>Conductometry: experimental details of conductometric titration and applications.</li> </ul>	1	2	
	<ul style="list-style-type: none"> <li>Electrogravimetry</li> </ul>	2	4	
	<ul style="list-style-type: none"> <li>Voltammetry</li> <li>Polarography</li> <li>Application of polarography</li> </ul>	2	4	
	<ul style="list-style-type: none"> <li>Amperometry: theory and technique of amperometric titration with dropping mercury electrode, high frequency titration, its applications.</li> </ul>	1	2	
Mid-Term Exam		1	2	a1, a2, a3, b1, b2, b3, b4, d3
Introduction to thermal chemistry	<ul style="list-style-type: none"> <li>Thermogravimetry: principle, instrumentation, temperature, verification, verification of electrobalance, procedures</li> </ul>	1	2	a2, a3, b1, b2, b3, b4, d1, d2
Thermal Techniques	<ul style="list-style-type: none"> <li>Experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence</li> </ul>	2	4	a2, a3, b1, b2, b3, b4, d1, d2, d3

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	Advantage and disadvantages Pharmaceutical applications			
<b>Optical instrumental analysis</b>	<ul style="list-style-type: none"> <li>Polarimetry: Determination of optical and specific optical rotation: Principle, purpose, apparatus, procedures,</li> <li>Determination of refractive index: Principle, purpose, apparatus, procedures</li> </ul>	2	4	a2, a3, b1, b2, b3, b4, d1, d2, d3
<b>Final Exam</b>		1	2	a1, a2, a3, b1, b2, b3, b4, d3
<b>Number of Weeks /and Units Per Semester</b>		<b>16</b>	<b>32</b>	

B. Case Studies and Practical Aspect:				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	introduction to pharmaceutical instrumental analysis Lab.: safety requirements, list of experiments, how to report, etc.	c1, c2, c3, d1, d2, d3	1	2
2	Potentiometric titration of HCl + NaOH	c1, c2, c3, d1, d2, d3	1	2
3	Potentiometric titration of CH <sub>3</sub> COOH + NaOH	c1, c2, c3, d1, d3	1	2
4	Assay of Ketoprofen using Potentiometric titration	c1, c2, c3, d2, d3	1	2
5	Polarographic analysis	c1, c2, c3, d1, d2	1	2
6	Conductivity analysis	c1, c2, c3, d2, d3	1	2
7	Melting point analysis	c1, c2, c3, d2, d3	1	2
8	Determination of Distillation Range	c1, c2, c3, d1, d3	1	2
9	Polarimetric analysis of specific rotation	c1, c2, c3, d1, d2,	1	2
10	Thermal analysis (thermogram)	c1, c2, c3, d1, d2	1	2
11	Final exam	c1, c2, c3, d3	1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>11</b>	<b>22</b>

### XVIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

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**Laboratory practice:** students doing experiments in labs individually or in small groups

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

XXXI. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> the teacher provides the students with problems related to the studied topics. Every student is assigned to solve some of those problems individually.	c3, d1, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to do a search report on pharmaceutical applications of one method of the studied titrimetric analysis.	c3, d1, d2, d3	14	2

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	c3, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d3
TOTAL				70	70 %	70

#### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, d3

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Total	30	30%
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<b>LI. Learning Resources:</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
<ol style="list-style-type: none"> <li>1. David Harvey. Analytical Chemistry 2.1. 2016, DePauw University</li> <li>2. D.A.skoog, D.M.west ,F.J holler and S.R. crouch , "Fundamentals of analytical chemistry", 8 th edition , book/cole-thomson learning, inc.(2004).</li> </ol>	
<b>2- Essential References.</b>	
<ol style="list-style-type: none"> <li>1. Leslie G Chatten: Deans analytical chemistry handbook, 2013, McGraw Hill</li> <li>2. G. D. Christian and J. E. Oreilly, "Instrumental analysis",Ally and Bacon, inc.</li> </ol>	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://dpuadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf">http://dpuadweb.depauw.edu/harvey_web/eTextProject/AC2.1Files/AnalChem2.1.pdf</a> <b>Websites:</b> <a href="http://ull.chemistry.uakron.edu/analytical/">http://ull.chemistry.uakron.edu/analytical/</a>	

<b>VII. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





## Faculty of Medical Sciences

Department of Pharmacy

Bachelor of Pharmacy

Course Specification of :

First Aid

Course Code No. (MSC318)

2022



This template of course specifications was prepared by CAQA, Yemen,  
2017.

Prepared by:                      Reviewed by:                      Head of the Department:                      Quality Assurance head                      Dean:  
Dr.                      Dr. Ahmad Alghani

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>I. Course Identification and General Information:</b>					
1	Course Title:	First Aid			
2	Course Code & Number:	MSC318			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medical Sciences			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

<b>II. Course Description:</b>	
This course provides necessary knowledge of how to provide aid to injured and accidental casualties.	



### III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies

#### 1. Alignment PILOs to CILOs

PILOS		CILOS
<b>A. Knowledge and Understanding:</b>		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Discuss the concept of primary health care and first aid. a2. Identify the procedures to be carried out in first aid of different types of accidents and injuries.
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a3. Comprehend his/her role as a pharmacist to implement and participate in primary health care and in assisting health care team to provide first aid services.
<b>B. Intellectual Skills:</b>		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b1. Compare between procedures of first-aid of various injuries and accidents.
<b>C. Professional and Practical Skills:</b>		
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	c1. Search efficiently for information using documented and electronic sources of information.
<b>D. Transferable Skills:</b>		





D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Show respect to life and commit to community and patients serving.
		d2. Demonstrate time management and self-learning during performing practical and professional works and assignments.

2. Alignment CILOs to teaching strategies and assessment strategies		
<b>(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Discuss the concept of primary health care and first aid.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
a2. Identify the procedures to be carried out in first aid of different types of accidents and injuries.		
a3. Comprehend his/her role as a pharmacist to implement and participate in primary health care and in assisting health care team to provide first aid services.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
<b>(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Compare between procedures of first-aid of various injuries and accidents.	Lecture Instructor – student Interactive Exercises Solving Problem Methods	Problem-Solving Exercises. Assignment Quiz
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Search efficiently for information using documented and electronic sources of information.	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		





Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Show respect to life and commit to community and patients serving.	Self-Learning Seminar Exercises	Presentation Assignment Quiz
d2. Demonstrate time management and self-learning during performing practical and professional works and assignments.		

## I. Course Content:

### A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Introduction to first-aid</b>	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Definition, concept and history of first aid</li> <li>objectives and responsibilities of first aid</li> <li>role of pharmacist in assisting health care team in providing first-aid to patients.</li> </ul>	3	6
2	<b>First aid of various accidents and injuries and conditions</b>	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of fractures and dislocation</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of bleeding &amp; shock</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of burns &amp; sunburn &amp; frost</li> </ul>	1	2
3	<b>Midterm Exam</b>	a 1, a2, b1, c1, d1, d2		1	2
4	<b>First aid of various accidents and injuries and conditions</b>	a 1, a2, a3, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of animal bites, stings</li> </ul>	1	2
		a 1, a2, a3, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of drowning and asphyxia</li> </ul>	1	2
5	<b>First aid of various accidents and injuries and conditions</b>	a 1, a2, a3, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of epileptic seizures</li> </ul>	1	2
		a 1, a2, a3, b1,	<ul style="list-style-type: none"> <li>first-aid of diabetic coma</li> </ul>	1	2



		c1, d1, d2			
6		a 1, a2, a3, b1, c1, d1, d2	▪ first-aid of poisoning	1	2
				1	2
				1	2
7	Course Review	a 1, a2, a3, b1, c1, d1, d2	Review of the course topics by discussion session.	1	2
8	Final Exam	a 1, a2, a3, b1, d2		1	2
Number of Weeks /and Units Per Semester				16	32

### V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

### VI. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

### VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Assignment 1:</b> Each student presents selected case in mentioned topics	a 1, a2, a3, b1, c1, d1, d2	6 <sup>th</sup>	5
2	<b>Assignment 2:</b> Each students group present selected cases discussion on above topic	a 1, a2, a3, b1, c1, d1, d2	12 <sup>th</sup>	5
Total				10



### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6 <sup>th</sup> , 12 <sup>th</sup>	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
3	Midterm Exam	Week 7	20	20%	a 1, a2, a3, b1, d1
4	Quiz 2	12 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
5	Final Exam (Theory)	Week 16	60	60%	a1, a2, a3, b1, d1, d2
Total			100	100%	

### IX. Learning Resources:

•Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).

#### 1- Required Textbook(s) ( maximum two ).

- 1- American Red Cross First Aid/CPR/AED PARTICIPANT'S MANUA, 2011.
- 2- David Pencheon. Oxford handbook of public health Practice
- 3- القواعد العامة للاسعافات الاولية / د/ محمد ابراهيم شلبي

#### 2- Essential References.

N. Muruges Health Education and community pharmacy.

#### 3- Electronic Materials and Web Sites etc.

1 -[www.accesspharmacy.com](http://www.accesspharmacy.com)

### X. Course Policies: (Based on the Uniform Students' By law (2007)

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b>



	No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





## Faculty of Medical Sciences

Department of Pharmacy

Program of Pharmacy

Course Plan (Syllabus) of :

**First Aid**

Course Code No. ( MSC318)

2022

### I. Information about Faculty Member Responsible for the Course:

Name of Faculty Member:		Office Hours					
Location & Telephone No.:							
E-mail:		SAT	SUN	MO N	TUE	WE D	TH U



1	Course Title:	Introduction to Pharmacy			
2	Course Code & Number:	PHP115			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	1st Level / 1st Semester			
5	Pre –Requisite (if any):	Prs: Pr:PHP418			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhawlani			
13	Date of Approval:	2022			

### III. Course Description:

This course provides necessary knowledge of how to provide aid to injured and accidental casualties.

### IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

#### 1. Alignment CILOs

#### (a) Course Intended Learning Outcomes of Knowledge and Understanding:

Course Intended Learning Outcomes

a1. Discuss the concept of primary health care and first aid.

a2. Identify the procedures to be carried out in first aid of different types of accidents and injuries.

a3. Comprehend his/her role as a pharmacist to implement and participate in primary health care and in assisting health care team to provide first aid services.

#### (b) Course Intended Learning Outcomes of Intellectual Skills:

Course Intended Learning Outcomes

b1. Compare between procedures of first-aid of various injuries and accidents.

#### (c) Course Intended Learning Outcomes of Professional and Practical Skills:



c1. Search efficiently for information using documented and electronic sources of information.

**(d) Course Intended Learning Outcomes of Transferable Skills:**

d1. Show respect to life and commit to community and patients serving.

d2. Demonstrate time management and self-learning during performing practical and professional works and assignments.

## V. Course Content:

### Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Introduction to first-aid</b>	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Definition, concept and history of first aid</li> <li>objectives and responsibilities of first aid</li> <li>role of pharmacist in assisting health care team in providing first-aid to patients.</li> </ul>	3	6
2	<b>First aid of various accidents and injuries and conditions</b>	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of fractures and dislocation</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of bleeding &amp; shock</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of burns &amp; sunburn &amp; frost</li> </ul>	1	2
3	<b>Midterm Exam</b>	a 1, a2, b1, c1, d1, d2		1	2
4	<b>First aid of various accidents and injuries and conditions</b>	a 1, a2, a3, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of animal bites, stings</li> </ul>	1	2
		a 1, a2, a3, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of drowning and asphyxia</li> </ul>	1	2
5	<b>First aid of various accidents and injuries and conditions</b>	a 1, a2, a3, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>first-aid of epileptic seizures</li> </ul>	1	2
		a 1, a2, a3, b1,	<ul style="list-style-type: none"> <li>first-aid of diabetic coma</li> </ul>	1	2





		c1, d1, d2			
6		a 1, a2, a3, b1, c1, d1, d2	▪ first-aid of poisoning	1	2
				1	2
				1	2
7	Course Review	a 1, a2, a3, b1, c1, d1, d2	Review of the course topics by discussion session.	1	2
8	Final Exam	a 1, a2, a3, b1, d2		1	2
Number of Weeks /and Units Per Semester				16	32

## VI. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

## VII. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

### 1- Required Textbook(s) ( maximum two ):

- Daniel, wayne and cross. C,L. (2013). Biostatistics: A fundamental for analysis in the health sciences, student solution manual. 10th edition, John wiley, Canada.
- David Bowers (2008). Medical statistics from scratch an introduction for health professionals, Johan wiley and Sons, England.

### 2- Essential References:



8. . Kanishka Bhattachary (2004). Introduction to statistics for medical students, University of Oxford.

### 3- Electronic Materials and Web Sites etc.:

**Websites:** <http://www.MikeMiddleton.com>

## VIII. Learning Resources:

•Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).

### 1- Required Textbook(s) ( maximum two ).

- 4- American Red Cross First Aid/CPR/AED PARTICIPANT'S MANUA, 2011.  
5- David Pencheon. Oxford handbook of public health Practice  
6- القواعد العامة للاسعافات الاولية / د/ محمد ابراهيم شلبي

### 2- Essential References.

N. Murugesh Health Education and community pharmacy.

### 3- Electronic Materials and Web Sites etc.

1 -[www.accesspharmacy.com](http://www.accesspharmacy.com)

## IX. Course Policies: (Based on the Uniform Students' Bylaw (2007)

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.



6	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
7	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

السنة الثالثة  
الفصل الثاني

**THIRD level (2<sup>nd</sup> semester)**

	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr.	Cr. hr	
1	Phytochemistry I	كيمياء عقاقير 1	PHG321	2	2	3	Pre: PHG314
2	Pharmacology III	علم الأدوية 3	PHP322	2	-	2	Pre: PHP316; Co: PHM326
3	Pharmaceutics III	صيدلانيات 3	PHT323	2	2	3	Pre: PHT312
4	Therapeutics I	معالجة دوائية 1	PHP324	2	-	2	Co: PHP327
5	Pharmaceutical instrumental analysis I	تحليل الي صيدلاني 1	PHM325	2	2	3	Pre: PHM316
6	Medicinal Chemistry III	كيمياء دوائية 3	PHM326	3	2	4	Pre: PHM311; Co: PHP322
7	Clinical Pharmacy I	صيدلة سريرية 1	PHC327	2	-	2	Co: PHC328



8	Integrated-Case based Learning I	التعلم القائم على الحالات 1	PHC328		2	1	Co: PHC327
Total					15	10	20

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisite



المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHYTOCHEMISTRY I**  
Course No. (PHG321)

**2022**



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I. Course Identification and General Information:					
1	Course Title:	Phytochemistry I			
2	Course Code & Number:	PHG4321			
3	Credit Hours: 3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Third Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHG314			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Salwa Raweh			
13	Date of Approval:	2022			

II. Course Description:
Phytochemistry courses are collaborative to (Pharmacognosy I, II) as all deal with plants as sources of drug and all are basis of complementary and alternative medicines . However, in contrast to Pharmacognosy courses, phytochemistry courses deal with extraction, isolation and identification of active chemical constituents (phytochemicals) present in the medicinal plants. This course concerns with 2 essential groups of phytochemicals: alkaloids, terpenoids while other phytochemicals will be covered in the next semester in (Phytochemistry II) course.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Salwa Raweh	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**49. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Explain the physicochemical properties of <b>alkaloids</b> and terpenoids phytochemicals.
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a2.</b> Discuss the methods and techniques used to extract and isolate phytochemicals <b>a3.</b> Define the botanical sources and therapeutic uses of alkaloids and terpenoids phytochemicals.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<b>b1.</b> Express the chemical structure of phytochemicals using drawings. <b>b2.</b> Differentiate between various types of alkaloids and terpenoids.
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b3.</b> Classify alkaloids and terpenoids. <b>b4.</b> Compare between different types of alkaloids and terpenoids <b>b5.</b> Select standard operation procedure to extract, isolate and identify alkaloids and terpenoids in a plant sample
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory

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	development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c2.</b> Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c3.</b> Screen for alkaloid and terpenoid drugs from plant sources.
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c4.</b> Search efficiently for information using documented and electronic sources of information.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice	<b>d3.</b> Demonstrate the skills of time management and self-learning.

<b>50. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the physicochemical properties of alkaloids and terpenoids phytochemicals.	Active Lecture	Written exams
<b>a2.</b> Discuss the methods and techniques used to extract and isolate phytochemicals		
<b>a3.</b> Define the botanical sources and therapeutic uses of alkaloids and terpenoids phytochemicals.		
<b>a4.</b> Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Express the chemical structure of phytochemicals using drawings.	Active Lecture, Feed-back learning	Written exams, quizzes
<b>b3.</b> Classify alkaloids and terpenoids.	Active Lecture	Written exam

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b2. Differentiate between various types of alkaloids and terpenoids.	Lecture, lab. Practice	Written exam s, lab. term works, final practical exam
b4. Compare between different types of alkaloids and terpenoids		
b5. Select standard operation procedure to extract, isolate and identify alkaloids and terpenoids in a plant sample		

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.		
c3. Screen for alkaloid and terpenoid drugs from plant sources.		
c4. Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments,

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group project	lab. term works, final practical exam, assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.	Feed-back learning, lab. Practice	Assignments, lab. term works, final practical exam

**Course Content:**

**A – Theoretical Aspect:**

Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
1	<b>Introduction to phytochemistry</b>	<ul style="list-style-type: none"> <li>Definition, brief history, types (conventional, medicinal)</li> <li>Scope of medicinal phytochemistry</li> <li>Phytochemicals: Definition, evolution process, clarification, chemical classification, physicochemical properties</li> </ul>	1	2	a1, a2, a3, a4

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2	Extraction of phytochemicals	<p><b>Extraction techniques</b></p> <ul style="list-style-type: none"> <li>• Maceration, percolation, soxhlet extractor: principle, apparatus, applications</li> <li>• Spouted bed extraction</li> <li>• Superficial fluid extraction</li> <li>• Solid-phase microextraction</li> </ul>	2	4	a1, a2, a3, a4, b1, b2
3	Separation and isolation of phytochemicals	<ul style="list-style-type: none"> <li>• <b>Sublimation, Distillation, Fractional liberation, Fractional crystallization:</b> principle, apparatus, applications</li> <li>• <b>Chromatography:</b> principle, brief history, types and selection of stationary phase and mobile phase, general factors affecting separation</li> <li>• <b>Adsorption chromatography: thin layer chromatography:</b> principle and procedures, applications, preparative TLC, illustrative examples of phytochemicals isolated by TLC</li> <li>• <b>Partition chromatography: Paper chromatography:</b> principle, procedures and application</li> <li>• <b>Simple Column chromatography:</b> Introduction and principle, components, procedures.</li> </ul>	3	6	a1, a2, a3, a4, b1, b2
<b>MID-TERM EXAM</b>			1	2	
4	Alkaloids	<ul style="list-style-type: none"> <li>• Introduction: definition, history, occurrence, classification, nomenclature, physical and chemical properties, isolation, purification and detection.</li> <li>• Phenylalkylamine alkaloids (ephedrine, cathinone and capsaicinoide)</li> <li>• Isochinolin alkaloids (papaverine, morphine, codeine and emetine)</li> <li>• Tropolon alkaloids (colchicines and demecolcine)</li> <li>• Amaryllidaceen alkaloids (lycorine and galantamine)</li> <li>• Alkaloids derived from tryptophan</li> <li>• Indol-alkaloids (physostigmine, carboline, ergoline, ajmalicine, yohimbine, ajmaline and strychnine type)</li> </ul>	4	8	a4, b2, b3, b4, b5

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		<ul style="list-style-type: none"> <li>• Chino line alkaloids (cinchona alkaloids)</li> <li>• Alkaloids derived from histidine: (pilocarpine, is pilocarpine and pilosine)</li> <li>• Alkaloids derived from asparagic acid : (ricinine and nicotine alkaloids)</li> <li>• Alkaloids derived from lysine piperidine alkaloids (piper, lobelia and pomegranate alkaloids)</li> <li>• Chinolizidine alkaloids (lupinine, sparteine and cytosine)</li> <li>• Alkaloids derived from ornithine: tropan alkaloids (atropine, hyoscyamine, scopolamine and cocaine) chinazoline alkaloids (tetradoxine)</li> <li>• Alkaloids derived from glycine: purine alkaloids (caffeine, theophylline and theobromine) terpen alkaloids (monoterpen, sesquiterpen and diterpen alkaloids)</li> </ul>			
5	<b>Terpenoids</b>	<ul style="list-style-type: none"> <li>• Introduction (definition, classification, biosynthesis and distribution)</li> <li>• Monoterpenes (regular and irregular monoterpenoids, iridoids, structures, chemical and physical properties and drugs containing monoterpenoids)</li> <li>• Sesquiterpenes and sesquiterpenes lactones (structures, chemical and biological properties and drug containing sesquiterpenes and sesquiterpenes lactones)</li> <li>• Diterpenes (structures, chemical and biological properties and drug containing diterpenes)</li> <li>• Triterpenes (classification, structures and drug containing triterpenes)</li> <li>• Tetraterpenes (chemical and biological properties, vitamin A and drug containing tetraterpenes).</li> </ul>	3	6	a1, b2, b3, b4, b5
	<b>Course Review</b>	Review of the course topics by discussion session.	1	2	a1, a2, a3, a4, b1, b2, b3, b4, b5
<b>FINAL – EXAM</b>			1	2	
<b>TOTAL</b>			16	32	

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<b>Number of Weeks /and Units Per Semester</b>	16 weeks	5 Units	
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B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	alkaloids (Caffeine)	c1, c2, c3, d1, d2, d3	1	2
2	alkaloids (Theophylline)	c1, c2, c3, d1, d2, d3	1	2
3	alkaloids (cathinone)	c1, c2, c3, d1, d2, d3	1	2
4	alkaloids (Trigonelline)	c1, c2, c3, d1, d2, d3	1	2
5	alkaloids (vincristine)	c1, c2, c3, d1, d2, d3	1	2
6	alkaloids (Capsaicin)	c1, c2, c3, d1, d2, d3	1	2
7	Terpenoids: (Prenol)	c1, c2, c3, d1, d2, d3	1	2
8	Terpenoids: (Eucalyptol)	b2, b4, b5, c1, c2, c3, d1, d2	1	2
9	Terpenoids: (Retinol)	b2, b4, b5, c1, c2, c3, d1, d3	1	2
10	Terpenoids: (squalene)	b2, b4, b5, c1, c2, c3, d1, d2	1	2
11	Review	b2, b4, b5, c1, c2, c3, d1, d3	1	2
PRACTICAL EXAM		b2, b4, b5, c1, c2, c3, d1, d3	1	2
Total			12	24

### XXIX. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XXIII. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : each student will be assigned solve the problems provided by the teacher. The problems involve nomenclature, isolation, chemical reaction, etc.	c4, d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to present 2-3 videos or simulations of one of the studied extraction, isolation techniques.	c4, d1, d2, d3	14	2

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VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
TOTAL				70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b2, b4, b5, c1, c2, c3, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	b2, b4, b5, c1, c2, c3, d1, d3
Total				30	30 %	

X. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
4. Robbers, J. E., M. K. Speedie and V.E. Tyler Pharmacognosy and Pharmacobiotechnology. Baltimore, London, Paris: Williams and Wilkins, 1996.	
5. J. Bruneton: "Pharmacognosy, Phytochemistry, Medicinal Plants" Lavoisier Publishing, Intercept 2nd ed., 2008.	
<b>2- Essential References.</b>	
1. Evans, W. C., Trease and Evans Pharmacognosy, Edinburgh, London, New York, Oxford, Philadelphia, St. Louis and Toronto: 16th. Ed. Elsevier, 2010.	
2. Siman Mills, Kerry Bone, Desmond Corrigan, James A. Duke and Jonathan V. Wright, Principles and Practice of Phytotherapy, Modern Herbal Medicine, Churchill Living Stone (2000).	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://www.pubmed.com">http://www.pubmed.com</a>	
<a href="http://www.botanical.com">http://www.botanical.com</a>	
<a href="http://www.herbmed.com">http://www.herbmed.com</a>	

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XI. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus)  
**PHYTOCHEMISTRY I**  
Course Code No. (PHG321)

XVII.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Salwa Raweh	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

II. Course Description:
Phytochemistry courses are collaborative to (Pharmacognosy I, II) as all deal with plants as sources of drug and all are basis of complementary and alternative medicines. However, in contrast to Pharmacognosy courses, phytochemistry courses deal with extraction, isolation and identification of active chemical constituents (phytochemicals) present in the medicinal plants. This course concerns with 2 essential groups of phytochemicals: alkaloids, terpenoids while other phytochemicals will be covered in the next semester in (Phytochemistry II) course.

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### III. Intended learning outcomes of the course (CILOs)

#### 51. Alignment CILOs

**A: Knowledge and understanding: upon completion of the course, students will be able to:**

- a1. Explain the physicochemical properties of **alkaloids** and terpenoids phytochemicals.
- a2. Discuss the methods and techniques used to extract and isolate phytochemicals
- a3. Define the botanical sources and therapeutic uses of alkaloids and terpenoids phytochemicals.
- a4. Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.

**B: Intellectual skills: upon completion of the course, students will be able to:**

- b1. Express the chemical structure of phytochemicals using drawings.
- b2. Differentiate between various types of alkaloids and terpenoids.
- b3. Classify alkaloids and terpenoids.
- b4. Compare between different types of alkaloids and terpenoids
- b5. Select standard operation procedure to extract, isolate and identify alkaloids and terpenoids in a plant sample

**C: Professional and practical skills: upon completion of the course, students will be able to:**

- c1. Handle efficiently and safely the chemical materials and tools used in the laboratory
- c2. Operate the instruments (Evaporator, **Soxhlet**, Grinder, Dryer and others) and perform experiments successfully in the laboratory.
- c3. Screen for alkaloid and terpenoid drugs from plant sources.
- c4. Search efficiently for information using documented and electronic sources of information.

**D: Transferable skills: upon completion of the course, students will be able to:**

- d1. Communicate effectively and behave in discipline with colleagues.
- d2. Participate efficiently with his colleagues in a team work.
- d3. Demonstrate the skills of time management and self-learning.

#### 52. Alignment CILOs to teaching strategies and assessment strategies

**(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the physicochemical properties of alkaloids and terpenoids phytochemicals.	Active Lecture	Written exam s
a2. Discuss the methods and techniques used to extract and isolate phytochemicals		
a3. Define the botanical sources and therapeutic uses of alkaloids and terpenoids phytochemicals.		

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a4. Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Express the chemical structure of phytochemicals using drawings.	Active Lecture, Feed-back learning	Written exams, quizzes
b3. Classify alkaloids and terpenoids.	Active Lecture	Written exam
b2. Differentiate between various types of alkaloids and terpenoids.	Lecture, lab. Practice	Written exams, lab. term works, final practical exam
b4. Compare between different types of alkaloids and terpenoids		
b5. Select standard operation procedure to extract, isolate and identify alkaloids and terpenoids in a plant sample		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.		
c3. Screen for alkaloid and terpenoid drugs from plant sources.		
c4. Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments,
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group project	lab. term works, final practical exam, assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.	Feed-back learning, lab. Practice	Assignments, lab. term works, final practical exam

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Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
1	Introduction to phytochemistry	<ul style="list-style-type: none"> <li>Definition, brief history, types (conventional, medicinal)</li> <li>Scope of medicinal phytochemistry</li> <li>Phytochemicals: Definition, evolution process, clarification, chemical classification, physicochemical properties</li> </ul>	1	2	a1, a2, a3, a4
2	Extraction of phytochemicals	<b>Extraction techniques</b> <ul style="list-style-type: none"> <li>Maceration, percolation, soxhlet extractor: principle, apparatus, applications</li> <li>Spouted bed extraction</li> <li>Superficial fluid extraction</li> <li>Solid-phase microextraction</li> </ul>	2	4	a1, a2, a3, a4, b1, b2
3	Separation and isolation of phytochemicals	<ul style="list-style-type: none"> <li><b>Sublimation, Distillation, Fractional liberation, Fractional crystallization:</b> principle, apparatus, applications</li> <li><b>Chromatography:</b> principle, brief history, types and selection of stationary phase and mobile phase, general factors affecting separation</li> <li><b>Adsorption chromatography: thin layer chromatography:</b> principle and procedures, applications, preparative TLC, illustrative examples of phytochemicals isolated by TLC</li> <li><b>Partition chromatography: Paper chromatography:</b> principle, procedures and application</li> <li><b>Simple Column chromatography:</b> Introduction and principle, components, procedures.</li> </ul>	3	6	a1, a2, a3, a4, b1, b2
<b>MID-TERM EXAM</b>			1	2	
4	Alkaloids	<ul style="list-style-type: none"> <li>Introduction: definition, history, occurrence, classification, nomenclature, physical and chemical properties, isolation, purification and detection.</li> <li>Phenylalkylamine alkaloids (ephedrine, cathinone and capsaicinoide)</li> </ul>	4		a4, b2, b3, b4, b5

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		<ul style="list-style-type: none"> <li>• Isochinolin alkaloids (papaverine, morphine, codeine and emetine)</li> <li>• Tropolon alkaloids (colchicines and demecolcine)</li> <li>• Amaryllidaceen alkaloids (lycorine and galanthamin)</li> <li>• Alkaloids derived from tryptophan</li> <li>• Indol-alkaloids (physostigmine, carboline, ergoline, ajmalicine, yohimbine, ajmaline and strychnine type)</li> <li>• Chinoline alkaloids (cinchona alkaloids)</li> <li>• Alkaloids derived from histidine: (pilocarpine, isopilocarpine and pilosine)</li> <li>• Alkaloids derived from asparagic acid : (ricinine and nicotine alkaloids)</li> <li>• Alkaloids derived from lysine piperidine alkaloids (piper, lobelia and pomegranate alkaloids)</li> <li>• Chinolizidine alkaloids (lupinine, sparteine and cytosine)</li> <li>• Alkaloids derived from ornithine: tropan alkaloids (atropine, hyoscyamine, scopolamine and cocaine) chinazoline alkaloids (tetradoxine)</li> <li>• Alkaloids derived from glycine: purine alkaloids (caffeine, theophylline and theobromine) terpen alkaloids (monoterpen, sesquiterpen and diterpen alkaloids)</li> </ul>		8	
5	<b>Terpenoids</b>	<ul style="list-style-type: none"> <li>• Introduction (definition, classification, biosynthesis and distribution)</li> <li>• Monoterpenes (regular and irregular monoterpenoids, iridoids, structures, chemical and physical properties and drugs containing monoterpenoids)</li> <li>• Sesquiterpenes and sesquiterpenes lactones (structures, chemical and biological properties and drug containing sesquiterpenes and sesquiterpenes lactones)</li> </ul>	3	6	a1, b2, b3, b4, b5

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	<ul style="list-style-type: none"> <li>Diterpenes (structures, chemical and biological properties and drug containing diterpenes)</li> <li>Triterpenes (classification, structures and drug containing triterpenes)</li> <li>Tetraterpenes (chemical and biological properties, vitamin A and drug containing tetraterpenes).</li> </ul>			
Course Review	Review of the course topics by discussion session.	1	2	a1,-a4, b1-b5
FINAL – EXAM		1	2	
TOTAL		16	32	
<b>Number of Weeks /and Units Per Semester</b>		16 weeks	5 Units	

<b>B - Practical Aspect:</b>				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	alkaloids (Caffeine)	c1, c2, c3, d1, d2, d3	1	2
2	alkaloids (Theophylline)	c1, c2, c3, d1, d2, d3	1	2
3	alkaloids (cathinone)	c1, c2, c3, d1, d2, d3	1	2
4	alkaloids (Trigonelline)	c1, c2, c3, d1, d2, d3	1	2
5	alkaloids (vincristine)	c1, c2, c3, d1, d2, d3	1	2
6	alkaloids (Capsaicin)	c1, c2, c3, d1, d2, d3	1	2
7	Terpenoids: (Prenol)	c1, c2, c3, d1, d2, d3	1	2
8	Terpenoids: (Eucalyptol)	b2, b4, b5, c1, c2, c3, d1, d2	1	2
9	Terpenoids: (Retinol)	b2, b4, b5, c1, c2, c3, d1, d3	1	2
10	Terpenoids: (squalene)	b2, b4, b5, c1, c2, c3, d1, d2	1	2
11	Review	b2, b4, b5, c1, c2, c3, d1, d3	1	2
PRACTICAL EXAM			1	2
<b>Total</b>			<b>12</b>	<b>24</b>

<b>XL. Teaching strategies of the course:</b>
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.</p> <p>The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student's brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Laboratory practice</b>: students doing experiments in labs individually or in small groups</p>
<p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>

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**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

XXIV. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> each student will be assigned solve the problems provided by the teacher. The problems involve nomenclature, isolation, chemical reaction, etc.	c4, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to present 2-3 videos or simulations of one of the studied extraction, isolation techniques.	c4, d1, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
TOTAL				70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b2, b4, b5, c1, c2, c3, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	b2, b4, b5, c1, c2, c3, d1, d3
Total				30	30 %	

XII. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
1. Robbers, J. E., M. K. Speedie and V.E. Tyler Pharmacognosy and Pharmacobiotechnology. Baltimore, London, Paris: Williams and Wilkins, 1996.

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2. J. Bruneton: "Pharmacognosy, Phytochemistry, Medicinal Plants" Lavoisier Publishing, Intercept 2nd ed., 2008.

### 2- Essential References.

1. Evans, W. C., Trease and Evans Pharmacognosy, Edinburgh, London, New York, Oxford, Philadelphia, St. Louis and Toronto: 16th. Ed. Elsevier, 2010.
2. Siman Mills, Kerry Bone, Desmond Corrigan, James A. Duke and Jonathan V. Wright, Principles and Practice of Phytotherapy, Modern Herbal Medicine, Churchill Living Stone (2000).

### 3- Electronic Materials and Web Sites etc.

<http://www.pubmed.com>  
<http://www.botanical.com>  
<http://www.herbmed.com>

## XIII. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of  
PHARMACOLOGY III**

Course Code No. (PHP322)

2022



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Course Specification

**PHARMACOLOGY III**

<b>I. Course Identification and General Information:</b>				
1	Course Title:	PHARMACOLOGY III		
2	Course Code & Number:	PHP322		
3	Credit Hours: 2	Credit Hours	Theory Hours	Lab. Hours
			Lecture	Exercise
		2	2	--
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> Semester		
5	Pre –Requisite (if any):	PHP316 Pharmacology II		
6	Co –Requisite (if any):	PHM326		
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy		
8	Language of Teaching the Course:	English		
9	Study System:	Semester based System		
10	Mode of Delivery:	Full Time		
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences		
12	Prepared by:	Dr. Nabil Albaser		
13	Date of Approval:	2022		

**L: lecturing ; Tut: Tutorial , S: seminar ; P: practical ; Tr.: training**

<b>II. Course Description:</b>
<p>This course is a continuation in the series of pharmacology for pharmacists. The focus of this series is on the drugs that affect the respiratory system, CNS and chemotherapeutics. The course will cover the mechanism of action, pharmacokinetic properties, contraindications and adverse effects with the emphasis on chemotherapeutics agents' mechanism of action, routes of administration, drug target, chemotherapeutic spectrum and modes of drug resistance by the pathogens.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
1. Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
<b>A3</b>	<p>Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.</p> <p><b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.</p> <p><b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.</p>
<b>A4</b>	<p>Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.</p> <p><b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.</p>
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
<b>B2</b>	<p>Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.</p> <p><b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.</p> <p><b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.</p>
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
<b>C5</b>	<p>Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.</p> <p><b>c1.</b> Advise the patient and healthcare professional to optimize medicine use</p> <p><b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.</p> <p><b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.</p>
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	

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<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Demonstrate time management and decision-making skills.
		<b>d2.</b> Interact effectively with patients, the public and health care professionals

## 2. Alignment CILOs to teaching strategies and assessment strategies

### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.		
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.		

### (b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	Active lecture	Written exams
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Active lecture, feed-back learning	Written exam , quizzes, assignments

### (c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.		
<b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.		

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**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Demonstrate time management and decision-making skills.	Feed-back learning	Assignments
d2. Interact effectively with patients, the public and health care professionals		

**Course Content:**

Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
1	Respiratory pharmacology	Drug therapy of Bronchial Asthma and COPD	1	2	a1, a3, b1, b2, c1, c2, c3, d1, d2
		Drug therapy of Allergic Rhinitis, common cold and cough therapy	1	2	
2	CNS pharmacology	Introduction to the Pharmacology of CNS Drugs	1	2	a1, a3, b1, b2, c1, c2, c3, d1, d2
		Sedative & Hypnotic drugs	1	2	
		Antidepressants	1	2	
		Anti-seizure Drugs	1	2	
		Antipsychotic agents & Lithium	1	2	
<b>Mid-term exam</b>			1	2	
		Drugs of Abuse	1	2	
3	Chemotherapeutics	Beta-Lactam & Other Cell Wall- & Membrane-Active Antibiotics	1	2	a1, a3, b1, b2, c1, c2, c3, d1, d2
		Tetracyclines, Macrolides, Clindamycin, Chloramphenicol, Streptogramins, & Oxazolidinones	1	2	
		Aminoglycosides & Spectinomycin, Sulfonamides,	1	2	
		Trimethoprim, & Quinolones	1	2	
		Antimycobacterial Drugs	1	2	
		Miscellaneous Antimicrobial Agents; Disinfectants, Antiseptics, & Sterilant	1	2	
		<b>FINAL – EXAM</b>			
<b>TOTAL</b>			16	32	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ameen Alwossabi	Dr. Anes Thabit	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





## V. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

## VI. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g. CVS patients, renal failure patients, etc.	b1, c1, d1	6-12

## VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	b1, c1, d1
2	Mid-term exam (written exam)		7	20	20	a1, a2, a3, b1, d1
3	Final exam (written exam)		16	60	60	a1, a2, a3, b1, d1
TOTAL				100	100 %	

## VIII. Learning Resources:

### 1- Required Textbook(s) ( maximum two ).

37. Basic & Clinical & Pharmacology, ed. Katzung, 13th edition, 2017. McGraw-Hill Medical. ISBN-13: 978-0071825054

38. Rang, Dale and Ritter. Pharmacology, (2015), Churchill Livingstone.

### 2- Essential References.

10. Richard A. Harvey. Lippincott's pharmacology, 2014, Lippincott William and Wilkins.

### 3- Electronic Materials and Web Sites etc.

Access Pharmacy: <http://accesspharmacy.mhmedical.com/>

[https://link.springer.com/chapter/10.1007/978-981-32-9779-1\\_4](https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4)

<https://accessmedicine.mhmedical.com/content.aspx?bookid=371&sectionid=41587611>

<https://clinicalgate.com/principles-of-drug-action/>

<https://libguides.tulane.edu/pharm>

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IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
PHARMACOLOGY III  
Course Code No. (PHP322)

XVIII.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Nabil Albaser	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

XXIX. Course Description:
This course is a continuation in the series of pharmacology for pharmacists. The focus of this series is on the drugs that affect the respiratory system, CNS and chemotherapeutics. The course will cover the mechanism of action, pharmacokinetic properties, contraindications and adverse effects with the emphasis on chemotherapeutics agents mechanism of action, routes of administration, drug target, chemotherapeutic spectrum and modes of drug resistance by the pathogens.

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XXX. Intended learning outcomes of the course (CILOs)
<b>3. Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
a1. Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.
a2. Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.
a3. Describe the role of pharmacist in providing correct information on rational use of medications.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:
b1. Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.
b2. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
c1. Advise the patient and healthcare professional to optimize medicine use
c2. Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.
c3. Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:
d1. Demonstrate time management and decision-making skills.
d2. Interact effectively with patients, the public and health care professionals.

4. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	Active lecture	Written exams
a2. Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.		
a3. Describe the role of pharmacist in providing correct information on rational use of medications.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies

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<b>b1.</b> Utilize pharmacological basis of therapeutics in the proper selection and use of drugs in various disease conditions.	Active lecture	Written exams
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Active lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>c2.</b> Use properly the pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.		
<b>c3.</b> Select the appropriate medication therapy for a given diseases based on its etiology, pathophysiology, patient medical history, possible interactions and age-related factors.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate time management and decision-making skills.	Feed-back learning	Assignments
<b>d2.</b> Interact effectively with patients, the public and health care professionals		

<b>Course Content:</b>					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	contact hours	CILOs
1	<b>Respiratory pharmacology</b>	Drug therapy of Bronchial Asthma and COPD	1	2	a1, a3, b1,
		Drug therapy of Allergic Rhinitis, common cold and cough therapy	1	2	b2, c1, c2, c3, d1, d2
2	<b>CNS pharmacology</b>	Introduction to the Pharmacology of CNS Drugs	1	2	a1, a3, b1,
		Sedative & Hypnotic drugs	1	2	b2, c1,
		Antidepressants	1	2	c2, c3,
		Anti-seizure Drugs	1	2	d1, d2
		Antipsychotic agents & Lithium	1	2	
<b>Mid-term exam</b>			1	2	
		Drugs of Abuse	1	2	

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3	Chemotherapeutics	Beta-Lactam & Other Cell Wall- & Membrane-Active Antibiotics	1	2	a1, a3, b1, b2, c1, c2, c3, d1, d2
		Tetracyclines, Macrolides, Clindamycin, Chloramphenicol, Streptogramins, & Oxazolidinones	1	2	
		Aminoglycosides & Spectinomycin, Sulfonamides,	1	2	
		Trimethoprim, & Quinolones	1	2	
		Antimycobacterial Drugs	1	2	
		Miscellaneous Antimicrobial Agents; Disinfectants, Antiseptics, & Sterilant	1	2	
FINAL – EXAM			1	2	
TOTAL			16	32	

### VI. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### VII. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g. CVS patients, renal failure patients, etc.	b1, c1, d1	6-12

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	b1, c1, d1
2	Mid-term exam (written exam)	7	20	20	a1, a2, a3, b1, d1	
3	Final exam (written exam)	16	60	60	a1, a2, a3, b1, d1	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ameen Alwossabi	Dr. Anes Thabit	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



TOTAL	100	100 %	
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X. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
1. Basic & Clinical & Pharmacology, ed. Katzung, 13th edition, 2017. McGraw-Hill Medical. ISBN-13: 978-0071825054	
2. Rang, Dale and Ritter. Pharmacology, (2015), Churchill Livingstone.	
<b>2- Essential References.</b>	
1. Richard A. Harvey. Lippincott's pharmacology, 2014, Lippincott William and Wilkins.	
<b>3- Electronic Materials and Web Sites etc.</b>	
Access Pharmacy: <a href="http://accesspharmacy.mhmedical.com/">http://accesspharmacy.mhmedical.com/</a> <a href="https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4">https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4</a> <a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611">https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611</a> <a href="https://clinicalgate.com/principles-of-drug-action/">https://clinicalgate.com/principles-of-drug-action/</a> <a href="https://libguides.tulane.edu/pharm">https://libguides.tulane.edu/pharm</a>	

XI. Course Policies: (Based on the Uniform Students' By law (2007))	
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعلیم العالی والبحث العلمی  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICS III**  
Course No. (PHT323)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutics III			
2	Course Code & Number:	PHT323			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	2
4	Study Level/ Semester at which this Course is offered:	Third Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHT312			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ameen Alwossabi			
13	Date of Approval:	2022			

II. Course Description:
<p>This course is the Third and last part of “Pharmaceutics” courses which all are intended to provide the student with knowledge in preformulation, formulation and preparation of pharmaceutical dosage forms in small and large scales. The course concerns mainly with solid dosage forms including powders, granules, tablets and capsules. The course also covers specific type of dosage forms: sterile pharmaceutical products, which requires strict aseptic techniques to prevent contamination of the products from pathogens. The practical part provides the student with skills to prepare those dosage forms in the Pharmaceutics Lab.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies		
1. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
A2.	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	a1. Describe the advantages and disadvantages, types, classification of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
A3.	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a2. Describe the stages of designing sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
		a3. Describe the role of pharmacist in formulation sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
A1.	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a4. Recognize the different additives used in manufacturing of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
A4.	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a5. Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
B2.	B2. Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and	b1. Classify sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
		b2. Compare between various types of sterile pharmaceutical parenteral

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	biopharmaceutical materials/products according to GLP and GMP guidelines.	preparations and solid dosage forms. (powders, granules, capsules, tablets) <b>b3.</b> Design sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1.</b>	<b>C1.</b> Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Operate the instruments and perform experiments successfully in the laboratory <b>c2.</b> Employ the relevant way to prepare sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets). <b>c3.</b> Formulate, label and evaluate of sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).
<b>D: Transferable skills :</b> Upon successful completion of the course, students will be able to:		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Participate efficiently with his colleagues in a teamwork. <b>d2.</b> Demonstrate the skills of time management and self-learning. <b>d3.</b> Communicate effectively and behave in discipline with colleagues.

## 2. Alignment CILOs to teaching strategies and assessment strategies

### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Describe the advantages and disadvantages, types, classification of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)	Active Lecture	Written exams
<b>a2.</b> Describe the stages of designing sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>a3.</b> Describe the role of pharmacist in formulation sterile pharmaceutical parenteral		

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preparations and solid dosage forms. (powders, granules, capsules, tablets)		
a4. Recognize the different additives used in manufacturing of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
a5. Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Classify sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)	Active Lecture , Feed-back learning	Written exams, quizzes
b2. Compare between various types of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
b3. Design sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Operate the instruments and perform experiments successfully in the laboratory	Laboratory practice Feed-back learning, Group-project	Lab. term works, final practical exam Assignments
c2. Employ the relevant way to prepare sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).		
c3. Formulate, label and evaluate of sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Participate efficiently with his colleagues in a teamwork.		Practical assessment (Lab.

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d2. Demonstrate the skills of time management and self-learning.	Laboratory practice, group-project	attendance, attitude, practical exam), Assignments
d3. Communicate effectively and behave in discipline with colleagues.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

Course Content:					
A. Theoretical Aspect:					
No.	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Solid dosage forms: (1) : Introduction &amp; Powders</b>	<b>Introduction</b> <ul style="list-style-type: none"> <li>○ Classifications of dosage forms</li> <li>○ Advantages and disadvantages</li> <li>○ Formulation consideration</li> </ul> <b>Powders</b> <ul style="list-style-type: none"> <li>○ Definitions, advantages, disadvantages</li> <li>○ Classification (coarse, fine, microfine, etc.; divided, bulk; compounded; medicated, cosmetic)</li> <li>○ Formulation considerations</li> <li>○ Bulk powder, divided powder and Dusting powder:: formulation, examples</li> <li>○ Powders packaging</li> <li>○ Quality control evaluation</li> </ul>	2	4	a1, a2, a3, b1, b2
2	<b>Solid dosage forms: (2) Granules</b>	<b>Granules</b> <ul style="list-style-type: none"> <li>○ Definition, advantages, disadvantages</li> <li>○ Method of preparation</li> <li>○ Formulation considerations</li> </ul> <b>Effervescent granules</b> <ul style="list-style-type: none"> <li>○ Definition, composition</li> <li>○ Method of preparation: dry (fusion) method, wet method</li> <li>○ Determination of the required quantity of effervescent base in the formulation</li> </ul>	1	2	a1, a3, a4, a5, b1, b3

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3	<b>Solid dosage forms: (3) Tablets</b>	<b>Tablets</b> <ul style="list-style-type: none"> <li>○ Advantages and disadvantages.</li> <li>○ Types and Ideal properties of tablets</li> <li>○ Tablet excipients</li> <li>○ Tableting methods</li> <li>○ Steps, advantages and disadvantages (Direct compression, Dry granulation, Wet granulation)</li> <li>○ Tablet press machines</li> <li>○ Problems encountered during tablet formulation.</li> <li>○ Tablet coating</li> <li>○ Sugar coating , Film coating, Enteric coating, extended release coating : advantages, disadvantages, coating materials, process of coatings</li> <li>○ Quality evaluation</li> </ul>	5	10	a1, a2, a3, a5, b2, b3
<b>Mid-Term Exam</b>			1	2	
4	<b>Solid dosage forms: (4) Capsules</b>	<b>i. Hard gelatin capsules</b> <ul style="list-style-type: none"> <li>○ Advantages and disadvantages</li> <li>○ Composition of capsule shell</li> <li>○ Types of capsule fill</li> <li>○ Selection of capsule size.</li> <li>○ Excipients used in hard gelatin capsule formulation.</li> <li>○ Capsule filling process.</li> <li>○ Storage of hard gelatin capsules.</li> </ul> <b>ii. Soft gelatin capsules</b> <ul style="list-style-type: none"> <li>○ Advantage and disadvantages.</li> <li>○ Capsule shell composition.</li> <li>○ Types of capsule fill</li> <li>○ Shapes and sizes.</li> <li>○ Soft gelatin capsule formulation.</li> <li>○ Capsule filling process</li> <li>○ Specific properties: O<sub>2</sub> impermeability, water content</li> </ul>	3	6	a1, a2, a4, a5, b1, b2
5	<b>Sterile pharmaceutical dosage forms: Introduction</b>	<b>Differences between sterile &amp; non-sterile dosage forms :</b> <ul style="list-style-type: none"> <li>○ Definition: sterility, sterilization, preservation, pyrogenicity, pyrogen-free</li> </ul>	1	2	a1, a2, a3, b2, b3

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		<ul style="list-style-type: none"> <li>○ Review of sterilization methods and preservation of dosage forms</li> <li>○ Aseptic techniques</li> <li>○ Sources of contamination and methods of prevention</li> <li>○ Design of aseptic area , Laminar flow benches services and maintenance)</li> <li>○ Isotonicity of sterile preparations and methods of adjustment</li> </ul>			
6	<b>Sterile pharmaceutical Parenteral preparations</b>	<ul style="list-style-type: none"> <li>○ Preformulation factors <ul style="list-style-type: none"> <li>● Route of administration of injection</li> <li>● Water for injection</li> <li>● Non-aqueous vehicles</li> </ul> </li> <li>○ Formulation consideration <ul style="list-style-type: none"> <li>● Formulation of Infusion fluids</li> </ul> </li> <li>○ Prefilling, filling and package (small and large scale) <ul style="list-style-type: none"> <li>● Quality evaluation</li> </ul> </li> </ul>	2	4	a1, a2, a3, a5, b1, b3
<b>FINAL - EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	5 Units	

**B. Practical Aspect:**

Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Intended Learning Outcomes CILOs
1	<b>Preparation of Dusting powders</b>	1	2	<b>b1, c1,c2, c3, d1</b>
2	<b>Preparation of Effervescent base granules</b>	1	2	b3, c1,c2, c3, d2
3	<b>Preparation of tablets using wet granulation method : paracetamol tablets</b>	1	2	b3, c1,c2, c3, d1, d2
4	<b>Preparation of tablets using wet granulation method : mefenamic acid tablets</b>	1	2	b3, c1,c2, c3, d1, d3
5	<b>Preparation of tablets using direct compression method : aspirin tablets</b>	1	2	b2, c1,c2, c3, d2, d3
6	<b>film-coating of tablets mefenamic acid</b>	1	2	b3, c1,c2, c3, d1, d3

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7	Preparation of hard gelatin capsules (Manual): aspirin	1	2	b1, c1,c2, c3, d1, d2
8	Preparation of hard gelatin capsules (Manual): paracetamol	1	2	b3, c1,c2, c3, d2, d3
9	Preparation of I.V. admixtures : DNS + vitamin C + vitamin B complex	1	2	b3, c1,c2, c3, d3
10	Preparation of parenteral solutions from parenteral powders : reconstitution of cefuroxime sodium vial	1	2	b3, c1,c2, c3, d2, d3
Practical Exam		1	2	
<b>Total</b>		<b>11</b>	<b>22</b>	

### XLI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

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<b>XXII. Assignments:</b>			
No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied dosage forms	c4, c5, d2	7
2	<b>Group :</b> every group is assigned to present an illustrating videos on lab. And industrial preparation of 3 types of studies dosage forms.	c4, c5, d1, d2, d3	12

<b>XXIII. Schedule of Assessment Tasks for Students During the Semester</b>						
<b>Theoretical part assessment</b>						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	c2, c3, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam		7	10	10	a1, a2, a3, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b2, b3
<b>TOTAL</b>				<b>70</b>	<b>70 %</b>	

<b>Practical part assessment</b>						
No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d1, d2, d3
<b>Total</b>				<b>30</b>	<b>30 %</b>	

<b>XXIV. Learning Resources</b>	
<b>1- Required Textbook(s) ( maximum two ).</b>	

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- 4 Aulton's Pharmaceuticals The Design and Manufacture of Medicines, 2018, Elsevier Ltd
- 5 Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK

### 2- Essential References.

39. Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA
40. United States pharmacopeia (USP-41, NF 36), 2018, the United States Pharmacopoeial Convention.

### 3- Electronic Materials and Web Sites etc.

Article from:

- www.emedicine.com  
www.sciencedirect.com  
www.blackwell.com  
www.ovid.com  
www.pubmed.com  
<http://slideplayer.com/slide/4385584/>  
<http://slideplayer.com/slide/4434636/>  
<http://slideplayer.com/slide/5274453/>  
<http://slideplayer.com/slide/4434619/>  
<http://slideplayer.com/slide/6428232/>

## VIII. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>7</b>	<b>Other policies:</b>

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The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة



Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of :  
**PHARMACEUTICS III**  
Course code (**PHT323**)

<b>I. Information about Faculty Member Responsible for the Course:</b>							
<b>Name of Faculty Member</b>	Dr. Ameen Alwossabi	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
<p>This course is the Third and last part of “Pharmaceutics” courses which all are intended to provide the student with knowledge in preformulation, formulation and preparation of pharmaceutical dosage forms in small and large scales. The course concerns mainly with solid dosage forms including powders, granules, tablets and capsules. The course also covers specific type of dosage forms: sterile pharmaceutical products, which requires strict aseptic techniques to prevent contamination of the products from pathogens. The practical part provides the student with skills to prepare those dosage forms in the Pharmaceutics Lab.</p>

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IV. The Course Intended Learning Outcomes (CILOs)
<b>3. Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
<b>a1.</b> Describe the advantages and disadvantages, types, classification of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>a2.</b> Describe the stages of designing sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>a3.</b> Describe the role of pharmacist in formulation sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>a4.</b> Recognize the different additives used in manufacturing of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>a5.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:
<b>b1.</b> Classify sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>b2.</b> Compare between various types of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>b3.</b> Design sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
<b>c1.</b> Operate the instruments and perform experiments successfully in the laboratory
<b>c2.</b> Employ the relevant way to prepare sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).
<b>c3.</b> Formulate, label and evaluate of sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).
<b>D: Transferable skills :</b> Upon successful completion of the course, students will be able to:
<b>d1.</b> Participate efficiently with his colleagues in a teamwork.
<b>d2.</b> Demonstrate the skills of time management and self-learning.
<b>d3.</b> Communicate effectively and behave in discipline with colleagues.

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<b>4. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Describe the advantages and disadvantages, types, classification of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)	Active Lecture	Written exams
<b>a2.</b> Describe the stages of designing sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>a3.</b> Describe the role of pharmacist in formulation sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>a4.</b> Recognize the different additives used in manufacturing of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>a5.</b> Discuss the principles, pharmacopoeial requirements, and methods of preparation, of various types' sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)	Active Lecture , Feed-back learning	Written exams, quizzes
<b>b2.</b> Compare between various types of sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>b3.</b> Design sterile pharmaceutical parenteral preparations and solid dosage forms. (powders, granules, capsules, tablets)		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Operate the instruments and perform experiments successfully in the laboratory	Laboratory practice	

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c2. Employ the relevant way to prepare sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).	Feed-back learning, Group-project	Lab. term works, final practical exam Assignments
c3. Formulate, label and evaluate of sterile pharmaceutical parenteral preparations and solid dosage forms. (Powders, granules, capsules, tablets).		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Participate efficiently with his colleagues in a teamwork.	Laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d2. Demonstrate the skills of time management and self-learning.		
d3. Communicate effectively and behave in discipline with colleagues.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments

Course Content:					
C. Theoretical Aspect:					
No.	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Solid dosage forms: (1) : Introduction &amp; Powders</b>	<b>Introduction</b> <ul style="list-style-type: none"> <li>○ Classifications of dosage forms</li> <li>○ Advantages and disadvantages</li> <li>○ Formulation consideration</li> </ul> <b>Powders</b> <ul style="list-style-type: none"> <li>○ Definitions, advantages, disadvantages</li> <li>○ Classification (coarse, fine, microfine, etc.; divided, bulk; compounded; medicated, cosmetic)</li> <li>○ Formulation considerations</li> <li>○ Bulk powder, divided powder and Dusting</li> </ul>	2	4	a1, a2, a3, b1, b2

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		powder:: formulation, examples ○ Powders packaging ○ Quality control evaluation			
2	<b>Solid dosage forms: (2) Granules</b>	<b>Granules</b> ○ Definition, advantages, disadvantages ○ Method of preparation ○ Formulation considerations <b>Effervescent granules</b> ○ Definition, composition ○ Method of preparation: dry (fusion) method, wet method ○ Determination of the required quantity of effervescent base in the formulation	1	2	a1, a3, a4, a5, b1, b3
3	<b>Solid dosage forms: (3) Tablets</b>	<b>Tablets</b> ○ Advantages and disadvantages. ○ Types and Ideal properties of tablets ○ Tablet excipients ○ Tableting methods ○ Steps, advantages and disadvantages (Direct compression, Dry granulation, Wet granulation) ○ Tablet press machines ○ Problems encountered during tablet formulation. ○ Tablet coating ○ Sugar coating , Film coating, Enteric coating, extended release coating : advantages, disadvantages, coating materials, process of coatings ○ Quality evaluation	5	10	a1, a2, a3, a5, b2, b3
<b>Mid-Term Exam</b>			1	2	
4	<b>Solid dosage forms: (4) Capsules</b>	<b>iii. Hard gelatin capsules</b> ○ Advantages and disadvantages ○ Composition of capsule shell ○ Types of capsule fill ○ Selection of capsule size. ○ Excipients used in hard gelatin capsule formulation. ○ Capsule filling process. ○ Storage of hard gelatin capsules. <b>iv. Soft gelatin capsules</b>	3	6	a1, a2, a4, a5, b1, b2

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		<ul style="list-style-type: none"> <li>○ Advantage and disadvantages.</li> <li>○ Capsule shell composition.</li> <li>○ Types of capsule fill</li> <li>○ Shapes and sizes.</li> <li>○ Soft gelatin capsule formulation.</li> <li>○ Capsule filling process</li> <li>○ Specific properties: O<sub>2</sub> impermeability, water content</li> </ul>			
5	<b>Sterile pharmaceutical dosage forms:</b> Introduction	<p><b>Differences between sterile &amp; non-sterile dosage forms :</b></p> <ul style="list-style-type: none"> <li>○ Definition: sterility, sterilization, preservation, pyrogenicity, pyrogen-free</li> <li>○ Review of sterilization methods and preservation of dosage forms</li> <li>○ Aseptic techniques</li> <li>○ Sources of contamination and methods of prevention</li> <li>○ Design of aseptic area , Laminar flow benches services and maintenance)</li> <li>○ Isotonicity of sterile preparations and methods of adjustment</li> </ul>	1	2	a1, a2, a3, b2, b3
6	<b>Sterile pharmaceutical Parenteral preparations</b>	<ul style="list-style-type: none"> <li>○ Preformulation factors <ul style="list-style-type: none"> <li>● Route of administration of injection</li> <li>● Water for injection</li> <li>● Non-aqueous vehicles</li> </ul> </li> <li>○ Formulation consideration <ul style="list-style-type: none"> <li>● Formulation of Infusion fluids</li> </ul> </li> <li>○ Prefilling, filling and package (small and large scale) <ul style="list-style-type: none"> <li>● Quality evaluation</li> </ul> </li> </ul>	2	4	a1, a2, a3, a5, b1, b3
<b>FINAL – EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	5 Units	

**D. Practical Aspect:**

Order	Tasks/ Experiments	Number of Weeks	contact hours	Aligned Course Intended Learning Outcomes CILOs
1	Preparation of Dusting powders	1	2	b1, c1, c2, c3, d1

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2	Preparation of Effervescent base granules	1	2	b3, c1,c2, c3, d2
3	Preparation of tablets using wet granulation method : paracetamol tablets	1	2	b3, c1,c2, c3, d1, d2
4	Preparation of tablets using wet granulation method : mefenamic acid tablets	1	2	b3, c1,c2, c3, d1, d3
5	Preparation of tablets using direct compression method : aspirin tablets	1	2	b2, c1,c2, c3, d2, d3
6	film-coating of tablets mefenamic acid	1	2	b3, c1,c2, c3, d1, d3
7	Preparation of hard gelatin capsules (Manual): aspirin	1	2	b1, c1,c2, c3, d1, d2
8	Preparation of hard gelatin capsules (Manual): paracetamol	1	2	b3, c1,c2, c3, d2, d3
9	Preparation of I.V. admixtures : DNS + vitamin C + vitamin B complex	1	2	b3, c1,c2, c3, d3
10	Preparation of parenteral solutions from parenteral powders : reconstitution of cefuroxime sodium vial	1	2	b3, c1,c2, c3, d2, d3
Practical Exam		1	2	
Total		11	22	

## XLII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

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XXV. Assignments:			
No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied dosage forms	c4, c5, d2	7
2	<b>Group :</b> every group is assigned to present an illustrating videos on lab. And industrial preparation of 3 types of studies dosage forms.	c4, c5, d1, d2, d3	12

XXVI. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	c2, c3, d1, d2, d3
2	Mid-semester exam of theoretical part ( written exam)		7	10	10	a1, a2, a3, b1
3	Final exam of theoretical part ( written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b2, b3
TOTAL				70	70 %	

Practical part assessment						
No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	
3	Final exam (practical)		12	20	20	c1, c2, c3, d1, d2, d3
Total				30	30 %	

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<b>XVII. Learning Resources</b>	
<b>1- Required Textbook(s) ( maximum two ).</b>	
6	Aulton's Pharmaceutics The Design and Manufacture of Medicines, 2018, Elsevier Ltd
7	Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK
<b>2- Essential References.</b>	
41.	Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA
42.	United States pharmacopeia (USP-41, NF 36), 2018, the United States Pharmacopoeial Convention.
<b>3- Electronic Materials and Web Sites etc.</b>	
<p><u>Article from:</u>  <a href="http://www.emedicine.com">www.emedicine.com</a>  <a href="http://www.sciencedirect.com">www.sciencedirect.com</a>  <a href="http://www.blackwell.com">www.blackwell.com</a>  <a href="http://www.ovid.com">www.ovid.com</a>  <a href="http://www.pubmed.com">www.pubmed.com</a>  <a href="http://slideplayer.com/slide/4385584/">http://slideplayer.com/slide/4385584/</a>  <a href="http://slideplayer.com/slide/4434636/">http://slideplayer.com/slide/4434636/</a>  <a href="http://slideplayer.com/slide/5274453/">http://slideplayer.com/slide/5274453/</a>  <a href="http://slideplayer.com/slide/4434619/">http://slideplayer.com/slide/4434619/</a>  <a href="http://slideplayer.com/slide/6428232/">http://slideplayer.com/slide/6428232/</a></p>	

<b>IX. Course Policies: (Based on the Uniform Students' By law (2007)</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>7</b>	<b>Other policies:</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albagali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

Department of **Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

**Therapeutics- I**

Course Code No. (PHP324)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.





Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



I. Course Identification and General Information:					
1	Course Title:	Therapeutics- I			
2	Course Code & Number:	PHP324			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Pharmacology III			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:	2022			

II. Course Description:
This course acts as an integration of all information about etiology, pathophysiology, and pharmacology to analyze and interpret patient's history and laboratory investigation altogether with the clinical picture of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**3. Alignment PILOs to CILOs**

PILOS		CILOS
<b>A. Knowledge and Understanding:</b>		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a2. Define the desired outcomes of drug therapy of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.
<b>B. Intellectual Skills:</b>		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b1. Construct appropriate drugs regimens and monitoring plan of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.
<b>C. Professional and Practical Skills:</b>		
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	c1. Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders
<b>D. Transferable Skills:</b>		

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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D3	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d1. Search efficiently for required medical information in professional medical references and sites.
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d2. Share successfully therapeutic decisions with a healthcare team and patients

4. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1-</b> Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
<b>a2-</b> Define the desired outcomes of drug therapy of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1-</b> Construct appropriate drugs regimens and monitoring plan of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.	Lecture Instructor – student Interactive Exercises Solving Problem Methods	Problem-Solving Exercises. Assignment Quiz
(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>C1-</b> Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of the	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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Gastrointestinal, Endocrine, and Bone and Joint Disorders	Cardiovascular,		
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>	
<b>d1-</b> Search efficiently for required medical information in professional medical references and sites.	Self-Learning Seminar Exercises	Presentation Assignment Quiz	
<b>d2-</b> Share successfully therapeutic decisions with a healthcare team and patients	Seminar Instructor–student Interactive Exercises	Presentation	

<b>II. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
<b>1</b>	<b>Gastrointestinal Disorders</b>	a 1, a2, b1, c1, d1	▪ Peptic Ulcer Disease	1	2
		a 1, a2, b1, c1, d2	▪ GERD	1	2
		a 1, a2, b1, c1, d1	▪ Portal Hypertension & Cirrhosis	1	2
		a 1, a2, b1, c1, d1	▪ Viral Hepatitis	1	2
<b>2</b>	<b>Cardiovascular Disorders</b>	a 1, a2, b1, c1, d2	▪ Hypertension (HTN)	1	2
		a 1, a2, b1, c1, d2	▪ Coronary Heart Disease(CHD)	1	2
		a 1, a2, b1, c1, d2	▪ Congestive heart failure (CHF)	1	2
<b>3</b>	<b>Midterm Exam</b>	a 1, a2, b1, c1, d1, d2		1	2
<b>4</b>	<b>CVD</b>	a 1, a2, b1, c1, d1	▪ Cardiac Arrhythmias	1	2

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		a 1, a2, b1, c1, d1	▪ Thrombosis (VTE)	1	2
5	Endocrine Disorders	a 1, a2, b1, c1, d2	▪ Diabetes mellitus	1	2
		a 1, a2, b1, c1, d2	▪ Thyroid Disorders	1	2
6	Bone and Joint Disorders	a 1, a2, b1, c1, d2	▪ Osteoporosis	1	2
		a 1, a2, b1, c1, d2	▪ Gout & Hyperuricemia	1	2
		a 1, a2, b1, c1, d2	▪ Rheumatoid Arthritis	1	2
7	Final Exam	a 1, a2, b1, c1, d1, d2		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

### B. Case Studies and Practical Aspect:

#### V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

#### VI. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

#### VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 1: Each student presents selected case in CVD	a 1, a2, b1, c1, d1, d2	6 <sup>th</sup>	5
2	Assignment 2: Each students group present	a 1, a2, b1, c1, d1, d2	12 <sup>th</sup>	5

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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selected cases discussion on selected GIT topic			
Total			10

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6th, 12th	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
3	Midterm Exam	Week 7	20	20%	a 1, a2, b1, c1, d1
4	Quiz 2	12 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
5	Final Exam (Theory)	Week 16	60	60%	a 1, a2, b1, c1, d1
Total			100	100%	

### IX. Learning Resources:

•Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).

#### 1- Required Textbook(s) ( maximum two ).

Chisholm-Burns et al, 2019. Pharmacotherapy principles & practice. ed. , 5<sup>th</sup> edition  
Katzung, 2018. Basic & Clinical Pharmacology, ed., 14th edition.

#### 2- Essential References.

1 -DiPiro et al, 11th edition, 2020. Pharmacotherapy: A Pathophysiologic Approach, ed. 11th edition.  
2. Carolin, 2018. Applied Therapeutics: The Clinical Use of Drugs, 11th edition  
3. Walker & Whittlesea, 6th edition, 2018. Clinical Pharmacy and Therapeutics  
Walker & Whittlesea, 6th edition, 2018.

#### 3- Electronic Materials and Web Sites etc.

1 -[www.accesspharmacy.com](http://www.accesspharmacy.com)  
2 -Disease management guidelines (specified in lecture notes)

### X. Course Policies: (Based on the Uniform Students' By law (2007))

1	Class Attendance:
---	-------------------

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



	Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Faculty of Medicine and Health Sciences

Department of Pharmacy

Program of **Pharmacy**

Course Plan (Syllabus) of :

# Therapeutics- I

Course Code No. ( PHP324)

2022

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Ali Alyahawi	Office Hours					
Location & Telephone No.:	775957401						
E-mail:	alyahawipharm@yahoo.com	SA T	SU N	MO N	TU E	WE D	TH U

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



I. Course Identification and General Information:					
1	Course Title:	Therapeutics- I			
2	Course Code & Number:	PHP324			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Pharmacology III			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:	2022			

II. Course Description:
This course acts as an integration of all information about etiology, pathophysiology, and pharmacology to analyze and interpret patient's history and laboratory investigation altogether with the clinical picture of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**5. Alignment PILOs to CILOs**

PILOS	CILOS
<b>A. Knowledge and Understanding:</b>	
a1. Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders	
a2. Define the desired outcomes of drug therapy of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.	
<b>B. Intellectual Skills:</b>	
b1. Construct appropriate drugs regimens and monitoring plan of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.	
<b>C. Professional and Practical Skills:</b>	
c1. Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders	
<b>D. Transferable Skills:</b>	
d1. Search efficiently for required medical information in professional medical references and sites.	
d2. Share successfully therapeutic decisions with a healthcare team and patients	

**6. Alignment CILOs to teaching strategies and assessment strategies**

**(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1-</b> Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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a2- Define the desired outcomes of drug therapy of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
<b>(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1- Construct appropriate drugs regimens and monitoring plan of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders.	Lecture Instructor – student Interactive Exercises Solving Problem Methods	Problem-Solving Exercises. Assignment Quiz
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1- Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of the Gastrointestinal, Cardiovascular, Endocrine, and Bone and Joint Disorders	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1- Search efficiently for required medical information in professional medical references and sites.	Self-Learning Seminar Exercises	Presentation Assignment Quiz
d2- Share successfully therapeutic decisions with a healthcare team and patients	Seminar Instructor–student Interactive Exercises	Presentation

### III. Course Content:

#### A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	Gastrointestinal Disorders	a 1, a2, b1, c1, d1	▪ Peptic Ulcer Disease	1	2
		a 1, a2, b1, c1, d2	▪ GERD	1	2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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		a 1, a2, b1, c1, d1	▪ Portal Hypertension & Cirrhosis	1	2
		a 1, a2, b1, c1, d1	▪ Viral Hepatitis	1	2
2	Cardiovascular Disorders	a 1, a2, b1, c1, d2	▪ Hypertension (HTN)	1	2
		a 1, a2, b1, c1, d2	▪ Coronary Heart Disease(CHD)	1	2
		a 1, a2, b1, c1, d2	▪ Congestive heart failure (CHF)	1	2
3	Midterm Exam	a 1, a2, b1, c1, d1, d2		1	2
4	CVD	a 1, a2, b1, c1, d1	▪ Cardiac Arrhythmias	1	2
		a 1, a2, b1, c1, d1	▪ Thrombosis (VTE)	1	2
5	Endocrine Disorders	a 1, a2, b1, c1, d2	▪ Diabetes mellitus	1	2
		a 1, a2, b1, c1, d2	▪ Thyroid Disorders	1	2
6	Bone and Joint Disorders	a 1, a2, b1, c1, d2	▪ Osteoporosis	1	2
		a 1, a2, b1, c1, d2	▪ Gout & Hyperuricemia	1	2
		a 1, a2, b1, c1, d2	▪ Rheumatoid Arthritis	1	2
7	Final Exam	a 1, a2, b1, c1, d1, d2		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

### B. Case Studies and Practical Aspect:

### V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





Seminar Assignment Self-Learning
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VI. Assessment Methods of the Course:
Assignments Quiz Exam

VII. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Assignment 1:</b> Each student presents selected case in CVD	a 1, a2, b1, c1, d1, d2	6 <sup>th</sup>	5
2	<b>Assignment 2:</b> Each students group present selected cases discussion on selected GIT topic	a 1, a2, b1, c1, d1, d2	12 <sup>th</sup>	5
<b>Total</b>				10

VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6 <sup>th</sup> , 12 <sup>th</sup>	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
3	Midterm Exam	Week 7	20	20%	a 1, a2, b1, c1, d1
4	Quiz 2	12 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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5	Final Exam (Theory)	Week 16	60	60%	a 1, a2, b1, c1, d1
Total			100	100%	

<b>IX. Learning Resources:</b>	
<b>1- Required Textbook(s) ( maximum two ).</b>	
	7- Chisholm-Burns et al, 2019. Pharmacotherapy principles & practice. ed. , 5 <sup>th</sup> edition 8- Katzung, 2018. Basic & Clinical Pharmacology, ed., 14th edition.
<b>2- Essential References.</b>	
	1 -DiPiro et al, 11th edition, 2020. Pharmacotherapy: A Pathophysiologic Approach, ed. 11th edition. 2. Carolin, 2018. Applied Therapeutics: The Clinical Use of Drugs, 11th edition 3. Walker & Whittlesea, 6th edition, 2018. Clinical Pharmacy and Therapeutics Walker & Whittlesea, 6th edition, 2018.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1 -www.accesspharmacy.com 2 -Disease management guidelines (specified in lecture notes)

<b>X. Course Policies: (Based on the Uniform Students' By law (2007)</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL INSTRUMENTAL ANALYSIS I**  
Course No. (PHM325)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Instrumental Analysis I			
2	Course Code & Number:	PHM325			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHM317			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

XXIV. Course Description:
<p>The course provides the student with knowledge and skills of advanced analytical techniques used for analysis of substances including drugs. The course focuses on the study of principles, instrumentation and applications of advanced spectroscopic techniques (atomic absorption/emission spectroscopy, Infrared spectroscopy (IR) and mass spectroscopy (MS)) The practical part of the course provides the student with skills to operate that equipment and perform analysis of compounds by those techniques.</p>

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**1. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy	<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a2.</b> Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	<b>b2.</b> Classify advanced analytical technique based on principles of works. <b>b3.</b> Lay out the design of advanced analytical techniques.
<b>B5</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b4.</b> Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.

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<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (UV-Visible spectroscopy, NMR) and perform experiments successfully in the laboratory.
		<b>c3.</b> Practice and carry out assays of number of drugs by spectrophotometric methods.
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c4.</b> Utilize IR, NMR and mass spectrometry simulated programs to identification of drugs.
		<b>c5.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
		<b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate the skills of time management and self-learning.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.

## 2. Alignment CILOs to teaching strategies and assessment strategies

### (a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	<b>Active Lecture</b>	<b>Written exam s</b>

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a2. Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.		
a3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
b2. Classify advanced analytical technique based on principles of works.		
b3. Lay out the design of advanced analytical techniques.		
b4. Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (UV spectroscopy, NMR) and perform experiments successfully in the laboratory.		
c3. Practice and carry out assays of number of drugs by spectrophotometric methods.	feed-back learning, Group-project	Assignments
c4. Utilize IR, NMR and mass spectrometry simulated programs to identification of drugs.		
c5. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude,

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d2. Participate efficiently with his colleagues in a team work.		practical exam), Assignments
d3. Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d4. Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.		

IV. Course Contents:					
A. Theoretical Aspect:					
No	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	General principal of spectroscopy	a1, a2,a3,b3	<ul style="list-style-type: none"> <li>Wave-particle duality</li> <li>wave properties</li> <li>particulate properties.</li> <li>Line &amp; band spectrum.</li> <li>Electromagnetic spectrum.</li> <li>Absorption &amp; emission spectroscopy.</li> </ul>	1	2
2	Spectrofluorimetry	a3, b1, b3, b4	<ul style="list-style-type: none"> <li>Principle, definitions &amp; types of luminescence.</li> <li>Singlet &amp; triplet states</li> <li>Mechanism and factors affecting of fluorescence phosphorescence.</li> <li>instrumentation.</li> <li>Applications of fluorimetry in pharmacy</li> </ul>	2	4
3	Ultraviolet Visible Spectroscopy	a1,a2, b1, b2, b3, b4, d1,d2	<ul style="list-style-type: none"> <li>absorbance, transmittance, molar absorptivity, <math>\lambda_{max}</math>, effect of solvent &amp; pH on <math>\lambda_{max}</math>. Law of absorption spectroscopy.</li> <li>Beer-Lambert law, its derivation.</li> <li>Different electronic transitions.</li> <li>Instrumentation [Single &amp; double beam spectrophotometers]</li> </ul>	3	6

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			<ul style="list-style-type: none"> <li>• Applications of UV-Vis in qualitative &amp; quantitative estimations.</li> <li>• Emphasis on problem solving.</li> </ul>		
4	<b>Atomic absorption &amp; Atomic emission spectrophotometry</b>	a1, a3, b2, b3, b4, d1, d2	<ul style="list-style-type: none"> <li>• Principle &amp; instrumentation with emphasis on working &amp; importance of different components.</li> <li>• Temperature, flame absorption &amp; emission profiles.</li> <li>• Quantitative estimations &amp; applications.</li> </ul>	2	4
5	<b>Mid-Term Exam</b>	a1, a2, b3, b1, b2, b3, b4, d1, d2		1	2
6	<b>Infrared Spectrometry</b>	a3, b1, b2, b3, d1, d2	<ul style="list-style-type: none"> <li>• Infrared region in EM spectrum.</li> <li>• Principle of different stretching &amp; bending vibrations.</li> <li>• Components [&amp; their working] of a dispersive instrument.</li> <li>• Fourier transform [FT] technique and instruments.</li> <li>• Sample handling techniques.</li> <li>• Functional group &amp; finger print regions in the spectrum.</li> <li>• Functional groups identification &amp; their use in characterization of compounds.</li> <li>• Problems on identification of functional groups from spectra of unknown compounds.</li> </ul>	3	6
7	<b>Nuclear Magnetic Resonance Spectroscopy (NMR)</b>	a2, b1, b2, b3, b4, d1, d2	<ul style="list-style-type: none"> <li>• Principle</li> <li>• Types <math>^1\text{H}</math> NMR and <math>^{13}\text{C}</math> NMR): comparison</li> <li>• Instrumentation</li> <li>• Procedures</li> <li>• Interpretation of data</li> </ul>	2	4

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8	Mass spectroscopy	a2,b1, b2, b3, d1, d2	<ul style="list-style-type: none"> <li>• Principle</li> <li>• Instrumentation</li> <li>• Procedures</li> <li>• Interpretation of data with examples</li> </ul>	1	2
9	<b>Final Theoretical Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

<b>B. Practical Aspect:</b>				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	Introduction to pharmaceutical instrumental analysis Lab.: safety requirements, list of experiments, how to report, etc.	c1, c2, c3, c4	1	2
2	Determination of absorption maxima of Fe-Bipyridine complex using ascorbic acid as antioxidant (FBAC method)	c1, c2, c3, c4, c5, d1, d2, d3	1	2
3	Determination of unknown concentration of ascorbic acid using FBAC method	c1,c2, c3,d1, d2, d3	1	2
4	Application of FBAC method on some natural antioxidant (plant extracts)	c1, c2, c3,c5, d1, d2, d3, d4	1	2
5	Assay of metformin by UV-Spectrophotometry	c1, c2, c3, c5, d1, d2, d3, d4	1	2
6	Effect of solvents on absorption of some pharmacular preparations maxima of organic compounds	c2, c3, c5, d1, d2, d3, d4	1	2
7	<b>Determination of sodium by flame photometry</b>	c1, c2, c3, c5, d1, d2, d3, d4	1	2
8	<b>Determination of potassium by flame photometry</b>	c1, c2, c3, d1, d2, d3, d4	1	2
9	<b>I.R. spectroscopy simulation and Interpretation of spectrum</b>	c1, c4, c5, d1, d2, d3, d4	1	2
10	<b>NMR spectroscopy simulation and Interpretation of spectrum</b>	c1, c4, c5,d1, d2, d3, d4	1	2
11	<b>Final exam</b>	c1, c2, c3, c4, c5,d1,d2,d3,d4	1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>11</b>	<b>22</b>

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### XLIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XVIII. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve the problems provided by the teacher at the end of each unit.	b2, c3, c4, d2, d3, d4	4-13
2	<b>Group</b> : each group of students will be assigned to provide a video of simulation of one of the analytical techniques studied. The students of each group must explain the simulation for other students.	c3, c4, d1, d2, d4	14

### XXXIX. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4.
		Assignments	7, 12	5	5	c3, c4, d1, d2, d3, d4
2	Mid-semester exam of theoretical part (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d3
3	Final exam of theoretical part (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d3
TOTAL				70	70 %	70

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Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b1, b2, b3, b4, c1, c2, d1, d2, d3
2		Accomplishments		5	5	
	Final exam (practical)		12	20	20	c1, c2, c3, c4, c5, d3
Total				30	30 %	

### LII. Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Satinder Ahuja and Stephen Scypinski. Handbook of Modern Pharmaceutical Analysis, 2010, Elsevier

#### 2- Essential References.

- 1- David G. Watson, RuAngelie Edrada-Ebel Pharmaceutical Analysis A Textbook for Pharmacy Students and Pharmaceutical Chemists, 2012, Elsevier Churchill Livingstone
- 2- USP 41-NF36, United states pharmacopeia, 2018

#### 3- Electronic Materials and Web Sites etc.

- 1- <https://www.slideserve.com/burian/interpreting-ir-and-nmr-spectra>
- 2- <https://www.slideshare.net/durgasairelangi/uvvisnmrmasir>
- 3- <https://www.slideserve.com/caridadp/identification-of-organic-compounds-by-gc-ms-ir-amp-powerpoint-ppt-presentation>

### LIII. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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قسم الصيدلة







Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
Pharmaceutical Instrumental Analysis I  
Course code No. (PHM325)

XXXI.- Information about Faculty Member Responsible for the Course:						
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>				
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>
<b>E-mail</b>						

<b>XXV. Course Description:</b>
The course provides the student with knowledge and skills of advanced analytical techniques used for analysis of substances including drugs. The course focuses on the study of principles, instrumentation and applications of advanced spectroscopic techniques (atomic absorption/emission spectroscopy, Infrared spectroscopy (IR) and mass spectroscopy (MS) The practical part of the course provides the student with skills to operate that equipment and perform analysis of compounds by those techniques.

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XXVI. Intended learning outcomes of the course (CILOs)
<b>1. Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
a1. Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis
a2. Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.
a3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:
b1. Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.
b2. Classify advanced analytical technique based on principles of works.
b3. Lay out the design of advanced analytical techniques.
b4. Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory
c2. Operate the instruments (UV-Visible spectroscopy, NMR) and perform experiments successfully in the laboratory.
c3. Practice and carry out assays of number of drugs by spectrophotometric methods.
c4. Utilize IR, NMR and mass spectrometry simulated programs to identification of drugs.
c5. Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:
d1. Communicate effectively and behave in discipline with colleagues.
d2. Participate efficiently with his colleagues in a team work.
d3. Demonstrate the skills of time management and self-learning.
d4. Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.

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<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exam
<b>a2.</b> Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.		
<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Classify advanced analytical technique based on principles of works.		
<b>b3.</b> Lay out the design of advanced analytical techniques.		
<b>b4.</b> Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (UV-Visible spectroscopy, NMR) and perform experiments successfully in the laboratory.		
<b>c3.</b> Practice and carry out assays of number of drugs by spectrophotometric methods.	feed-back learning, Group-project	Assignments
<b>c4.</b> Utilize IR, NMR and mass spectrometry simulated programs to identification of drugs.		

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c5. Present and report his/her works correctly using appropriate writing rules and technologies media.		
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d4. Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.		

XXVII. Course Contents:					
A. Theoretical Aspect:					
No	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	General principal of spectroscopy	a1, a2,a3,b3	<ul style="list-style-type: none"> <li>Wave-particle duality</li> <li>wave properties</li> <li>particulate properties.</li> <li>Line &amp; band spectrum.</li> <li>Electromagnetic spectrum.</li> <li>Absorption &amp; emission spectroscopy.</li> </ul>	1	2
2	Spectrofluorimetry	a3, b1, b3, b4	<ul style="list-style-type: none"> <li>Principle, definitions &amp; types of luminescence.</li> <li>Singlet &amp; triplet states</li> <li>Mechanism and factors affecting of fluorescence phosphorescence.</li> <li>instrumentation.</li> <li>Applications of fluorimetry in pharmacy</li> </ul>	2	4
3	Ultraviolet Visible Spectroscopy	a1,a2, b1, b2, b3, b4, d1,d2	<ul style="list-style-type: none"> <li>absorbance, transmittance, molar absorptivity, <math>\lambda_{max}</math>, effect of solvent &amp; pH on</li> </ul>	3	6

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			<p><math>\lambda_{\max}</math>. Law of absorption spectroscopy.</p> <ul style="list-style-type: none"> <li>• Beer-Lambert law, its derivation.</li> <li>• Different electronic transitions.</li> <li>• Instrumentation [Single &amp; double beam spectrophotometers]</li> <li>• Applications of UV-Vis in qualitative &amp; quantitative estimations.</li> <li>• Emphasis on problem solving.</li> </ul>		
4	<b>Atomic absorption &amp; Atomic emission spectrophotometry</b>	a1, a3, b2, b3, b4, d1, d2	<ul style="list-style-type: none"> <li>• Principle &amp; instrumentation with</li> <li>• emphasis on working &amp; importance of different components.</li> <li>• Temperature, flame absorption &amp; emission profiles.</li> <li>• Quantitative estimations &amp; applications.</li> </ul>	2	4
5	<b>Mid-Term Exam</b>	a1, a2, b3, b1, b2, b3, b4, d1, d2		1	2
6	<b>Infrared Spectrometry</b>	a1, a2, b1, b2, b3, d1, d2	<ul style="list-style-type: none"> <li>• Infrared region in EM spectrum.</li> <li>• Principle of different stretching &amp; bending vibrations.</li> <li>• Components [&amp; their working] of a dispersive instrument.</li> <li>• Fourier transform [FT] technique and instruments.</li> <li>• Sample handling techniques.</li> <li>• Functional group &amp; finger print regions in the spectrum.</li> <li>• Functional groups identification &amp; their use in characterization of compounds.</li> </ul>	3	6

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			<ul style="list-style-type: none"> <li>Problems on identification of functional groups from spectra of unknown compounds.</li> </ul>		
7	<b>Nuclear Magnetic Resonance Spectroscopy (NMR)</b>	a3, b1, b2, b3, d1, d2	<ul style="list-style-type: none"> <li>Principle</li> <li>Types <math>^1\text{H}</math> NMR and <math>^{13}\text{C}</math> NMR): comparison</li> <li>Instrumentation</li> <li>Procedures</li> <li>Interpretation of data</li> </ul>	2	4
8	<b>Mass spectroscopy</b>	a2,b1, b2,b3, b4,d1, d2	<ul style="list-style-type: none"> <li>Principle</li> <li>Instrumentation</li> <li>Procedures</li> <li>Interpretation of data with examples</li> </ul>	1	2
9	<b>Final Theoretical Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

B. Practical Aspect:				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	Introduction to pharmaceutical instrumental analysis Lab.: safety requirements, list of experiments, how to report, etc.	c1, c2, c3, c4	1	2
2	Determination of absorption maxima of Fe-Bipyridine complex using ascorbic acid as antioxidant (FBAC method)	c1, c2, c3, c4, c5, d1, d2, d3	1	2
3	Determination of unknown concentration of ascorbic acid using FBAC method	c1,c2, c3,d1, d2, d3	1	2
4	Application of FBAC method on some natural antioxidant (plant extracts)	c1, c2, c3,c5, d1, d2, d3, d4	1	2
5	Assay of metformin by UV-Spectrophotometry	c1, c2, c3, c5, d1, d2, d3, d4	1	2
6	Effect of solvents on absorption of some pharmacular preparations maxima of organic compounds	c2, c3, c5, d1, d2, d3, d4	1	2
7	<b>Determination of sodium by flame photometry</b>	c1, c2, c3, c5, d1, d2, d3, d4	1	2
8	<b>Determination of potassium by flame photometry</b>	c1, c2, c3, d1, d2, d3, d4	1	2
9	<b>I.R. spectroscopy simulation and Interpretation of spectrum</b>	c1, c4, c5, d1, d2, d3, d4	1	2

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10	NMR spectroscopy simulation and Interpretation of spectrum	c1, c4, c5,d1, d2, d3, d4	1	2
11	Final exam	c1, c2, c3, c4, c5,d1,d2,d3,d4	1	2
Number of Weeks /and Units Per Semester			11	22

### XXVIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

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XXIX. Assignments:			
No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> every student is assigned to solve the problems provided by the teacher at the end of each unit.	b2, c3, c4, d2, d3, d4	4-13
2	<b>Group:</b> each group of students will be assigned to provide a video of simulation of one of the analytical techniques studied. The students of each group must explain the simulation for other students.	c3, c4, d1, d2, d4	14

XXX. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4.
		Assignments	7, 12	5	5	c3, c4, d1, d2, d3, d4
2	Mid- term exam (written exam)	7	10	10	a1,a2,a3,b1,b2, b3,b4, d3	
3	Final exam of theoretical part (written exam)	16	50	50	a1,a2,a3,b1,b2,b3,b4,d3	
TOTAL			70	70 %	70	

Practical part assessment						
No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)	12	20	20	c1,c2, c3,c4,c5, d3	
Total				30	30 %	

XXXI. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
Satinder Ahuja and Stephen Scypinski. Handbook of Modern Pharmaceutical Analysis, 2010, Elsevier
<b>2- Essential References.</b>
1- <u>David G. Watson, RuAngelie Edrada-Ebel</u> Pharmaceutical Analysis A Textbook for Pharmacy Students and Pharmaceutical Chemists, 2012, <u>Elsevier Churchill Livingstone</u>
2- USP 41-NF36, United states pharmacopeia, 2018
<b>3- Electronic Materials and Web Sites etc.</b>

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- 1- <https://www.slideserve.com/burian/interpreting-ir-and-nmr-spectra>
- 2- <https://www.slideshare.net/durgasairelangi/uvvisnmrmassir>
- 3- <https://www.slideserve.com/caridadp/identification-of-organic-compounds-by-gc-ms-ir-and-nmr-powerpoint-ppt-presentation>

XXXII. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



جامعة الرازي  
AL-RAZI UNIVERSITY

الجمهورية اليمنية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة



Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of

**Medicinal Chemistry III**

Course No. (45)

Course Code No. (PHM326)

2022



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Course Specification

**MEDICINAL CHEMISTRY III**

XXXIII.Course Identification and General Information:							
1	Course Title:	Medicinal Chemistry III					
2	Course Code &Number:	PHM326					
3	Credit hours: 3	C.H					
		Theoretical			P	Tr.	TOTAL
		L.	Tut.	S.			
3	-	-	2	-	4		
4	Study level/ semester at which this course is offered:	3 <sup>rd</sup> Level – 2 <sup>nd</sup> Semester					
5	Pre –requisite (if any):	PHM311(Medicinal Chemistry II)					
6	Co –requisite (if any):	---					
7	Program (s) in which the course is offered:	Pharmacy Bachelor					
8	Study System:	Semester based System					
9	Mode of delivery:	Full Time					
10	Language of teaching the course:	ENGLISH					
11	Location of teaching the course:	At The University Facility					
12	Prepared By:	Dr. Ahmed Al-Ghani					
13	Date of Approval	2022					

**L: lecturing; Tut: Tutorial, S: seminar; P: practical; Tr: training**

**XXXIV.Course Description:**

This course is the fourth one among (Medicinal chemistry) courses which are designed to provide knowledge and skills in chemistry of medicinal agents (drugs). It deals with the physicochemical properties, chemical synthesis, quantitative structure activity relationship (SAR), qualitative structure activity relationship (QSAR), pharmacophore molecules, mechanism of action, and metabolism of drugs used for infections and cancer. Also, there are practical part concerns with **Pharmacoepial physicochemical properties, chemical, chromatographic or spectroscopy identification of some drugs used for infections, cancer and antiprotozoal drugs.**

**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**5. Alignment CILOs to PILOs**

PILOs	CILOs
<b>A:Knowledge and understanding: upon completion of the course, students will be able to:</b>	
<b>A2</b> Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals	<b>a1.</b> Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.

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	in compliance with standard operating procedures (SOPs) and GMP guidelines.	
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a2.</b> Explain the principles of synthesis, purification and metabolic reactions of drugs used for infections, cancer and antiprotozoal.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacist in chemical synthesis of drugs.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body	<b>b1.</b> Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for infections, cancer and antiprotozoal.
		<b>b2.</b> Express molecular structure, synthesis and reactions of drugs with hand-drawing
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b3.</b> Classify, chemically, drugs affecting, drugs used for infections, cancer and antiprotozoal.
		<b>b4.</b> Compare between chemically related drugs based on their chemical structure
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems	<b>b5.</b> Design newer drugs used for infections, cancer and antiprotozoal.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (UV-Spectrometry, HPLC) and perform

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		experiments successfully in the laboratory
C4	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	c3. Carry out synthesis of some drugs used for infections, cancer and antiprotozoal.
		c4. perform the quantitative analysis of some drugs used for infections, cancer and antiprotozoal.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	d1. Communicate effectively and behave in discipline with colleagues.
		d2. Demonstrate the skills of time management and self-learning.
		d3. Participate efficiently with his colleagues in a team work.
D3	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)

6. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the correlation between the chemical and therapeutic properties of drugs to their chemical structure.	Active Lecture-discussion	Written exams
a2. Explain the principles of synthesis, purification and metabolic reactions of drugs used for infections, cancer and antiprotozoal.		
a3. Describe the role of pharmacist in chemical synthesis of drugs.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for infections, cancer and antiprotozoal.	Active Lecture-discussion, feed-back learning	Written exams, quizzes
b2. Express molecular structure, synthesis and reactions of drugs with hand-drawing	Active Lecture-discussion	Written exams

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b3. Classify, chemically, drugs affecting drugs used for infections, cancer and antiprotozoal.		
b4. Compare between chemically related drugs based on their chemical structure		
b5. Design newer drugs used for infections, cancer and antiprotozoal.	Group-project	Assignments

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory		
c3. Carry out synthesis of some drugs used for infections, cancer and antiprotozoal.	Group-project	Assignments
c4. Perform the quantitative analysis of some drugs used for infections, cancer and antiprotozoal.		

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Lab. term works, assignment
d3. Participate efficiently with his colleagues in a team work.		
d2. Demonstrate the skills of time management and self-learning.	laboratory practice	Lab. term works, final practical exam
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)		

**VII. Course Content:**

**A – Theoretical Aspect:**

Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of</b>					
1	<b>Chemotherapeutic drugs For infections</b>	a1, a2,a3, b1,b2,b3, b4	<ul style="list-style-type: none"> <li>Antibacterials</li> <li><math>\beta</math>-lactam and related antibiotics: Penicillin, Cephalosporins, Carbapenems, monobactams, ...etc.</li> </ul>	5	15

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			<ul style="list-style-type: none"> <li>• <b>Protein synthesis inhibitors;</b> macrolides, lincosamides, aminoglycosides, tetracyclines</li> <li>• <b>Nucleic acid synthesis inhibitors</b> Quinolones, sulfonamides, trimethoprim</li> <li>• <b>Other antibiotics</b></li> </ul>		
			<ul style="list-style-type: none"> <li>• <b>Antiprotozoals</b> Anti-malarial drugs Antamoebics, anti giardials and antitrichomonal antitrypanosomals, others</li> </ul>	5	15
		<ul style="list-style-type: none"> <li>• <b>Anthelmintic drugs</b> Drugs that used in treatment of worms' infestation</li> </ul>			
		<ul style="list-style-type: none"> <li>• <b>Antifungal drugs</b> Drugs used in treatment of fungal infections</li> </ul>			
		<ul style="list-style-type: none"> <li>• <b>Antiviral drugs</b> Drugs used in treatment of viral infections</li> </ul>			
<b>MID – EXAM</b>				1	2
2	<b>Drugs for cancer</b>	a1, a2,a3, b1,b2,b3, b4	<ul style="list-style-type: none"> <li>• Antimetabolites: methotrexate, 5-fluorouracil. 6-mercaptopurine</li> <li>• Alkylating agents: nitrogen mustards, alkyl sulphonates, nitrosourea</li> <li>• Natural products: antibiotics, plant alkaloids, enzymes, interferons</li> <li>• Hormones and hormones antagonists</li> <li>• Radioactive isotopes</li> <li>• Miscellaneous: cisplatin, mitotane , etc</li> </ul>	4	12
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	46

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: amoxicillin	c1, c2, c3, c4, d1, d2, d3	1	2
2	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: cefixime	c1, c2, c3, c4, d1, d2, d3	1	2
3	Pharmacopeial physicochemical properties, chemical, chromatographic or	c1, c2, c3, c4, d1, d2, d3	1	2

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	spectroscopy identification of: of: tetracycline			
4	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: ciprofloxacin	c1, c2, c3, c4, d1, d2, d3	1	2
5	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: miconazole	c1, c2, c3, c4, d1, d2, d3	1	2
6	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: busulfan	c1, c2, c3, c4, d1, d2, d3	1	2
7	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: metronidazole	c1, c2, c3, c4, d1, d2, d3	1	2
8	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: chloroquine	c1, c2, c3, c4, d1, d2, d3	1	2
9	Synthesis of drugs	c1, c2, c3, d1, d2, d3	1	2
10	Purification of drugs.	c1, c2, c4, d1, d2, d3	2	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2	1	2
Total			12	24
Number of Weeks			12	

#### XLIV. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

#### XXV. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Group</b> : each group of students will be assigned to hypothetically	b5, c3, c4, d1, d2, d3, d4	8

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	design newer drugs form a studied patent drug using SAR principles		
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### VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b5, c3, c4, d1, d3d4,
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b3, b4, d2
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b3, b4, d2
TOTAL				70	70 %	70

### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term work	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d4
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, c4, d1, d2
Total				30	30	

### LIV. Learning Resources:

<b>1- Required Textbook(s) (maximum two ).</b>
43. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, Copyright © 2020 by Lippincott Williams & Wilkins, a Wolters Kluwer business.
44. Foy's Principles of medicinal chemistry, seventh edition, Copyright © 2017 Lippincott Williams & Wilkins, a Wolters Kluwer business
45. Gareth Thomas, Medicinal chemistry: an introduction, third edition, Copyright © 2011 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.
<b>2- Essential References.</b>
4. AshutochKar. Medicinal chemistry, New age international publisher
5. Rajie. Pharmaceutical chemistry
6. Wermuth. The practice of medicinal chemistry
<b>3- Electronic Materials and Web Sites etc.</b>
3. <a href="https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300">https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300</a>
4. <a href="https://slideplayer.com/slide/7330128/">https://slideplayer.com/slide/7330128/</a>

### LV. Course Policies: (Based on the Uniform Students' By law (2007))

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science

**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
MEDICINAL CHEMISTRY III

Course No. (45)  
Course Code No. (PHM326)

XXII.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

XXXIII. Course Description:
<p>This course is the fourth one among (Medicinal chemistry) courses which are designed to provide knowledge and skills in chemistry of medicinal agents (drugs). It deals with the physicochemical properties, chemical synthesis, quantitative structure activity relationship (SAR), qualitative structure activity relationship (QSAR), pharmacophore molecules, mechanism of action, and metabolism of drugs used for infections and cancer. Also there are practical part concerns with <b>Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of some drugs used for infections, cancer and antiprotozoal drugs .</b></p>

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XXXIV. Intended learning outcomes of the course (CILOs)	
<b>1. Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Explain the correlation between the chemical and therapeutic properties of drugs to their molecular structure.	
a2. Explain the principles of synthesis, purification and metabolic reactions of drugs used for infections, cancer and antiprotozoal.	
a3. Describe the role of pharmacist in chemical synthesis of drugs.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for infections, cancer and antiprotozoal.	
b2. Express molecular structure, synthesis and reactions of drugs with hand-drawing	
b3. Classify, chemically, drugs affecting drugs used for infections, cancer and antiprotozoal.	
b4. Compare between chemically related drugs based on their chemical structure	
b5. Design newer drugs used for infections, cancer and antiprotozoal.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory	
c3. Carry out synthesis of some drugs used for infections, cancer and antiprotozoal.	
c4. perform the quantitative analysis of some drugs used for infections, cancer and antiprotozoal.	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Communicate effectively and behave in discipline with colleagues.	
d2. Demonstrate the skills of time management and self-learning.	
d3. Participate efficiently with his colleagues in a team work.	
d4. Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)	

2. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the correlation between the chemical and therapeutic properties of drugs to their chemical structure.	Active discussion      Lecture-	Written exams
a2. Explain the principles of synthesis, purification and metabolic reactions of drugs used for infections, cancer and antiprotozoal.		
a3. Describe the role of pharmacist in chemical synthesis of drugs.		

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**(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret the rules of structure-activity relationship to construct pharmacophore of drugs used for infections, cancer and antiprotozoal.	Active Lecture- discussion, feed-back learning	Written exams, quizzes
<b>b2.</b> Express molecular structure, synthesis and reactions of drugs with hand-drawing	Active Lecture- discussion	Written exams
<b>b3.</b> Classify, chemically, drugs affecting drugs used for infections, cancer and antiprotozoal.		
<b>b4.</b> Compare between chemically related drugs based on their chemical structure		
<b>b5.</b> Design newer drugs used for infections, cancer and antiprotozoal.	Group-project	Assignments

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (UV-Spectrometry, HPLC) and perform experiments successfully in the laboratory		
<b>c3.</b> Carry out synthesis of some drugs used for infections, cancer and antiprotozoal.	Group-project	Assignments
<b>c4.</b> Perform the quantitative analysis of some drugs used for infections, cancer and antiprotozoal.		

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Lab. term works, assignment
<b>d3.</b> Participate efficiently with his colleagues in a team work.		
<b>d2.</b> Demonstrate the skills of time management and self-learning.	laboratory practice	Lab. term works, final practical exam
<b>d4.</b> Use internet, computer-based programs to search for information that can help to hypothetically design newer drugs from a studied patent drug using SAR principles)		





XXXV.Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Physicochemical properties, synthesis, chemical &amp; common names, structure-activity relationship, metabolism of</b>					
1	<b>Chemotherapeutic drugs For infections</b>	a1, a2, a3, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>• <b>Antibacterials</b></li> <li>• <b>β-lactam and related antibiotics:</b> Penicillins, Cephalosporins, Carbapenems, monobactams, ...etc.</li> <li>• <b>Protein synthesis inhibitors;</b> macrolides, lincosamides, aminoglycosides, tetracyclines</li> <li>• <b>Nucleic acid synthesis inhibitors</b> Quinolones, sulfonamides, trimethoprim</li> <li>• <b>Other antibiotics</b></li> </ul>	5	15
			<ul style="list-style-type: none"> <li>• <b>Antiprotozoals</b> Anti-malarial drugs Antamoebics, anti giardials and antitrichomonals antitrypanosomals, others</li> </ul>	5	15
			<ul style="list-style-type: none"> <li>• <b>Anthelmintic drugs</b> Drugs that used in treatment of worm's infestation</li> </ul>		
			<ul style="list-style-type: none"> <li>• <b>Antifungal drugs</b> Drugs used in treatment of fungal infections</li> <li>• <b>Antiviral drugs</b> Drugs used in treatment of viral infections</li> </ul>		
<b>MID-EXAM</b>				1	2
2	<b>Drugs for cancer</b>	a1, a2, a3, b1, b2, b3, b4	<ul style="list-style-type: none"> <li>• Antimetabolites: methotrexate, 5-fluorouracil. 6-mercaptopurine</li> <li>• Alkylating agents: nitrogen mustards, alkyl sulphonates, nitrosurea</li> <li>• Natural products: antibiotics, plant alkaloids, enzymes, interferons</li> <li>• Hormones and hormones anatgonists</li> <li>• Radioactive isotopes</li> <li>• Miscellaneous: cisplatin, mitotane , etc</li> </ul>	4	12
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	46

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B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: amoxicillin	c1, c2, c3, c4, d1, d2, d3	1	2
2.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: cefixime	c1, c2, c3, c4, d1, d2, d3	1	2
3.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: of: tetracycline	c1, c2, c3, c4, d1, d2, d3	1	2
4.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: ciprofloxacin	c1, c2, c3, c4, d1, d2, d3	1	2
5.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: miconazole	c1, c2, c3, c4, d1, d2, d3	1	2
6.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: busulfan	c1, c2, c3, c4, d1, d2, d3	1	2
7.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: metronidazole	c1, c2, c3, c4, d1, d2, d3	1	2
8.	Pharmacopeial physicochemical properties, chemical, chromatographic or spectroscopy identification of: chloroquine	c1, c2, c3, c4, d1, d2, d3	1	2
9.	Synthesis of drugs	c1, c2, c3, d1, d2, d3	1	2
10.	Purification of drugs.	c1, c2, c4, d1, d2, d3	2	2
PRACTICAL EXAM		c1, c2, c3, c4, d1, d2	1	2
Total			12	24
Number of Weeks			12	

### XXXVI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

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The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XXXVII.Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Group</b> : each group of students will be assigned to hypothetically design newer drugs form a studied patent drug using SAR principles	b5, c3, c4, d1, d2, d3, d4	8

### XXXVIII.Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	b5, c3, c4, d1, d3
2	Mid-semester exam (written exam)	7	10	10	a1, a2, a3, b1, b2, b3, b4, d2	
3	Final exam (written exam)	16	50	50	a1, a2, a3, b1, b2, b3, b4, d2	
TOTAL			70	70 %	70	

#### Practical part assessment

No	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d4
		Accomplishments		5		
2	Final exam (practical)	12	20	20	c1, c2, c3, c4, d1, d2	
Total			30	30 %		

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XXXIX. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
<ol style="list-style-type: none"> <li>1. Wilson and Gisvold's textbook of organic medicinal and pharmaceutical chemistry, Copyright © 2020 by Lippincott Williams &amp; Wilkins, a Wolters Kluwer business.</li> <li>2. Foy's Principles of medicinal chemistry, seventh edition, Copyright © 2017 Lippincott Williams &amp; Wilkins, a Wolters Kluwer business</li> <li>3. Gareth Thomas, Medicinal chemistry: an introduction, third edition, Copyright © 2011 John Wiley &amp; Sons Ltd, The Atrium, Southern Gate, Chichester.</li> </ol>	
<b>2- Essential References.</b>	
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<b>3- Electronic Materials and Web Sites etc.</b>	
<ol style="list-style-type: none"> <li>1. <a href="https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300">https://www.slideshare.net/akkimipadama/medicinal-chemistry-125707300</a></li> <li>2. <a href="https://slideplayer.com/slide/7330128/">https://slideplayer.com/slide/7330128/</a></li> </ol>	

XL. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor Program of Pharmacy**

Course Specification of  
**Clinical Pharmacy-I**  
Course No. (PHC327)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.





### Course Specification of Clinical Pharmacy-I

I. Course Identification and General Information:					
1	Course Title:	Clinical Pharmacy-I			
2	Course Code & Number:	PHC327			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Seminar	
		2	2	-	--
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Pharmacology II & III			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Credit Hour System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and health Sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:	2022			

II. Course Description:	
<p>The Clinical Pharmacy-I course provides the students basic principles of pharmaceutical care and skills necessary for successfully completing the body-system courses which are required in the pharmacy program. This professional course aims to improve the students skills with a systematic approach to patient-centred pharmaceutical care that use the theoretical and basic principles of pharmacology, therapeutic and clinical courses to identify and resolve medication related issues.</p>	

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**1. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a1.</b> Identify knowledge and skills required to practice clinical pharmacy in health care facilities.
		<b>a2.</b> Explicit the pharmaceutical care services offered by clinical pharmacists to patients in health care facilities.
		<b>a3.</b> Determine the non-pharmacotherapy and advices that assist in management of diseases.
		<b>a4.</b> Comprehend his/her role as a pharmacist in offering clinical pharmaceutical care services to patients in health care facilities and in participation and communication with other members of the health care team.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems	<b>b1.</b> Express investigational data using abbreviations.
		<b>b2.</b> Interpret clinical features, lab. and instrumental investigations data used in diagnosis of diseases and data of patient medical records.
		<b>b3.</b> Classify drug therapy problems according to their appropriate interventions.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C5</b>	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	<b>c1.</b> Provide <i>patient-centered care</i> as the medication expert (collect and interpret evidence, prioritize patient needs, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities)
		<b>c2.</b> Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		

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<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Share successfully in team-work.
		<b>d2.</b> Communicate effectively with his/her colleagues, members of health care team and patients.
		<b>d3.</b> Display technical and time management skill.

## 2-Alignment CILOs to teaching strategies and assessment strategies

### (A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1 Identify knowledge and skills required to practice clinical pharmacy in health care facilities.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Watching videos - Case Presentation	- Exam - Assignment - Oral presentation
a2 Explicit the pharmaceutical care services offered by clinical pharmacists to patients in health care facilities.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Watching videos - Case Presentation	- Exam - Assignment - Oral presentation
a3 Determine the non-pharmacotherapy and advices that assist in management of diseases.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Watching videos - Case Presentation	- Exam - Assignment - Oral presentation -
a4 Comprehend his/her role as a pharmacist in offering clinical pharmaceutical care services to patients in health care facilities and in participation and communication with other members of the health care team.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Watching videos - Case Presentation	- Exam - Assignment - Oral presentation -

### (B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1 <b>b1.</b> Express investigational data using abbreviations.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Watching videos - Case Presentation	- Exam - Assignment - Oral presentation

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b2	b2. Interpret clinical features, lab. and instrumental investigations data used in diagnosis of diseases and data of patient medical records.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Case Presentation	- Exam - Assignment - Oral presentation
b3	b3. Classify drug therapy problems according to their appropriate interventions.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Case Presentation	- Exam - Assignment - Oral presentation

**(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Provide <i>patient-centered care</i> as the medication expert (collect and interpret evidence, prioritize patient needs, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities)	- Lectures/ Seminar - Assignment - Office hours - Role plays - Case Presentation	- Exam - Assignment - Oral presentation
c2	Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs	- Lectures/ Seminar - Assignment - Office hours - Role plays - Case Presentation	- Exam - Assignment - Oral presentation

**(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Share successfully in team-work.	- Role plays - Case Presentation Seminar	- Oral presentation
d2	Communicate effectively with his/her colleagues, members of health care team and patients.	- Lectures - Assignment - Office hours - Case Presentation - Seminar	- Exam - Assignment - Oral presentation
d3	Display technical and time management skill.	- Lectures - Assignment - Office hours - Case Presentation - Seminar	- Exam - Assignment - Oral presentation

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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Learning Outcomes (CILOs)	Number of Weeks	Contact Hours
1	Introduction to pharmaceutical care	- Overview and Definitions	a 1, a2, b1	2	4
		- The needs for pharmaceutical care	a 1, a2, a3, b1, b2	1	2
		- Barriers to pharmaceutical care, Clinical & Economic Impact of Pharmaceutical Care Practice: Minnesota PC Project	a 1, a2, a3, b1, b2	2	4
		- Becoming a practitioner : the tools you need	a1, a2, a3, b1, b2	1	2
2	Collecting patient data base and medical history	- Subjective and objective information regarding the patient's health - Sources of patient information	a1, a2, a3, a4, b1, b2, b3	1	2
8	Mid-Term Theoretical Exam		a1, a2, a3, a4, b1, b2, b3, c1, c2,d3	1	2
5	The Assessment of drug related needs	- The Therapeutic Relationship - Assessment techniques - Patients drug related needs Indication, Effectiveness, Safety, and Adherence)	a1, a2, a3, a4, b1, b2, b3	1	2
6	Drug related problems classification systems	- Strand and colleagues classification System - The seven categories of drug related problems - Drug therapy problem identification - Categories and Common Causes of Drug Related Problems	a1, a2, b1, b2	2	4
9	Identification of Drug related Problems	- Stating Drug Related Problems. - Examples	a2, b1, b2, c1, c2, d1, d2	1	2

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10	Pharmacy Care Plan)	- Goals - Interventions - Documentation - Consult note - Monitoring and follow up	a 2, b1, b2, c1, c2, d1, d2	2	4
11	Seminar	- Formulate & Implement Pharmaceutical care (Examples)	b1, b2, c1, c2, d1, d2	1	2
12	Final Exam		a1, a2, a3, a4, b1, b2, c1, c2, d3	1	2
<b>Total</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>9</b>

#### V. Teaching Strategies of the Course:

- Lectures
- Assignment
- Office hours
- Role plays
- Case Presentation
- Seminar

#### VI. Assessment Methods of the Course:

- Assignments
- Exam
- Quiz

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Assignment 1: Describe Examples of DRPs classification for different diseases (Group)	Week 3	5	a1, a2, a3, b1, b2, c1, c2, d1, d2, d3
2	Assignment 2: Describe Examples of care plan for different diseases (Single)	Week 12	5	a1, a2, a3, b1, b2, b3 c1, c2, d3
<b>Total</b>			<b>10</b>	

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 3-12	10	10 %	a1, a2, a3, b1, b2, b3, c1, c2, d1, d2, d3

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2	Quiz 1	Week 6	5	5 %	a1, a2, a3, a4, b1, b2, b3, d2
3	Midterm Exam	Week 8	20	20 %	a1, a2, a3, a4, b1, b2, b3, c1, c2, d3
4	Quiz 2	Week 12	5	5%	a 1, a2, b1, b2, d2
5	Final Exam	Week 16	60	60 %	a1, a2, a3, a4, b1, b2, c1, c2, d3
<b>Total</b>			<b>100</b>	<b>100%</b>	

<b>IX. Learning Resources:</b>	
<i>Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).</i>	
<b>1- Required Textbook(s) ( maximum two ).</b>	
	<ol style="list-style-type: none"> <li>Langely CA, Belcher D, 2009 , Applied Pharmaceutical Practice. 1st ed. Pharmaceutical Press. London. ISBN 978 0 85369 746 6</li> <li>David M. Angaran, Karen Whalen, 2015. Medication Therapy Management: A Comprehensive Approach., 2<sup>nd</sup> edition, ISBN: 978-0-07-184869-5</li> </ol>
<b>2- Essential References.</b>	
	<ol style="list-style-type: none"> <li>Cipolle, RJ, Strand, LM, &amp; Morley, PC, 2012. Pharmaceutical Care Practice: Patient-Centered Approach to Medication Management Services (3rd edition). ISBN 978-0071756389</li> <li>Robert S. Beardsley, Carole L. Kimberlin, William N. Tindall, 2011, Communic Skills in Pharmacy Practice: A Practical Guide for Students and Practitioners.. SBI 978-1608316021.</li> </ol>
<b>3- Electronic Materials and Web Sites etc.</b>	
	<ul style="list-style-type: none"> <li>www.medlineplus.com (for patient counseling).</li> <li>www.guidelines.gov (International guidelines)</li> <li>www.drugs.com (for drug-drug interactions)</li> <li>www.pubmed.com (Clinical trials).</li> </ul>

<b>X. Course Policies: (Based on the Uniform Students' By law (2007)</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة







Second Part of Course Specification  
Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Program of Pharmacy**

Course Plan (Syllabus) of:  
**Clinical Pharmacy-I**  
Course No. (327)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Ali Alyahawi						
Location & Telephone No.:	775957401	SA T	SU N	M ON	TU E	WE D	TH U
E-mail:	alyahawipharm@yahoo.com						

II. Course Description:
The Clinical Pharmacy-I course provides the students basic principles of pharmaceutical care and skills necessary for successfully completing the body-system courses which are required in the pharmacy program. This professional course aims to improve the students skills with a systematic approach to patient-centred pharmaceutical care that use the theoretical and basic principles of pharmacology, therapeutic and clinical courses to identify and resolve medication related issues.

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III. Course Intended Learning Outcomes (CILOs) :	
<b>A. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:	
a1	Describe the elements of a Medication Therapy Management (MTM) service and how to provide pharmaceutical care plan to an individual patient
a2	Outline how to gather subjective and objective data to develop a care plan
a3	Determine the non-pharmacotherapy and advices that assist in management of diseases.
a4	Comprehend his/her role as a pharmacist in offering clinical pharmaceutical care services to patients in health care facilities and in participation and communication with other members of the health care team.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:	
b1	Express investigational data using abbreviations.
b2	Interpret clinical features, lab. and instrumental investigations data used in diagnosis of diseases and data of patient medical records.
b3	Classify drug therapy problems according to their appropriate interventions.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:	
c1	Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize patient needs, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities)
c2	Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:	
d1	Share successfully in team-work.
d2	Communicate effectively with his/her colleagues, members of health care team and patients.
d3	Display technical and time management skill.

IV. Course Contents:				
A. Theoretical Aspect:				
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction to pharmaceutical care	- Overview and Definitions	2	4
		- The needs for pharmaceutical care	1	2
		- Barriers to pharmaceutical care, Clinical & Economic Impact of Pharmaceutical Care Practice: Minnesota PC Project	2	4

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		Becoming a practitioner : the tools you need	1	2
2	<b>Collecting patient data base and medical history</b>	- Subjective and objective information regarding the patient's health - Sources of patient information	1	2
8	<b>Mid-Term Theoretical Exam</b>		1	2
5	<b>The Assessment of drug related needs</b>	- The Therapeutic Relationship - Assessment techniques - Patients drug related needs Indication, Effectiveness, Safety, and Adherence)	1	2
6	<b>Drug related problems classification systems</b>	- Strand and colleagues classification System - The seven categories of drug related problems - Drug therapy problem identification - Categories and Common Causes of Drug Related Problems	2	4
9	<b>Identification of Drug related Problems</b>	- Stating Drug Related Problems. - Examples	1	2
10	<b>Pharmacy Care Plan)</b>	- Goals - Interventions - Documentation - Consult note - Monitoring and follow up	2	4
11	<b>Seminar</b>	- Formulate & Implement Pharmaceutical care (Examples)	1	2
16	<b>Final Exam</b>		1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>

#### V. Teaching Strategies of the Course:

- Lectures
- Assignment
- Office hours
- Role plays
- Case Presentation
- Seminar

#### VI. Assessment Methods of the Course:

- Assignments
- Exam
- Quiz

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



VII. Assignments:			
No.	Assignments	Week Due	Mark
1	<b>Assignment 1:</b> Describe Examples of DRPs classification for different diseases (Group)	Week 3-12	5
2	<b>Assignment 2:</b> Describe Examples of care plan for different diseases (Single)	Week 3-12	5
<b>Total</b>			<b>10</b>

VIII. Schedule of Assessment Tasks for Students During the Semester:				
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	<b>Assignments</b>	Week 3- 12	10	10 %
2	<b>Quiz 1</b>	Week 6	5	5 %
3	<b>Midterm Exam</b>	Week 8	20	20 %
4	<b>Quiz 2</b>	Week 12	5	5%
5	<b>Final Exam</b>	Week 16	60	60 %
<b>Total</b>			<b>100</b>	<b>100%</b>

IX. Learning Resources:	
<i>Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).</i>	
<b>1- Required Textbook(s) ( maximum two ).</b>	
	1. Langely CA, Belcher D, 2009 , Applied Pharmaceutical Practice. 1st ed. Pharmaceutical Press. London. ISBN 978 0 85369 746 6 2. David M. Angaran, Karen Whalen, 2015. Medication Therapy Management: A Comprehensive Approach., 2 <sup>nd</sup> edition, ISBN: 978-0-07-184869-5
<b>2- Essential References.</b>	
	3. Cipolle, RJ, Strand, LM, & Morley, PC, 2012. Pharmaceutical Care Practice Patient-Centered Approach to Medication Management Services (3rd edi ISBN-13: 978-0071756389 4. Robert S. Beardsley, Carole L. Kimberlin, William N. Tindall, Communication Skills in Pharmacy Practice: A Practical Guide for Student Practitioners.. SBN-13: 978-1608316021.
<b>3- Electronic Materials and Web Sites etc.</b>	
	- www.medlineplus.com (for patient counseling). - www.guidelines.gov (International guidelines) - www.drugs.com (for drug-drug interactions) - www.pubmed.com (Clinical trials).

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<b>X. Course Policies: (Based on the Uniform Students' By law .</b>	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of:**

**Integrated Based-Case Learning-I: “case-based seminars”**

Course Code No. (PHC328)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



I. Course Identification and General Information:					
1	Course Title:	Integrated Based-Case Learning- I: “case-based seminars”			
2	Course Code & Number:	PHC328			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Seminar	
		2	--	2	--
4	Study Level/ Semester at which this Course is offered:	3 <sup>rd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Pharmacology III			
6	Co –Requisite (if any):	Therapeutics-I			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:	2022			

II. Course Description:
The course is designed to integrate the course of clinical pharmacy and therapeutics- I by seminar discussion for clinical cases. The course content will emphasize on the comprehensive delivery of pharmaceutical care (pharmacokinetics & pharmacodynamics, drug/drug interactions, dosage calculations, adverse effects, treatment algorithm, goals of therapy & patient education) for selected cases discussion.

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
<b>7. Alignment CILOs to PILOs</b>		
<b>D. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Describe pathophysiology, clinical presentations, and complications of cardiovascular, gastrointestinal, endocrine , bone and joint disorders.
A3	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a2. Define the rational medication use and goals of therapy of cardiovascular and infectious diseases.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	b1. Interpret clinical and Laboratory findings of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b2. Design an appropriate pharmaceutical care plan to selected cases discussion of cardiovascular, gastrointestinal, endocrine , bone and joint disorders.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		

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C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	c1. Choose the rational pharmacotherapy regimens and monitoring parameters based on patient conditions
C5	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	c2. Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
D3	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d1. Search effectively for updated medical information from professional medical references.
D2	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d2. Develop students presentation skills

## 2-Alignment CILOs to teaching strategies and assessment strategies

### (A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1. Describe pathophysiology, clinical presentations, and complications of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Watching videos</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>

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a2. Define the rational medication use and goals of therapy of cardiovascular and infectious diseases.	- Case Presentation	
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1. Interpret clinical and Laboratory findings of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.	- Lectures/ Seminar - Assignment - Office hours - Role plays - Watching videos - Case Presentation	- Exam - Assignment - Oral presentation
b2. Design an appropriate pharmaceutical care plan to selected cases discussion of cardiovascular, gastrointestinal, endocrine , bone and joint disorders.		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1. Choose the rational pharmacotherapy regimens and monitoring parameters based on patient conditions	- Lectures/ Seminar - Assignment - Office hours - Role plays - Case Presentation	- Exam - Assignment - Oral presentation
c2. Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.		
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1. Search effectively for updated medical information from professional medical references.	- Role plays - Case Presentation Seminar	- Oral presentation
d2. Develop students presentation skills		

#### IV. Course Content:

##### A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
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1	Principles of Pharmacy Practice	b1	- Pharmacist Care - Pharmacist Care Plan - Monitoring Parameters	1	2
2	Cases study of CVD	a1, a2, b1, b2, c1, c2, d1, d2	- HTN	1	
			- HF	1	2
			- CAD	1	2
			- Acute Coronary Syndromes (ACS)	1	2
			- Dyslipidemia	1	2
			- Venous Thromboembolism (VTE)	1	2
3	<b>Midterm Exam</b>			1	2
4	Cases study of Gastrointestinal Disorders	a1, a2, b1, b2, c1, c2, d1, d2	- Peptic Ulcer Disease	1	2
			- Portal Hypertension & Cirrhosis	1	2
			- Viral Hepatitis	1	2
5	Cases study of Endocrine Disorders	a1, a2, b1, c1, c2, d1, d2	- Diabetes mellitus	1	2
			- Thyroid Disorders	1	2
	Cases study of Bone and Joint Disorders	a1, a2, b1, c1, c2, d1, d2	- Osteoporosis	1	2
			- Rheumatoid Arthritis	1	2
6	<b>Final Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

#### V. Teaching Strategies of the Course:

- Assignments
- Interactive class discussions
- Office hours
- Seminars

#### VI. Assessment Methods of the Course:

- Assignments

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- Quiz
- Exam

VII. Assignments:				
No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	Assignment 1: Case Presentation for AF.	a 1, a2, b1, b2, c1, c2, d1, d2	Week 6	5
2	Assignment 2: Search for updated guideline recommendations of CAD	a 1, a2, b1, b2, c1, c2, d1, d2	Week 12	5
<b>Total</b>				10

VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 3-13	10	10 %	a 1, a2, b1, b2, c1, c2, d1, d2
2	Quiz 1	Week 6	5	5%	a 1, a2, b1, b2, c1, c2, d1
3	Midterm Exam	Week 8	20	20 %	a 1, a2, b1, b2, c1, c2, d1
4	Quiz 2	Week 12	5	5%	a 1, a2, b1, b2, c1, c2, d1
5	Final Exam	Week 16	60	60 %	a 1, a2, b1, b2, c1, c2, d1
<b>Total</b>			100	100 %	

IX. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
	<ol style="list-style-type: none"> <li>1. MARIE A. CHISHOLM-BURNS and others, (2016), Pharmacotherapy: Principles &amp; practice, 4<sup>nd</sup> edition, McGraw-Hill Companies, Inc., United States of America.</li> <li>2. Joseph Dipiro, (2017), Pharmacotherapy: pathophysiologic approaches, 10<sup>th</sup> edition, McGraw-Hill Companies, Inc., United States of America.</li> </ol>
<b>2- Essential References.</b>	
	<ol style="list-style-type: none"> <li>1. Walker and Edwards, (2012), Clinical Pharmacy and Therapeutics, 5th edition.</li> </ol>

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	<p>2. Koda-Kimble, and others, (2012), Applied Therapeutics: The Clinical Use Of Drugs, 10<sup>th</sup> edition, Lippincott Williams &amp; Wilkins , Philadelphia, United States of America.</p> <p>3. Drug Information Handbook: A Clinically Relevant Resource for All Healthcare Professionals 25th Edition Lexi Comp; 25 edition (May 2, 2016).</p> <p>4. Pharmacotherapy Casebook: A Patient-Focused Approach, Tenth Edition (Pharmacy) 10th Edition, McGraw-Hill Education / Medical; 10 edition (January 2017)</p>
<b>3- Electronic Materials and Web Sites etc.</b>	
	<p>1. Word Document or Portable Data Files (PDF) for Lectures Delivery.</p> <p>2. American College of Clinical Pharmacy (ACCP) <a href="http://www.accp.com">http://www.accp.com</a></p>

<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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الجمهورية العربية السورية

وزارة التعليم العالي والبحث العلمي

**جامعة الرازي**

كلية الطب والعلوم الصحية

قسم الصيدلة





Second Part of Course Specification  
Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of Therapeutics: “case-based seminars”

Course No. (PHC328)

2022

I. Information about Faculty Member Responsible for the Course:									
Name of Faculty Member:	Dr. Ali Alyahawi			Office Hours					
Location & Telephone No.:	775957401			SA T	SU N	MO N	TU E	WE D	TH U
E-mail:	<a href="mailto:Alyahawipharm@yahoo.com">Alyahawipharm@yahoo.com</a>								

**III. Course Description:**

The course is designed to provide students with principles and concepts of biology. The course covers topics including introduction, basic biological chemistry, cell structure and function, cell division, metabolism and energy transformation, genetics, protein synthesis, tissue, evolution, and other related topics. In addition, the course will provide students with scientific knowledge on experimental skills in biological sciences as well as develop their skills in interpreting the results and reporting findings and information in a clear, and accurate

**III. Intended learning outcomes of the course (CILOs)**

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8. Alignment CILOs	
<b>E. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Describe pathophysiology, clinical presentations, and complications of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.	
a2. Define the rational medication use and goals of therapy of cardiovascular and infectious diseases.	
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:	
b1. Interpret clinical and Laboratory findings of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.	
b2. Design an appropriate pharmaceutical care plan to selected cases discussion of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.	
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:	
c1. Choose the rational pharmacotherapy regimens and monitoring parameters based on patient conditions	
c2. Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.	
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:	
d1. Search effectively for updated medical information from professional medical references.	
d2. Develop students presentation skills	

9. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1-Describe pathophysiology, clinical presentations, and complications of cardiovascular, gastrointestinal, endocrine, bone and joint disorders.	- Assignments - Interactive class discussions - Office hours	- Exam - Assignment - Quiz
a2- Define the rational medication use and goals of therapy of cardiovascular and infectious diseases.	- Seminars	

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<b>(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1-</b> Interpret clinical and Laboratory findings of cardiovascular, gastrointestinal, endocrine , bone and joint disorders.	- Assignments - Interactive class discussions	- Exam - Assignme nt
<b>b2-</b> Design an appropriate pharmaceutical care plan to selected cases discussion of cardiovascular, gastrointestinal, endocrine , bone and joint disorders.	- Office hours - Seminars	- Quiz
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>C1-</b> Choose the rational pharmacotherapy regimens and monitoring parameters based on patient conditions	- Assignments - Interactive class discussions	- Exam - Assignme nt
<b>C2-</b> Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.	- Office hours - Seminars	- Quiz
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1-</b> Search for updated medical information from the professional medical references.	- Assignments - Interactive class discussions	- Exam - Assignme nt
<b>d2-</b> Improve students presentation skills	- Office hours - Seminars	- Quiz

<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Principles of Pharmacy Practice	b1	- Pharmacist Care - Pharmacist Care Plan - Monitoring Parameters	1	2
2	Cases study of CVD		- HTN	1	
			- HF	1	2

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		a1, a2, b1, b2, c1, c2, d1, d2	- CAD	1	2
			- Acute Coronary Syndromes (ACS)	1	2
			- Dyslipidemia	1	2
			- Venous Thromboembolism (VTE)	1	2
<b>3</b>	<b>Midterm Exam</b>			1	2
<b>4</b>	Cases study of Gastrointestinal Disorders	a1, a2, b1, b2, c1,c2, d1, d2	- Peptic Ulcer Disease	1	2
			- Portal Hypertension & Cirrhosis	1	2
			- Viral Hepatitis	1	2
<b>5</b>	Cases study of Endocrine Disorders	a1, a2, b1, c1, c2, d1, d2	- Diabetes mellitus	1	2
			- Thyroid Disorders	1	2
	Cases study of Bone and Joint Disorders	a1, a2, b1, c1, c2, d1, d2	- Osteoporosis	1	2
			- Rheumatoid Arthritis	1	2
<b>6</b>	<b>Final Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

#### V. Teaching Strategies of the Course:

- Assignments
- Interactive class discussions
- Office hours
- Seminars

#### VI. Assessment Methods of the Course:

- Assignments
- Quiz
- Exam

#### VII. Assignments:

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No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Assignment 1:</b> Case Presentation for AF.	a 1, a2, b1, b2, c1, c2, d1, d2	Week 6	5
2	<b>Assignment 2:</b> Search for updated guideline recommendations of CAD	a 1, a2, b1, b2, c1, c2, d1, d2	Week 12	5
<b>Total</b>				10

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 3-13	10	10 %	a 1, a2, b1, b2, c1, c2, d1, d2
2	Quiz 1	Week 6	5	5%	a 1, a2, b1, b2, c1, c2, d1
3	Midterm Exam	Week 8	20	20 %	a 1, a2, b1, b2, c1, c2, d1
4	Quiz 2	Week 12	5	5%	a 1, a2, b1, b2, c1, c2, d1
5	Final Exam	Week 16	60	60 %	a 1, a2, b1, b2, c1, c2, d1
<b>Total</b>			100	100 %	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

3. MARIE A. CHISHOLM-BURNS and others, (2016), Pharmacotherapy: Principles & practice, 4<sup>nd</sup> edition, McGraw-Hill Companies, Inc., United States of America.
4. Joseph Dipiro, (2017), Pharmacotherapy: pathophysiologic approaches, 10<sup>th</sup> edition, McGraw-Hill Companies, Inc., United States of America.

#### 2- Essential References.

5. Walker and Edwards, (2012), Clinical Pharmacy and Therapeutics, 5th edition.
6. Koda-Kimble, and others, (2012), Applied Therapeutics: The Clinical Use Of Drugs, 10<sup>th</sup> edition, Lippincott Williams & Wilkins , Philadelphia, United States of America.
7. Drug Information Handbook: A Clinically Relevant Resource for All Healthcare Professionals 25th Edition Lexi Comp; 25 edition (May 2, 2016).

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	8. Pharmacotherapy Casebook: A Patient-Focused Approach, Tenth Edition (Pharmacy) 10th Edition, McGraw-Hill Education / Medical; 10 edition (January 2017)
<b>3- Electronic Materials and Web Sites etc.</b>	
	3. Word Document or Portable Data Files (PDF) for Lectures Delivery.
	4. American College of Clinical Pharmacy (ACCP) <a href="http://www.accp.com">http://www.accp.com</a>

<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
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<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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السنة الرابعة  
الفصل الأول

FOURTH level ( 1 <sup>st</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr	Cr. hr	
1	Experimental Pharmacology	علم الأدوية التجريبي	PHP417	2	2	3	Pre: PHP322
2	Integrated-Case based Learning II	التعلم القائم على الحالات 2	PHC416	-	2	1	Co: PHP414
3	Therapeutics II	معالجة دوائية 2	PHP415	2	-	2	Pre: PHP324
4	Clinical Pharmacy II	صيدلة سريرية 2	PHC414	2	-	2	Pre: PHP326; Co:PHP418
5	Phytochemistry II	كيمياء عقاقير 2	PHG413	2	2	3	Pre: PHG321
6	Cosmetic preparations	مستحضرات تجميل	PHT412	2	2	3	Pre: PHT323
7	Pharmaceutical instrumental analysis II	تحليل الي صيدلاني 2	PHM41 1	2	2	3	Pre: PHM324
8	Pharmacology IV	علم الأدوية 4	PHP418	2	-	2	Pre: PHP322;
Total				14	10	19	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisite



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Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of  
EXPERIMENTAL PHARMACOLOGY**

Course Code No. (PHP417)

2022



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Course Specification

**EXPERIMENTAL PHARMACOLOGY**

I. Course Identification and General Information:					
1	Course Title:	EXPERIMENTAL PHARMACOLOGY			
2	Course Code & Number:	PHP417			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
		3	Lecture	Exercise	
			2	--	2
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Pre: PHP 322			
6	Co –Requisite (if any):	-----			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Nabil Albaser			
13	Date of Approval:	2022			

**L: lecturing ; Tut: Tutorial , S: seminar ; P: practical ; Tr.: training**

II. Course Description:
The course deals with the study of experiments related to study of drug effects on animals. Therefore, this course is a complementary of the previously studied pharmacology courses. The course also provides students with practical skills of pharmacology.

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
53. Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b> Identify types of animals used for testing of drugs. <b>a2.</b> Determine the types of drug effects and toxicity of drugs tested on experimental animals.
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Explicit the techniques and approaches of experimenting drugs on animals as well as the alternative methods in which animals are not used such as simulation.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Comprehend his/her role as a pharmacist in implementing ethics and laws regulations while experimenting drugs on animals and employing alternative methods for drug testing.
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<b>b1.</b> Interpret outcome data obtained after a pharmacologic experiment.
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b2.</b> Classify the drug effects tested on animals. <b>b3.</b> Assess the effect of the drug on the tested animals.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c1.</b> Perform effectively the experiments, practical tasks including experimenting of drugs on animals using standard procedures.

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<b>C3</b>	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	<b>c2. Take</b> the required safety criteria during performing different types of practical and professional pharmacy works.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1. Share</b> successfully in team-work. <b>d2. Communicate</b> effectively with his/her colleagues.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d3. Comply</b> to pharmacy laws and ethics and behave in discipline during practicing practical and professional works and assignments.

54. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify types of animals used for testing of drugs.	Active lecture, laboratory practice	Written exam, Attendance, Practical assessment (Lab. attendance, accomplishment)
<b>a2.</b> Determine the types of drug effects and toxicity of drugs tested on experimental animals.		
<b>a3.</b> Explicit the techniques and approaches of experimenting drugs on animals as well as the alternative methods in which animals are not used such as simulation.	Active lecture	Written exam, Attendance
<b>a4.</b> Comprehend his/her role as a pharmacist in implementing ethics and laws regulations while experimenting drugs on animals and employing alternative methods for drug testing.	Active lecture, laboratory practice	Written exam, Attendance Practical assessment (Lab. attendance, accomplishment)
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret outcome data obtained after a pharmacologic experiment.	laboratory practice	Practical assessment (Lab. attendance, accomplishment,

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		oral/written exam, practical exam)
<b>b2.</b> Classify the drug effects tested on animals.	Active lecture	Written exam, Attendance
<b>b3.</b> Assess the effect of the drug on the tested animals.	Active lecture laboratory practice	Written exam, Attendance Practical assessment (Lab. attendance, accomplishment, oral/written exam, practical exam)
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Perform effectively the experiments, practical tasks including experimenting of drugs on animals using standard procedures.	laboratory practice feed-back learning, Group-project	Practical assessment (Lab. attendance, accomplishment, attitude, practical exam)
<b>c2.</b> Take the required safety criteria during performing different types of practical and professional pharmacy works.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Share successfully in team-work.	laboratory practice Feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam) Assignments
<b>d2.</b> Communicate effectively with his/her colleagues.		
<b>d4.</b> Comply to pharmacy laws and ethics and behave in discipline during practicing practical and professional works and assignments.		

<b>LVIII. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction to experimental pharmacology</b>	a1, a3, a4, d2	<ul style="list-style-type: none"> <li>Definition of terms: experimental pharmacology, experimental animals</li> <li>Objectives of experimental pharmacology</li> <li>Brief history of experimental pharmacology</li> </ul>	1	2
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			<ul style="list-style-type: none"> <li>Approaches: in vivo testing, in vitro testing, vivisection, etc.</li> </ul>		
2	<b>Experimental animals</b>	a1, a4, d2	<ul style="list-style-type: none"> <li>Handling of experimental animals</li> <li>Requirements (food, homes, light, etc.) of animals cages.</li> <li>Types and specifications of experimental animals: <ul style="list-style-type: none"> <li>Invertebrates: fruit flies (Drosophila)</li> <li>Vertebrates: fishes, cats, dogs, frogs, rabbits, rats, monkey, etc.</li> </ul> </li> </ul>	2	4
3	<b>Applied experimental pharmacology researches</b>	a2, a3, a4, b1, b2, b3, d2	<p>Procedures and objectives of researches focusing on :</p> <ul style="list-style-type: none"> <li>Drug testing</li> <li>Drug safety testing</li> <li>Xenotransplantation</li> <li>Cosmetic testing</li> <li>Genetic-modifying testing</li> <li>Others</li> </ul>	2	4
4	<b>Drug testing safety</b>	a2, a3, a4, b1, b2, b3, d2	<p>Procedure and objectives of:</p> <ul style="list-style-type: none"> <li>LD<sub>50</sub> test</li> <li>Eye irritancy</li> <li>Skin irritation</li> <li>Mutagenicity &amp; carcinogenicity</li> <li>Toxicokinetic &amp; ADME</li> <li>Metabolic toxicity</li> </ul>	2	4
<b>Mid-term exam</b>				1	2
	<b>Drug testing safety</b>	a2, a3, a4, b1, b2, b3, d2	<p>Procedure and objectives of:</p> <ul style="list-style-type: none"> <li>Pyrogen testing</li> <li>Phototoxicity</li> <li>Embryotoxicity</li> <li>Endocrine disrupts</li> <li>Ecotoxicity</li> <li>Toxicogenomics</li> </ul>	2	4
5	<b>Ethics, regulations &amp; laws of using experimental animals</b>	a4	<ul style="list-style-type: none"> <li>Ethics of use of experimental animals: The three Rs (replacement, refinement, reduction)</li> <li>Regulations e.g., animal welfare act</li> </ul>	2	4

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6	<b>Alternatives to animal testing</b>	a3, a4	<ul style="list-style-type: none"> <li>Organs-on-a-chip</li> <li>In silico: computer simulation</li> <li>Microdosing</li> <li>Position emission tomography</li> </ul>	2	4
<b>Course Review</b>		a1-a4, b1, b2, b3, d2	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

### B - Practical Aspect:

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	Introduction to pharmacology Lab: safety requirements, list of experiments, handling animals, how to report, etc.	b3, c1, c2, d1, d2	1	2
2	Testing of drug effects on rabbit eyes: miotics, mydriatics, normal saline	b2, c1, c2, d1, d3	2	4
3	Testing of skin irritation of dermatological products on animals: (ciprofloxacin cream), tetracycline ointments, ketoprofen gel	b1, c1, c2, d2, d3	2	4
4	Testing of eye irritancy of solutions: eye washes	b1, c1, c2, d1, d2	1	2
5	Testing of LD <sub>50</sub> of drugs: warfarin, digoxin	b3, c1, c2, d2	2	4
6	Pyrogen testing of parenteral injections: vitamin B complex ampoules, sterile water for injection	b3, c1, c2, d1, d2	2	4
7	Review	b2, c1, c2, d1, d2, d3	1	2
<b>PRACTICAL EXAM</b>		b1, b2, b3 c1, c2, d1, d2, d3	1	2
<b>Total</b>			12	24
<b>Number of Weeks</b>				12

### XLV. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

XL. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student will be assigned to provide a search-based report supported with illustrating videos on drug testing on animals.	c1, c2, d1	4-13	3
2	<b>Group</b> : every group of students will be assigned to provide a search-based report on other alternative methods for testing drugs studied in the course.	c1, c2, d2, d3	14	2

VII. Schedule of Assessment Tasks for Students During the Semester					
Theoretical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	2.5	2.5	a1, a2, b1, b2, d2
2	Assignments (1 + 2)	4, 14	5	5	a1, a2, a3, b1, b2, b3, d3
3	Quiz 1 + Quiz 2	7, 12	2.5	2.5	a1, b1, a2, b2, d1
4	Mid-semester exam of theoretical part (written exam)	7	10	10	a1, a2, b1, b2, d2
5	Final exam of theoretical part (written exam)	17	40	40	a1, a2, a3, a4, b1, b2, b3, d1, d2, d3
<b>TOTAL</b>			60	60 %	60

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Practical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Attendance	Weekly	5	5	b1, b3, c1, c2, d1, d2, d2
2	Lab. Attitude	weekly	2.5	2.5	b2, b3, c1, c2, d1, d3
3	Lab. Accomplishments	weekly	5	5	b3, c1, c2, d2, d2
4	Lab. Reporting	weekly	2.5	2.5	b1, c1, c2, d3
5	Exam of practice theory (written exam or oral exam)	14	5	5	b1, b2, c1, c2, d1, d2
6	Practical exam (practical)	14	20	20	b1, b3, c1, c2, d1, d2, d2
Total			40	40 %	

#### LVI. Learning Resources:

##### 1- Required Textbook(s) (maximum two ).

1. **Rosenthal**, Walte, Handbook of Experimental Pharmacology, Springer, 2004

##### 2- Essential References.

1. Dinseh Badyal, Practical manual of pharmacology, Jaypee, India, 2008
2. Aulbach, A. D., and C. J. Amuzie. "A comprehensive guide to toxicology in nonclinical drug development." Biomarkers in Nonclinical Drug Development. Elsevier Inc., 2017.

##### 3- Electronic Materials and Web Sites *etc.*

1. [https://en.wikipedia.org/wiki/Animal\\_testing](https://en.wikipedia.org/wiki/Animal_testing)
2. <https://www.oecd.org>

#### LVII. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b>

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	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**EXPERIMENTAL PHARMACOLOGY**  
Course No. ()  
Code (PHP417)

XLI.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Nabil Albaser	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
The course deals with the study of experiments related to study of drug effects on animals. Therefore, this course is a complementary of the previously studied pharmacology courses. The course also provides students with practical skills of pharmacology.

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III. Intended learning outcomes of the course (CILOs)
<b>1. Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
<b>a1.</b> Identify types of animals used for testing of drugs.
<b>a2.</b> Determine the types of drug effects and toxicity of drugs tested on experimental animals.
<b>a3.</b> Explicit the techniques and approaches of experimenting drugs on animals as well as the alternative methods in which animals are not used such as simulation.
<b>a4.</b> Comprehend his/her role as a pharmacist in implementing ethics and laws regulations while experimenting drugs on animals and employing alternative methods for drug testing.
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:
<b>b1.</b> Interpret outcome data obtained after a pharmacologic experiment.
<b>b2.</b> Classify the drug effects tested on animals.
<b>b3.</b> Assess the effect of the drug on the tested animals.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
<b>c1.</b> Perform effectively the experiments, practical tasks including experimenting of drugs on animals using standard procedures.
<b>c2.</b> Take the required safety criteria during performing different types of practical and professional pharmacy works.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:
<b>d1.</b> Share successfully in team-work.
<b>d2.</b> Communicate effectively with his/her colleagues.
<b>d3.</b> Comply to pharmacy laws and ethics and behave in discipline during practicing practical and professional works and assignments.

55. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify types of animals used for testing of drugs.	Active lecture, laboratory practice	Written exam, Attendance, Practical assessment (Lab. attendance, accomplishment)
<b>a2.</b> Determine the types of drug effects and toxicity of drugs tested on experimental animals.		
<b>a3.</b> Explicit the techniques and approaches of experimenting drugs on animals as well as the alternative methods in which animals are not used such as simulation.	Active lecture	Written exam, Attendance

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a4. Comprehend his/her role as a pharmacist in implementing ethics and laws regulations while experimenting drugs on animals and employing alternative methods for drug testing.	Active lecture, laboratory practice	Written exam, Attendance Practical assessment (Lab. attendance, accomplishment)
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret outcome data obtained after a pharmacologic experiment.	laboratory practice	Practical assessment (Lab. attendance, accomplishment, oral/written exam, practical exam)
b2. Classify the drug effects tested on animals.	Active lecture	Written exam, Attendance
b3. Assess the effect of the drug on the tested animals.	Active lecture laboratory practice	Written exam, Attendance Practical assessment (Lab. attendance, accomplishment, oral/written exam, practical exam)
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Perform effectively the experiments, practical tasks including experimenting of drugs on animals using standard procedures.	laboratory practice feed-back learning, Group-project	Practical assessment (Lab. attendance, accomplishment, attitude, practical exam)
c2. Take the required safety criteria during performing different types of practical and professional pharmacy works.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	laboratory practice	Practical assessment (Lab. attendance, attitude, practical exam)
d2. Communicate effectively with his/her colleagues.	Feed-back learning	Assignments
d4. Comply to pharmacy laws and ethics and behave in discipline during practicing practical and professional works and assignments.		

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IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to experimental pharmacology	a1, a3, a4, d2	<ul style="list-style-type: none"> <li>Definition of terms: experimental pharmacology, experimental animals</li> <li>Objectives of experimental pharmacology</li> <li>Brief history of experimental pharmacology</li> <li>Approaches: in vivo testing, in vitro testing, vivisection, etc.</li> </ul>	1	2
2	Experimental animals	a1, a4, d2	<ul style="list-style-type: none"> <li>Handling of experimental animals</li> <li>Requirements (food, homes, light, etc.) of animals cages.</li> <li>Types and specifications of experimental animals: <ul style="list-style-type: none"> <li>Invertebrates: fruit flies (Drosophila)</li> <li>Vertebrates: fishes, cats, dogs, frogs, rabbits, rats, monkey, etc.</li> </ul> </li> </ul>	2	4
3	Applied experimental pharmacology researches	a2, a3, a4, b1, b2, b3, d2	Procedures and objectives of researches focusing on : <ul style="list-style-type: none"> <li>Drug testing</li> <li>Drug safety testing</li> <li>Xenotransplantation</li> <li>Cosmetic testing</li> <li>Genetic-modifying testing</li> <li>others</li> </ul>	2	4
4	Drug safety testing	a2, a3, a4, b1, b2, b3, d2	Procedure and objectives of : <ul style="list-style-type: none"> <li>LD<sub>50</sub> test</li> <li>Eye irritancy</li> <li>Skin irritation</li> <li>Mutagenicity carcinogenicity</li> <li>Toxicokinetic &amp; ADME</li> <li>Metabolic toxicity</li> </ul>	2	4
Mid-term exam				1	2
	Drug safety testing	a2, a3, a4, b1, b2, b3, d2	Procedure and objectives of: <ul style="list-style-type: none"> <li>Pyrogen testing</li> <li>Phototoxicity</li> <li>Embryotoxicity</li> </ul>	2	4

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			<ul style="list-style-type: none"> <li>• Endocrine disrupts</li> <li>• Ecotoxicity</li> <li>• Toxicogenomics</li> </ul>		
5	<b>Ethics, regulations &amp; laws of using experimental animals</b>	a4	<ul style="list-style-type: none"> <li>• Ethics of use of experimental animals: The three Rs (replacement, refinement, reduction)</li> <li>• Regulations e.g., animal welfare act</li> </ul>	2	4
6	<b>Alternatives to animal testing</b>	a3, a4	<ul style="list-style-type: none"> <li>• Organs-on-a-chip</li> <li>• In silico: computer simulation</li> <li>• Microdosing</li> <li>• Position emission tomography</li> </ul>	2	4
<b>Course Review</b>		a1-a4, b1, b2, b3, d2	Review of the course topics by discussion session.	1	2
<b>FINAL - EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>6 Units</b>

B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1.	Introduction to pharmacology Lab: safety requirements, list of experiments, handling animals, how to report, etc.	b3, c1, c2, d1, d2	1	2
2.	Testing of drug effects on rabbit eyes: miotics, mydriatics, normal saline	b2, c1, c2, d1, d3	2	4
3.	Testing of skin irritation of dermatological products on animals: (ciprofloxacin cream), tetracycline ointments, ketoprofen gel	b1, c1, c2, d2, d3	2	4
4.	Testing of eye irritancy of solutions: eye washes	b1, c1, c2, d1, d2	1	2
5.	Testing of LD <sub>50</sub> of drugs: warfarin, digoxin	b3, c1, c2, d2	2	4
6.	Pyrogen testing of parenteral injections: vitamin B complex ampoules, sterile water for injection	b3, c1, c2, d1, d2	2	4
7.	Review	b2, c1, c2, d1, d2, d3	1	2
<b>PRACTICAL EXAM</b>			1	2
<b>Total</b>			<b>12</b>	<b>24</b>
<b>Number of Weeks</b>				<b>12</b>

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### V. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student will be assigned to provide a search-based report supported with illustrating videos on drug testing on animals.	c1, c2, d1	4-13	3
2	<b>Group</b> : every group of students will be assigned to provide a search-based report on other alternative methods for testing drugs studied in the course.	c1, c2, d2, d3	14	2

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	2.5	2.5	a1, a2, b1, b2, d2
2	Assignments (1 + 2)	4, 14	5	5	a1, a2, a3, b1, b2, b3, d3
3	Quiz 1 + Quiz 2	7, 12	2.5	2.5	a1, b1, a2, b2, d1
4	Mid-semester exam of theoretical part (written exam)	7	10	10	a1, a2, b1, b2, d2
5	Final exam of theoretical part (written exam)	17	40	40	a1, a2, a3, a4, b1, b2, b3, d1, d2, d3
<b>TOTAL</b>			<b>60</b>	<b>60 %</b>	<b>60</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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Practical part assessment					
No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Attendance	Weekly	5	5	b1, b3, c1, c2, d1, d2, d2
2	Lab. Attitude	weekly	2.5	2.5	b2, b3, c1, c2, d1, d3
3	Lab. Accomplishments	weekly	5	5	b3, c1, c2, d2, d2
4	Lab. Reporting	weekly	2.5	2.5	b1, c1, c2, d3
5	Exam of practice theory (written exam or oral exam)	14	5	5	b1, b2, c1, c2, d1, d2
6	Practical exam (practical)	14	20	20	b1, b3, c1, c2, d1, d2, d2
Total			40	40 %	

VIII. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
1.	<b>Rosenthal, Walte</b> , Handbook of Experimental Pharmacology, Springer, 2004
<b>2- Essential References.</b>	
1.	Dinseh Badyal, Practical manual of pharmacology, Jaypee, India, 2008
2.	Aulbach, A. D., and C. J. Amuzie. "A comprehensive guide to toxicology in nonclinical drug development." Biomarkers in Nonclinical Drug Development. Elsevier Inc., 2017.
<b>3- Electronic Materials and Web Sites etc.</b>	
1.	<a href="https://en.wikipedia.org/wiki/Animal_testing">https://en.wikipedia.org/wiki/Animal_testing</a>
2.	<a href="https://www.oecd.org">https://www.oecd.org</a>

IX. Course Policies: (Based on the Uniform Students' By law (2007)	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b>

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	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification

Integrated Based-Case Learning- II: “case-based seminars”

Course Code No. (PHC416)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.





I. Course Identification and General Information:					
1	Course Title:	Integrated Based-Case Learning- II: “case-based seminars”			
2	Course Code & Number:	PHC416			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Seminar	
		2	--	2	--
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Pharmacology III			
6	Co –Requisite (if any):	Therapeutics- II			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:				

II. Course Description:
<p>The course is designed to integrate the course of clinical pharmacy and therapeutics- II. It aims to improve the students skills of pharmacy practice by seminar discussion for clinical cases discussion of selected diseases. It is designed to cover the pathophysiology, clinical presentations, complications, and pharmacotherapy of selected cases discussion including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani

<b>III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>10. Alignment CILOs to PILOs</b>		
<b>F. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Describe the pathophysiology, clinical presentations, and complications of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.
A3	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a2. Discuss the rational medication use and goals of therapy for respiratory tract, renal, neurologic, immunologic, hematologic, and infectious Diseases.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	b1. Identify drug-related problems and formulate appropriate pharmaceutical care plan of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b2. Design an appropriate pharmaceutical care plan to selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines,	c1. Choose the rational pharmacotherapy regimens of selected

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	pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.
C5	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	c2. Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
D3	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d1. Search effectively for updated medical information from professional medical references.
D2	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d2. Improve students presentation skills

11. Alignment CILOs to teaching strategies and assessment strategies		
(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1-</b> Describe the pathophysiology, clinical presentations, and complications of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases <b>a2-</b> Discuss the rational medication use and goals of therapy of selected cases including respiratory tract,	<ul style="list-style-type: none"> <li>- Assignments</li> <li>- Interactive class discussions</li> <li>- Office hours</li> <li>- Seminars</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Quiz</li> </ul>

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renal, neurologic, immunologic, hematologic, and infectious diseases.		
<b>(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1-</b> Identify drug-related problems and formulate appropriate pharmaceutical care plan of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.	- Assignments - Interactive class discussions - Office hours	- Exam - Assignment - Quiz
<b>b2-</b> Design an appropriate pharmaceutical care plan to selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.	- Seminars	
<b>(C) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>C1-</b> Choose the rational pharmacotherapy regimens for selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.	- Assignments - Interactive class discussions - Office hours	- Exam - Assignment - Quiz
<b>C2-</b> Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.	- Seminars	
<b>(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1-</b> Search efficiently for updated medical information from professional medical references	- Assignments - Interactive class discussions - Office hours	- Exam - Assignment
<b>d2-</b> Improve the students presentations skills	- Seminars	

#### IV. Course Content:

A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1			- Bronchial asthma	1	2

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	<b>Cases study of Respiratory Tract Diseases</b>	a1, a2, b1, b2, c1, c2, d1, d2	- Chronic obstructive pulmonary disease (COPD)	1	2
2	<b>Cases study of Renal diseases</b>	a1, a2, b1, b2, c1, c2, d1, d2	- Acute renal failure (ARF)	1	2
		a1, a2, b1, b2, c1, c2, d1, d2	- Chronic Kidney failure (CKD)	2	4
3	<b>Cases study of Neurologic Disorders</b>	a1, a2, b1, b2, c1, c2, d1, d2	- Epilepsy	1	2
		a1, a2, b1, b2, c1, c2, d1, d2	- Parkinson's disease	1	2
4	<b>Midterm Exam</b>			1	2
5	<b>Cases study of Immunologic disorders</b>	a1, a2, b1, b2, c1, c2, d1, d2	- Systemic Lupus Erythematosus (SLE)	1	2
6	<b>Cases study of Hematologic disorders</b>	a1, a2, b1, b2, c1, c2, d1, d2	- Anemia	1	2
		a1, a2, b1, b2, c1, c2, d1, d2	- Coagulation disorders (hemophilia)	1	2
7	<b>Cases study of Infectious Diseases</b>	a1, a2, b1, b2, c1, c2, d1, d2	- Malaria	1	2
			- Tuberculosis	1	2
			- Pneumonia	1	2
			- Antimicrobial Prophylaxis in Surgery	1	2
8	<b>Final Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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### V. Teaching strategies of the course:

1. Assignments
2. Interactive class discussions
3. Office hours
4. Seminars

### VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Assignment 1:</b> Case Presentation for DM type 1 & type II.	a 1, a2, b1, b2,c1, d1, d2	Week 6	5
2	<b>Assignment 2:</b> Search for updated guideline recommendations for managing DM type II.	a 1, a2, b1, b2,c1, d1, d2	Week 12	5
3	<b>Total</b>			10

### VII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 6, 12	10	10 %	a1, a2, b1,b2,c1, c2, d1, d2
2	Quiz 1	Week 6	5	5%	a1, a2, b1,b2,c1, c2, d1, d2
3	Midterm Exam	Week 8	20	20 %	a1, a2, b1,b2,c1, c2, d1, d2
4	Quiz 2	Week 12	5	5%	a1, a2, b1,b2,c1, c2, d1, d2
5	Final Exam	Week 16	60	60 %	a1, a2, b1,b2,c1, c2, d1, d2
	<b>Total</b>		100	100 %	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

- 1.MARIE A. CHISHOLM-BURNS and others, (2016), Pharmacotherapy: Principles & practice, 4<sup>nd</sup> edition, McGraw-Hill Companies, Inc., United States of America.
- 2.Joseph Dipiro, (2017), Pharmacotherapy: pathophysiologic approaches, 10<sup>th</sup> edition, McGraw-Hill Companies, Inc., United States of America.

#### 2- Essential References.

- 1.Walker and Edwards, (2012), Clinical Pharmacy and Therapeutics, 5th edition.

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	<p>2.Koda-Kimble, and others, (2012), Applied Therapeutics: The Clinical Use Of Drugs, 10<sup>th</sup> edition, Lippincott Williams &amp; Wilkins , Philadelphia, United States of America.</p> <p>3.Drug Information Handbook: A Clinically Relevant Resource for All Healthcare Professionals 25th Edition Lexi Comp; 25 edition (May 2, 2016).</p> <p>4.Pharmacotherapy Casebook: A Patient-Focused Approach, Tenth Edition (Pharm 10th Edition,McGraw-Hill Education / Medical; 10 edition (January 4, 2017)</p>
<b>3- Electronic Materials and Web Sites etc.</b>	
	<p>1.Word Document or Portable Data Files (PDF) for Lectures Delivery.</p> <p>2.American College of Clinical Pharmacy (ACCP) <a href="http://www.accp.com">http://www.accp.com</a></p>

<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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**جامعة الرازي**

كلية الطب والعلوم الصحية

قسم الصيدلة





## Second Part of Course Specification

Faculty of Medicine and Health Sciences

Department of Pharmacy

Bachelor of Pharmacy

Course Specification

**Integrated Based-Case Learning- II: “case-based seminars”**

Course No. (PHC416)

2022

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member:	Dr. Ali Alyahawi	Office Hours				
Location & Telephone No.:	775957401					
E-mail:	<a href="mailto:alyahawipharm@yahoo.co">alyahawipharm@yahoo.co</a> <a href="mailto:alyahawipharm@yahoo.co">m</a>	S A T	S U N	M O N	T U E	W E D T H U

### III. Course Description:

The course is designed to integrate the course of clinical pharmacy and therapeutics- II. It aims to improve the students skills of pharmacy practice by seminar discussion for clinical cases discussion of selected diseases. It is designed to cover the pathophysiology, clinical presentations, complications, and pharmacotherapy of selected cases discussion including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.

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## Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

### A. Knowledge and Understanding:

a1	Describe the pathophysiology, clinical presentations, and complications of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases
a2	Discuss the rational medication use and goals of therapy of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.

### B. Intellectual Skills:

b1	Identify drug-related problems and formulate appropriate pharmaceutical care plan of selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.
b2	Design an appropriate pharmaceutical care plan to selected cases discussion of including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.

### C. Professional and Practical Skills:

c1	Choose the rational pharmacotherapy regimens for selected cases including respiratory tract, renal, neurologic, immunologic, hematologic, and infectious diseases.
c2	Provide effective advices of life style and drug compliance to patients in order to improve targeted outcomes.

### D. Transferable Skills:

d1	Search efficiently for updated medical information from professional medical references
d2	Improve the students presentations skills

1	Course Title:	Introduction to Pharmacy
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2	Course Code & Number:	PHP115			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	1st Level / 1st Semester			
5	Pre –Requisite (if any):	Prs: Pr:PHP418			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhwilani			
13	Date of Approval:	2022			

VIII. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Cases study of Respiratory Tract Diseases	a1, a2, b1, b2,c1, c2, d1, d2	- Bronchial asthma	1	2
			- Chronic obstructive pulmonary disease (COPD)	1	2
2	Cases study of Renal diseases	a1, a2, b1, b2,c1, c2, d1, d2	- Acute renal failure (ARF)	1	2
			- Chronic Kidney failure (CKD)	2	4
3	Cases study of Neurologic Disorders	a1, a2, b1, b2,c1, c2, d1, d2	- Epilepsy	1	2
			- Parkinson's disease	1	2

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Dr. Ali Alyahawi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



4	Midterm Exam		1	2	
5	Cases study of Immunologic disorders	a1, a2, b1, b2, c1, c2, d1, d2	- Systemic Lupus Erythematosus (SLE)	1	2
6	Cases study of Hematologic disorders	a1, a2, b1, c1, c2, d1, d2	- Anemia	1	2
		a1, a2, b1, b2, c1, c2, d1, d2	- Coagulation disorders (hemophilia)	1	2
7	Cases study of Infectious Diseases	a1, a2, b1, b2, c1, c2, d1, d2	- Malaria	1	2
			- Tuberculosis	1	2
			- Pneumonia	1	2
			- Antimicrobial Prophylaxis in Surgery	1	2
8	Final Exam		1	2	
Number of Weeks /and Units Per Semester			16	32	

## VI. Teaching Strategies of the Course:

- Assignments
- Interactive class discussions
- Office hours
- Seminars

## VII. Assessment Methods of the Course:

- Assignments
- Quiz
- Exam

## VIII. Assignments:

No.	Assignments	Week Due	Mark
1	Assignment 1: Case Presentation for AF.	Week 6	5

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### VIII. Assignments:

No.	Assignments	Week Due	Mark
2	<b>Assignment 2:</b> Search for updated guideline recommendations of CAD	Week 12	5
<b>Total</b>			10

### IX. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Assignments	Week 6, 12	10	10 %
2	Quiz 1	Week 6	5	5%
3	Midterm Exam	Week 8	20	20 %
4	Quiz 2	Week 12	5	5 %
5	Final Exam	Week 16	60	60 %
<b>Total</b>				

### X. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

- MARIE A. CHISHOLM-BURNS and others, (2016), Pharmacotherapy: Principles & practice, 4<sup>nd</sup> edition, McGraw-Hill Companies, Inc., United States of America.
- Joseph Dipiro, (2017), Pharmacotherapy: pathophysiologic approaches, 10<sup>th</sup> edition, McGraw-Hill Companies, Inc., United States of America.

#### 2- Essential References.

- Walker and Edwards, (2012), Clinical Pharmacy and Therapeutics, 5th edition.
- Koda-Kimble, and others, (2012), Applied Therapeutics: The Clinical Use Of Drugs 8<sup>th</sup> edition, Lippincott Williams & Wilkins , Philadelphia, United States of America.
- Drug Information Handbook: A Clinically Relevant Resource for All Healthcare Professionals 25th Edition Lexi Comp; 25 edition (May 2, 2016).
- Pharmacotherapy Casebook: A Patient-Focused Approach, Tenth Edition (Pharmacy) 10th Edition, McGraw-Hill Education / Medical; 10 edition (January 2017)

#### 3- Electronic Materials and Web Sites etc.

- Word Document or Portable Data Files (PDF) for Lectures Delivery.
- American College of Clinical Pharmacy (ACCP) <http://www.accp.com>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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<b>XI. Course Policies:</b>	
<b>1</b>	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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جامعة الرازي

Faculty of Medicine and Health Sciences

كلية الطب والعلوم الصحية

Department of Pharmacy

قسم الصيدلة

Bachelor of Pharmacy

## Course Specification of :

### Therapeutics- II

Course Code No. (PHP415)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.





I. Course Identification and General Information:					
1	Course Title:	Therapeutics- II			
2	Course Code & Number:	PHP415			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Pharmacology III			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:	2022			

II. Course Description:
This This course aims cover the etiology, pathophysiology, laboratory investigations, clinical picture, and the rational pharmacotherapy regimens of bronchial asthma, COPD, acute renal failure, chronic Kidney failure (CKD), epilepsy, Parkinson's, Systemic Lupus Erythematosus (SLE), anemia, Coagulation disorders, malaria, tuberculosis, Pneumonia, and antimicrobial prophylaxis in Surgery.

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
12. Alignment CILOs to PILOs		
PILOS		CILOS
<b>G. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of conditions under study.
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a2. Define the desired outcomes of drug therapy for conditions under study.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b1. Design rational pharmacotherapy regimen and monitoring plan for conditions under study.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	c1. Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of conditions under study.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		

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D3	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d1. Search efficiently for required medical information in professional medical references and sites.
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d2. Share successfully therapeutic decisions with a healthcare team and patients

13. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of conditions under study.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
a2- Define the desired outcomes of drug therapy for conditions under study.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1- Design rational pharmacotherapy regimen and monitoring plan for conditions under study	Lecture Instructor – student Interactive Exercises Solving Problem Methods	Problem-Solving Exercises. Assignment Quiz
(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
C1- Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of conditions under study.	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz
(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		

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Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1-</b> Search efficiently for required medical information in professional medical references and sites.	Self-Learning Seminar Exercises	Presentation Assignment Quiz
<b>d2-</b> Share successfully therapeutic decisions with a healthcare team and patients	Seminar Instructor–student Interactive Exercises	Presentation

IX. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	Respiratory Tract Diseases	a 1, a2, b1, c1, d1, d2	▪ Bronchial asthma	1	2
		a 1, a2, b1, c1, d1, d2	▪ Chronic obstructive pulmonary disease (COPD)	1	2
2	Renal diseases	a 1, a2, b1, c1, d1, d2	▪ Acute renal failure (ARF)	1	2
		a 1, a2, b1, c1, d1, d2	▪ Chronic Kidney failure (CKD)	2	4
3	Neurologic disorders	a 1, a2, b1, c1, d1, d2	▪ Epilepsy	1	2
		a 1, a2, b1, c1, d1, d2	▪ Parkinson's disease	1	2
4	Midterm Exam	a 1, a2, b1, c1, d1, d2		1	2
5	Immunologic disorders	a 1, a2, b1, c1, d1, d2	▪ Systemic Lupus Erythematosus (SLE)	1	2
6	Hematologic disorders	a 1, a2, b1, c1, d1, d2	▪ Anemia	1	2
		a 1, a2, b1, c1, d1, d2	▪ Coagulation disorders (hemophilia)	1	2
7	Infectious Diseases	a 1, a2, b1, c1, d1, d2	▪ Malaria	1	2
		a 1, a2, b1, c1, d1, d2	▪ Tuberculosis	1	2
		a 1, a2, b1, c1, d1, d2	▪ Pneumonia	1	2

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		a 1, a2, b1, c1, d1, d2	Antimicrobial Prophylaxis in Surgery	1	2
8	Final Exam	a 1, a2, b1, c1, d1		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

#### V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

#### VI. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

#### VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1	<b>Assignment 1:</b> Develop Pharmaceutical Care plan for selected condition under course study (Individual)	a 1, a2, b1, c1, d1, d2	6 <sup>th</sup>	5
2	<b>Assignment 2:</b> Each students group present updated guideline on selected course topic	a 1, a2, b1, c1, d1, d2	12 <sup>th</sup>	5
<b>Total</b>				<b>10</b>

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6th, 12th	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
3	Midterm Exam	Week 7	20	20%	a 1, a2, b1, c1, d1
4	Quiz 2	12 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
5	Final Exam (Theory)	Week 16	60	60%	a 1, a2, b1, c1, d1
<b>Total</b>			<b>100</b>	<b>100%</b>	

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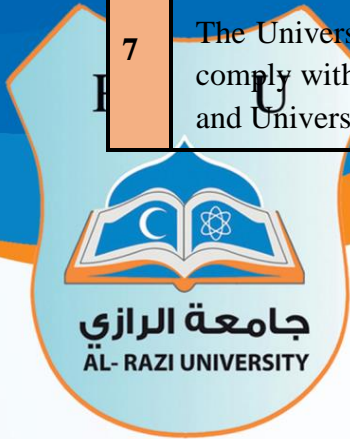


IX. Learning Resources:	
<p>•Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).</p>	
1- Required Textbook(s) ( maximum two ).	
	<p>1.Chisholm-Burns et al, 2019. Pharmacotherapy principles &amp; practice. ed. , 5<sup>th</sup> edition 2.Katzung, 2018. Basic &amp; Clinical Pharmacology, ed., 14th edition.</p>
2- Essential References.	
	<p>1 -DiPiro et al, 11th edition, 2020. Pharmacotherapy: A Pathophysiological Approach 11th edition. 2. Carolin, 2018. Applied Therapeutics: The Clinical Use of Drugs, 11th edition. 3. Walker &amp; Whittlesea, 6th edition, 2018.Clinical Pharmacy and Therapeutics, ed. W &amp; Whittlesea, 6th edition, 2018.</p>
3- Electronic Materials and Web Sites etc.	
	<p>1 -<a href="http://www.accesspharmacy.com">www.accesspharmacy.com</a> 2 -Disease management guidelines (specified in lecture notes)</p>

X. Course Policies: (Based on the Uniform Students' By law (2007)	
1	<p><b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
2	<p><b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
3	<p><b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
4	<p><b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
5	<p><b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
6	<p><b>Forgery and Impersonation:</b></p>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



Second Part of Course Specification  
Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Program of Pharmacy**

**Course Plan (Syllabus) of :**

**Therapeutics- II**

Course No. ( PHP415)

2022

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Ali Alyahawi	Office Hours					
Location & Telephone No.:	775957401	SAT	SUN	MON	TUE	WED	THU
E-mail:	<a href="mailto:alyahawipharm@yahoo.com">alyahawipharm@yahoo.com</a>						

**II. Course Description:**





This This course aims cover the etiology, pathophysiology, laboratory investigations, clinical picture, and the rational pharmacotherapy regimens of bronchial asthma, COPD, acute renal failure, chronic Kidney failure (CKD), epilepsy, Parkinson's, Systemic Lupus Erythematosus (SLE), anemia, Coagulation disorders, malaria, tuberculosis, Pneumonia, and antimicrobial prophylaxis in Surgery.

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III. Intended learning outcomes of the course (CILOs)
<b>14. Alignment CILOs</b>
<b>H. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:
a1. Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of conditions under study.
a2. Define the desired outcomes of drug therapy for conditions under study.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:
b1. Design rational pharmacotherapy regimen and monitoring plan for conditions under study.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:
c1. Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of conditions under study.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:
d1. Search efficiently for required medical information in professional medical references and sites.
d2. Share successfully therapeutic decisions with a healthcare team and patients

15. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1-</b> Describe the clinical manifestations, pathophysiology, laboratory tests, physical examination, diagnosis, and prognosis of conditions under study.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
<b>a2-</b> Define the desired outcomes of drug therapy for conditions under study.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1-</b> Design rational pharmacotherapy regimen and monitoring plan for conditions under study	Lecture	Problem-Solving Exercises.

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	Instructor – student Interactive Exercises Solving Problem Methods	Assignment Quiz
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>C1-</b> Implement rational pharmacotherapy regimen and monitoring plan to achieve targeted therapeutic outcomes of conditions under study.	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1-</b> Search efficiently for required medical information in professional medical references and sites.	Self-Learning Seminar Exercises	Presentation Assignment Quiz
<b>d2-</b> Share successfully therapeutic decisions with a healthcare team and patients	Seminar Instructor–student Interactive Exercises	Presentation

<b>X. Course Content:</b>					
A – Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	Respiratory Tract Diseases	a 1, a2, b1, c1, d1, d2	▪ Bronchial asthma	1	2
		a 1, a2, b1, c1, d1, d2	▪ Chronic obstructive pulmonary disease (COPD)	1	2
2	Renal diseases	a 1, a2, b1, c1, d1, d2	▪ Acute renal failure (ARF)	1	2
		a 1, a2, b1, c1, d1, d2	▪ Chronic Kidney failure (CKD)	2	4
3	Neurologic disorders	a 1, a2, b1, c1, d1, d2	▪ Epilepsy	1	2
		a 1, a2, b1, c1, d1, d2	▪ Parkinson's disease	1	2
4	Midterm Exam	a 1, a2, b1, c1, d1, d2		1	2

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5	Immunologic disorders	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Systemic Lupus Erythematosus (SLE)</li> </ul>	1	2
6	Hematologic disorders	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Anemia</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Coagulation disorders (hemophilia)</li> </ul>	1	2
7	Infectious Diseases	a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Malaria</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Tuberculosis</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Pneumonia</li> </ul>	1	2
		a 1, a2, b1, c1, d1, d2	<ul style="list-style-type: none"> <li>Antimicrobial Prophylaxis in Surgery</li> </ul>	1	2
8	Final Exam	a 1, a2, b1, c1, d1		1	2
Number of Weeks /and Units Per Semester				16	32

#### V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

#### VI. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

#### VII. Assignments:

No	Assignments	Aligned CIOs(symbols)	Week Due	Mark
1	<b>Assignment 1:</b> Develop Pharmaceutical Care plan for selected condition under course study (Individual)	a 1, a2, b1, c1, d1, d2	6 <sup>th</sup>	5

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2	<b>Assignment 2:</b> Each students group present updated guideline on selected course topic	a 1, a2, b1, c1, d1, d2	12 <sup>th</sup>	5
<b>Total</b>				<b>10</b>

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6th, 12th	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
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5	Final Exam (Theory)	Week 16	60	60%	a 1, a2, b1, c1, d1
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

- 9- Chisholm-Burns et al, 2019. Pharmacotherapy principles & practice. ed. , 5<sup>th</sup> edition  
10- Katzung, 2018. Basic & Clinical Pharmacology, ed., 14th edition.

#### 2- Essential References.

- 1 -DiPiro et al, 11th edition, 2020. Pharmacotherapy: A Pathophysiological Approach 11th edition.  
2. Carolin, 2018. Applied Therapeutics: The Clinical Use of Drugs, 11th edition.  
3. Walker & Whittlesea, 6th edition, 2018. Clinical Pharmacy and Therapeutics, ed. W & Whittlesea, 6th edition, 2018.

#### 3- Electronic Materials and Web Sites *etc.*

- 1 -[www.accesspharmacy.com](http://www.accesspharmacy.com)  
2 -Disease management guidelines (specified in lecture notes)

### X. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b>

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	No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor Program of Pharmacy**

Course Specification of  
**Clinical Pharmacy-II**  
Course Code No. (PHC414)

**2022**



This template of course specifications was prepared by CAQA, Yemen, 2017.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Albegali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



I. Course Identification and General Information:				
1	Course Title:	Clinical Pharmacy II		
2	Course Code & Number:	PHC414		
3	Credit Hours:	Credit Hours	Theory Hours	Lab. Hours
		Lecture	Seminar	
		2	2	-
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 1 <sup>st</sup> Semester		
5	Pre –Requisite (if any):	-----		
6	Co –Requisite (if any):	None		
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy		
8	Language of Teaching the Course:	English		
9	Study System:	Credit Hour System		
10	Mode of Delivery:	Full Time		
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences		
12	Prepared by:	Dr. Ali Alyahawi		
13	Date of Approval:	2022		

II. Course Description:
<p>The course aims to expose students to the comprehensive process of pharmaceutical care, including data collection, identification of drug-related problems, factors to consider when formulating care plan and professional communication of therapeutic plan in seminar based cases presentation. In addition, The course is designed to give the students the opportunity to work as team to solve clinical problems and to practice in a professional manner with peers, patients and other healthcare professionals of selected diseases.</p>

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III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
2. Alignment PILOs to CILOs		
PILOs	CILOs	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a1. Identify knowledge and skills required to practice clinical pharmacy in health care facilities.
		a2. Explicit the pharmaceutical care services offered by clinical pharmacists to patients in health care facilities.
		a3. Determine the non-pharmacotherapy and advices that assist in management of diseases.
		a4. Comprehend his/her role as a pharmacist in offering clinical pharmaceutical care services to patients in health care facilities and in participation and communication with other members of the health care team.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems	b1. Express investigational data using abbreviations.
		b2. Interpret clinical features, lab. and instrumental investigations data used in diagnosis of diseases and data of patient medical records.
		b3. Classify drug therapy problems according to their appropriate interventions.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
C5	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	c1. Provide <i>patient-centered care</i> as the medication expert (collect and interpret evidence, prioritize patient needs, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities)
		c2. Actively participate and engage as a healthcare

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		team member by demonstrating mutual respect, understanding, and values to meet patient care needs.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Share successfully in team-work.
		<b>d2.</b> Communicate effectively with his/her colleagues, members of health care team and patients.
		<b>d3.</b> Display technical and time management skill.

2-Alignment CIOs to teaching strategies and assessment strategies			
(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies	
a1	Identify knowledge and skills required to practice clinical pharmacy in health care facilities.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
a2	Explicit the pharmaceutical care services offered by clinical pharmacists to patients in health care facilities.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
a3	Determine the non-pharmacotherapy and advices that assist in management of diseases.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
a4	Comprehend his/her role as a pharmacist in offering clinical pharmaceutical care services to patients in health care facilities and in participation and communication with other members of the health care team.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies	

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b1	<b>b1.</b> Express investigational data using abbreviations.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
b2	<b>b2.</b> Interpret clinical features, lab. and instrumental investigations data used in diagnosis of diseases and data of patient medical records.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
b3	<b>b3.</b> Classify drug therapy problems according to their appropriate interventions.	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>

**(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Provide <i>patient-centered care</i> as the medication expert (collect and interpret evidence, prioritize patient needs, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities)	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
c2	Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs	<ul style="list-style-type: none"> <li>- Lectures/ Seminar</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Role plays</li> <li>- Case Presentation</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>

**(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Share successfully in team-work.	<ul style="list-style-type: none"> <li>- Role plays</li> <li>- Case Presentation</li> <li>- Seminar</li> </ul>	<ul style="list-style-type: none"> <li>- Oral presentation</li> </ul>
d2	Communicate effectively with his/her colleagues, members of health care team and patients.	<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Case Presentation</li> <li>- Seminar</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>

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d3	Display technical and time management skill.	<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Assignment</li> <li>- Office hours</li> <li>- Case Presentation</li> <li>- Seminar</li> </ul>	<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Oral presentation</li> </ul>
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IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Learning Outcomes (CILOs)	Number of Weeks	Contact Hours
1	<b>Documentation &amp; Presentation</b>	<ul style="list-style-type: none"> <li>- Guidelines for Documenting Pharmaceutical Care</li> <li>- Skills required for documenting pharmaceutical care</li> <li>- SOAP note format</li> </ul>	b2	2	4
2	Patient Counselling and basics Communication skills	<ul style="list-style-type: none"> <li>- The basics of patient communication</li> <li>- Product-specific counselling points</li> </ul>	a 1, b2, d1	2	4
3	Patient Adherence	<ul style="list-style-type: none"> <li>- Defining Adherence</li> <li>- The Patient's Medication Experience</li> <li>- Adherence as a Test of Patient-Centeredness</li> <li>- The common causes of medication non-adherence</li> <li>- Medication Management as a Solution to Non-adherence</li> </ul>	a 1, a2, b2, d1	1	2
4	Pharmaceutical care of people with infectious diseases (Cases Presentation)	<ul style="list-style-type: none"> <li>- Meningitis</li> <li>- Pneumonia</li> <li>- Urinary tract Infection (UTI)</li> </ul>	a 1, a2, a3, a4, b1, b2, c1, d1, d2	2	4
5	Mid-Term Theoretical Exam	- ...	a 1, a2, a3, a4, b1, b2, c1, d1, d3	1	2
6	Pharmaceutical and health care	Formal Case Presentation of Pharmaceutical Care for	a 1, a2, a3, a4,	4	8

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	needs of people with CVD Problems (Cases Presentation)	- HTN - HF - IHD - DVT	b1, b2, c1, d1, d2		
7	Pharmaceutical care of people with Endocrine Problems (Cases Presentation)	Formal Case Presentation of Pharmaceutical Care for - DM type 2 - Initiation and titration of insulin - Thyroid disorders	a 1,a2,a3, a4, b1,b2, c1, d1, d2	3	6
8	Final Theoretical Exam		a1, a2,a3, a4,b1, b2, c1, c2, d3	1	2
<b>Total</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16	8

#### V. Teaching Strategies of the Course:

- Lectures
- Assignment
- Office hours
- Role plays
- Case Presentation
- Seminar

#### VI. Assessment Methods of the Course:

- Assignments
- Quiz
- Exam

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	<b>Assignment 1:</b> Describe Examples of the Documentation formats for Pharmaceutical care plan	Week 6	5	a1, a2, b1, b2, d2
2	<b>Assignment 2:</b> Describe the Meaningful Use for Software Programs in Pharmaceutical care practice	Week 12	5	a1, a2, b1, b2, d2
<b>Total</b>			<b>10</b>	

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

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No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 6, 12	10	10 %	a1, a2, b1, b2, d2
2	Quiz 1	Week 6	5	5 %	a1, a2
3	Midterm Exam	Week 8	20	20 %	a1, a2, a3, a4, b1, b2, c1, d3
4	Quiz 2	Week 12	5	5%	a 1, a2, b1, b2
5	Final Exam	Week 16	60	60 %	a1, a2, a3, a4, b1, b2, c1, c2, d3
<b>Total</b>					

<b>IX. Learning Resources:</b>	
<b>1- Required Textbook(s) ( maximum two ).</b>	
	<p>3. Langely CA, Belcher D, 2009 , Applied Pharmaceutical Practice. 1st ed. Pharmaceutical Press. London. ISBN 978 0 85369 746 6</p> <p>4. David M. Angaran, Karen Whalen, 2015. Medication Therapy Management: A Comprehensive Approach., 2<sup>nd</sup> edition, ISBN: 978-0-07-184869-5</p>
<b>2- Essential References.</b>	
	<p>5. Cipolle, RJ, Strand, LM, &amp; Morley, PC, 2012. Pharmaceutical Care Practice Patient-Centered Approach to Medication Management Services (3rd edition). I 13: 978-0071756389</p> <p>6. Robert S. Beardsley, Carole L. Kimberlin, William N. Tindall, 2011, Communic Skills in Pharmacy Practice: A Practical Guide for Students and Practitioners.. 13: 978-1608316021.</p>
<b>3- Electronic Materials and Web Sites etc.</b>	
	<ul style="list-style-type: none"> <li>- www.medlineplus.com (for patient counseling).</li> <li>- www.guidelines.gov (International guidelines)</li> <li>- www.drugs.com (for drug-drug interactions)</li> <li>- www.pubmed.com (Clinical trials).</li> </ul>

<b>X. Course Policies: (Based on the Uniform Students' By law .</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b>

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	Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.







Second Part of Course Specification  
Faculty of Medicine and Health Sciences

**Department of Pharmacy**  
**Program of Pharmacy**

Course Plan (Syllabus) of Clinical Pharmacy-II

Course No. (PHC414)

2022

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Ali Alyahawi						
Location & Telephone No.:	775957401	SA T	SU N	M O N	TU E	W ED	T H U
E-mail:	--@--						

II. Course Description:
The course aims to expose students to the comprehensive process of pharmaceutical care, including data collection, identification of drug-related problems, factors to consider when formulating care plan and professional communication of therapeutic plan in seminar based cases presentation. In addition, The course is designed to give the students the opportunity to work as team to solve clinical problems and to practice in a professional manner with peers, patients and other healthcare professionals of selected diseases.

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III. Course Intended Learning Outcomes (CILOs) :	
<b>A. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:	
a1	Describe the elements of a Medication Therapy Management (MTM) service and how to provide pharmaceutical care plan to an individual patient
a2	Outline how to gather subjective and objective data to develop a care plan
a3	Determine the non-pharmacotherapy and advices that assist in management of diseases.
a4	Comprehend his/her role as a pharmacist in offering clinical pharmaceutical care services to patients in health care facilities and in participation and communication with other members of the health care team.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:	
b1	Express investigational data using abbreviations.
b2	Interpret clinical features, lab. and instrumental investigations data used in diagnosis of diseases and data of patient medical records.
b3	Classify drug therapy problems according to their appropriate interventions.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:	
c1	Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize patient needs, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities)
c2	Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:	
d1	Share successfully in team-work.
d2	Communicate effectively with his/her colleagues, members of health care team and patients.
d3	Display technical and time management skill.

IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Learning Outcomes (CILOs)	Number of Weeks	Contact Hours
1	<b>Documentation &amp; Presentation</b>	<ul style="list-style-type: none"> <li>- Guidelines for Documenting Pharmaceutical Care</li> <li>- Skills required for documenting pharmaceutical care</li> </ul>	b2	2	4

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		- SOAP note format			
2	Patient Counselling and basics Communication skills	- The basics of patient communication - Product-specific counselling points	a 1, b2, d1	2	4
3	Patient Adherence	- Defining Adherence - The Patient's Medication Experience - Adherence as a Test of Patient-Centeredness - The common causes of medication non-adherence - Medication Management as a Solution to Non-adherence	a 1, a2, b2, d1	1	2
4	Pharmaceutical care of people with infectious diseases (Cases Presentation)	- Meningitis - Pneumonia - Urinary tract Infection (UTI)	a 1, a2, a3, a4, b1, b2, c1, d1, d2	2	4
5	Mid-Term Theoretical Exam	- ...	a 1, a2, a3, a4, b1, b2, c1, d1, d3	1	2
6	Pharmaceutical and health care needs of people with CVD Problems (Cases Presentation)	Formal Case Presentation of Pharmaceutical Care for - HTN - HF - IHD - DVT	a 1, a2, a3, a4, b1, b2, c1, d1, d2	4	8
7	Pharmaceutical care of people with Endocrine Problems (Cases Presentation)	Formal Case Presentation of Pharmaceutical Care for - DM type 2 - Initiation and titration of insulin - Thyroid disorders	a 1, a2, a3, a4, b1, b2, c1, d1, d2	3	6
8	Final Theoretical Exam		a1, a2, a3, a4, b1, b2, c1, c2, d3	1	2
Total				16	32

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Number of Weeks /and Units Per Semester		16	8
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#### V. Teaching Strategies of the Course:

- Lectures
- Assignment
- Office hours
- Role plays
- Case Presentation
- Seminar

#### VI. Assessment Methods of the Course:

- Assignments
- Quiz
- Exam

#### VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	<b>Assignment 1:</b> Describe Examples of the Documentation formats for Pharmaceutical care plan	Week 6	5	a1, a2, b1, b2, d2
2	<b>Assignment 2:</b> Describe the Meaningful Use for Software Programs in Pharmaceutical care practice	Week 12	5	a1, a2, b1, b2, d2
<b>Total</b>			<b>10</b>	

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	<b>Assignments</b>	Week 6, 12	10	10 %	a1, a2, b1, b2, d2
2	<b>Quiz 1</b>	Week 6	5	5 %	a1, a2
3	<b>Midterm Exam</b>	Week 8	20	20 %	a1, a2, a3, a4, b1, b2, c1, d3
4	<b>Quiz 2</b>	Week 12	5	5%	a 1, a2, b1, b2
5	<b>Final Exam</b>	Week 16	60	60 %	a1, a2, a3, a4, b1, b2, c1, c2, d3
<b>Total</b>					

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<b>3- Electronic Materials and Web Sites etc.</b>	
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<b>7</b>	<p><b>Other policies:</b></p>

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The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHYTOCHEMISTRY II**  
Course No. (PHG413)

2022



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I. Course Identification and General Information:					
1	Course Title:	Phytochemistry II			
2	Course Code & Number:	PHG413			
3	Credit Hours: 3	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Fourth Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHG321			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Salwa Raweh			
13	Date of Approval:	2022			

II. Course Description:
This course is complementary to (phytochemistry I) course and both courses together with Pharmacognosy courses comprise the basis of phytotherapy as a part of complementary and alternative medicines. This course provides the students with study and knowledge of chemical structures extraction, isolation and identifications of phytochemicals present in medicinal plants including: phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.

III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies	
56. Alignment CILOs to PILOs	
PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
<b>A3</b> Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well	<b>a1.</b> Explain the physicochemical properties of phenyl propane derivatives, volatile oils, glycosides, tannins and present in medicinal plant.

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	as the complementary therapies including phytotherapy.			
A2	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	a2. Discuss the methods and techniques used to extract and isolate phenyl propane derivatives, volatile oils, glycosides tannins and bitter constituents present from medicinal plant.		
		a3. Define the botanical sources and therapeutic uses of phenyl propane derivatives, volatile oils, glycosides, tannins present in medicinal plant.		
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a4. Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.		
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>				
B1	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	b1. Express the chemical structure of phytochemicals using drawings.		
		b2. Differentiate between various types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.		
B2	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	b3. Classify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles		
		b4. Compare between different types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.		
		b5. Select standard operation procedure to extract, isolate and identify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles from a plant sample		
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>				
C1	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	c1. Handle efficiently and safely the chemical materials and tools used in the laboratory		
		c2. Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.		
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C2	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	c3. Screen for phenyl propane derivatives, volatile oils, glycosides, tannins and others drugs from plant sources.
C4	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	c4. Search efficiently for information using documented and electronic sources of information.
<b>C: Transferable skills: upon completion of the course, students will be able to:</b>		
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Communicate effectively and behave in discipline with colleagues. d2. Participate efficiently with his colleagues in a team work.
D2	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice	d3. Demonstrate the skills of time management and self-learning.

57. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the physicochemical properties of phenyl propane derivatives, volatile oils, glycosides, tannins and present in medicinal plant.	Active Lecture	Written exam s
a2. Discuss the methods and techniques used to extract and isolate phenyl propane derivatives, volatile oils, glycosides tannins and bitter constituents present from medicinal plant.		
a3. Define the botanical sources and therapeutic uses of phenyl propane derivatives, volatile oils, glycosides, tannins present in medicinal plant.		
a4. Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies

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<b>b1.</b> Express the chemical structure of phytochemicals using drawings.	Active Lecture, Feed-back learning	Written exams, quizzes
<b>b3.</b> Classify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.	Active Lecture	Written exam s
<b>b2.</b> Differentiate between various types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles	Active Lecture, lab. practice	Written exam s, lab. term works, final practical exam
<b>b4.</b> Compare <b>between</b> different types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.		
<b>b5.</b> Select standard operation procedure to extract, isolate and identify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g. bitter principles from a plant sample		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.		
<b>c3.</b> Screen for phenyl propane derivatives, volatile oils, glycosides, tannins and others drugs from plant sources.		
<b>c4.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments,
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group project	lab. term works, final practical exam, assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	Feed-back learning, lab. Practice	Assignments, lab. term works, final practical exam,

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XLIX. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CIOs	Sub Topics List	No. of Weeks	contact hours
1	Phenyl propane derivatives	a1, a2, b1, b2, b3, b5	<ul style="list-style-type: none"> <li>Introduction (definition, classification, biogenesis)</li> <li><b>Hydroxycinnamic acids</b> (Definition, classification, biosynthesis, chemical structure, physic-chemical properties, extraction, pharmacological properties and uses)</li> <li><b>Cinnamic aldehydes and monolignols</b> (Definition, classification, biosynthesis, chemical structure, physic-chemical properties, extraction, pharmacological properties and uses)</li> <li><b>Coumarins</b> (Definition, classification, biosynthesis, chemical structure, physic-chemical properties, extraction, pharmacological properties and uses)</li> <li><b>Stilbenoids</b> (Definition, classification, biosynthesis, chemical structure, physic-chemical properties, extraction, pharmacological properties and uses)</li> </ul>	3	6
2	Volatile oils	a1, a3, a4, b1, b3, b4, b5	<ul style="list-style-type: none"> <li>Definition, classification, distribution and occurrence; Extraction: distillation methods and solvent extraction; Chemical, physical and pharmacological properties examples of crude drugs containing volatile oils</li> </ul>	3	6
Midterm exam				1	2
3	Glycosides	a1, a2, a3, a4,	<ul style="list-style-type: none"> <li>Introduction (definition, classification, distribution,</li> </ul>	3	

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		b1, b2, b3, b5	<p>extraction, isolation and pharmacological properties)</p> <ul style="list-style-type: none"> <li>• <b>Cardioactive glycosides</b> (cardinolides, bufadienolides, sugars, structure activity relationship, distribution, extraction, chemical and physical properties, hydrolysis of cardiac glycosides, biogenesis, pharmacological properties, mechanism of action, chemical tests.</li> <li>• Chief drugs containing cardiac glycosides (Digitalis, strophanthus, Adonis, Convalaria and squill).</li> <li>• <b>Saponin glycosides</b> (definition, classification, distribution, structures, biogenesis, chemical, physical properties, characterization, biological and pharmacological properties.</li> <li>• Drugs as expectorant, antitussive, anti-exudative, adaptogens and diuretic)</li> <li>• <b>Anthracene glycosides</b> (classification, distribution, structures, biosynthesis, extraction, chemical, physical properties, characterization, pharmacological properties, Senna, Rhabarub and Aloe)</li> <li>• <b>Flavonoid glycosides</b> (classification, biosynthesis, chemical structure, physico-chemical properties, rutin, hesperidin and flavonoid containing drugs)</li> <li>• <b>Cynogenic glycosides</b> (cynogenesis, distribution, structures, biogenesis, detection, extraction, pharmacological activities and cynogenic drugs)</li> <li>• <b>Glucosinolates (Thioglycosides):</b> definition, distribution, structures, biogenesis, hydrolysis, toxicity and drugs containing glucosinolates.</li> </ul>		6
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4	<b>Tannins</b>	a1, a3, a4, b1, b2, b4, b5	<ul style="list-style-type: none"> <li>definition, classification, structure, distribution, biosynthesis, physico-chemical properties, extraction, biological properties, examples of crude drugs containing tannins</li> </ul>	1	2
5	<b>Steroids</b>	a1, a2, a3, b1, b2, b4, b5	<ul style="list-style-type: none"> <li>Definition, classification, structures, biogenesis, chemical and physical properties and characterization.</li> </ul>	1	2
6	<b>Miscellaneous e.g. bitter principles</b>	a1, a2, a3, b1, b3, b4, b5	<ul style="list-style-type: none"> <li>Definition, classification, structures, biogenesis, chemical and physical properties and characterization.</li> </ul>	1	2
<b>Course Review</b>		a1, a2, a3, a4, b1, b2, b3, b4, b5	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

### B - Practical Aspect:

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1	Phenyl propane derivatives: ( <b>Cinnamic aldehyde</b> )	c1, c2, c3, d1, d2	1	2
2	<b>Volatile oils (Peppermint oil)</b>	c1, c2, c3, d1, d2	1	2
3	<b>Volatile oils (Clove oil)</b>	c1, c2, c3, d1, d2, d3	1	2
4	<b>Saponins (Glycyrrhizin)</b>	c1, c2, c3, d1, d2	1	2
5	<b>Flavonoids (Hesperetin)</b>	c1, c2, c3, d2, d3	1	2
6	<b>Flavonoids (apigenin)</b>	c1, c2, c3, d2, d3	1	2
7	<b>Anthracin Glycoside (sennosides)</b>	c1, c2, c3, d1, d3	1	2
8	<b>Cardiac Glycoside (digoxin)</b>	c1, c2, c3, d1, d2	1	2
9	<b>Tannins in Tea</b>	c1, c2, c3, d2, d3	1	2
10	<b>Miscellaneous: bitter principles (Khellin)</b>	c1, c2, c3, d1, d3	1	2
11	<b>Review</b>	c1, c2, c3, d1, d2, d3	1	2
<b>PRACTICAL EXAM</b>		c1, c2, c3, d1, d3	1	2
<b>Total</b>			<b>12</b>	<b>24</b>

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### XLVI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### XXVI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : each student will be assigned solve the problems provided by the teacher. The problems involve nomenclature, isolation, chemical reaction, etc.	c4, d2	4-13	3
2	<b>Group</b> : each group of students will be assigned to present 2-3 videos or simulations of one of the studied extraction, isolation techniques.	c4, d1, d2, d3	14	2

### XXVII. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
TOTAL				70	70 %	70

### Practical part assessment

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No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term Works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, d1, d3
Total				30	30%	

XIV. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
6. Robbers, J. E., M. K. Speedie and V.E. Tyler Pharmacognosy and Pharmacobiotechnology. Baltimore, London, Paris: Williams and Wilkins, 1996.	
7. J. Bruneton: "Pharmacognosy, Phytochemistry, Medicinal Plants" Lavoisier Publishing, Intercept 2nd ed., 2008.	
<b>2- Essential References.</b>	
3. Evans, W. C., Trease and Evans Pharmacognosy, Edinburgh, London, New York, Oxford, Philadelphia, St. Louis and Toronto: 16th. Ed. Elsevier, 2010.	
4. Siman Mills, Kerry Bone, Desmond Corrigan, James A.Duke and Jonathan V. Wright, Principles and Practice of Phytotherapy, Modern Herbal Medicine, Churchill Living Stone (2000).	
<b>3- Electronic Materials and Web Sites etc.</b>	
http://www.pubmed.com	
http://www.botanical .com	
http://www.herbmed.com	

XV. Course Policies: (Based on the Uniform Students' By law (2007)	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
PHYTOCHEMISTRY II  
Code No (PHG413)

XLII.- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Salwa Raweh	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>II. Course Description:</b>
This course is complementary to (phytochemistry I) course and both courses together with Pharmacognosy courses comprise the basis of phytotherapy as a part of complementary and alternative medicines. This course provides the students with study and knowledge of chemical structures extraction, isolation and identifications of phytochemicals present in medicinal plants including: phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.

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III. Intended learning outcomes of the course (CILOs)	
<b>58. Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Explain the physicochemical properties of phenyl propane derivatives, volatile oils, glycosides, tannins and present in medicinal plant.	
a2. Discuss the methods and techniques used to extract and isolate phenyl propane derivatives, volatile oils, glycosides tannins and bitter constituents present from medicinal plant.	
a3. Define the botanical sources and therapeutic uses of phenyl propane derivatives, volatile oils, glycosides, tannins present in medicinal plant.	
a4. Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Express the chemical structure of phytochemicals using drawings.	
b2. Differentiate between various types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.	
b3. Classify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.	
b4. Compare between different types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.	
b5. Select standard operation procedure to extract, isolate and identify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles from a plant sample.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.	
c3. Screen for phenyl propane derivatives, volatile oils, glycosides, tannins and others drugs from plant sources.	
c4. Search efficiently for information using documented and electronic sources of information.	
<b>C: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Communicate effectively and behave in discipline with colleagues.	
d2. Participate efficiently with his colleagues in a team work.	
d3. Demonstrate the skills of time management and self-learning.	

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59. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Explain the physicochemical properties of <b>phenyl</b> propane derivatives, volatile oils, glycosides, tannins and present in medicinal plant.	Active Lecture	Written exam s
a2. Discuss the methods and techniques used to extract and isolate phenyl propane derivatives, volatile oils, glycosides tannins and bitter constituents present from medicinal plant.		
a3. Define the botanical sources and therapeutic uses of phenyl propane derivatives, volatile oils, glycosides, tannins present in medicinal plant.		
a4. Describe the role of pharmacist in extraction, isolation and identification of phytochemicals.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Express the chemical structure of phytochemicals using drawings.	Active Lecture, Feed-back learning	Written exams, quizzes
b3. Classify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.	Active Lecture	Written exam s
b2. Differentiate between various types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles	Active Lecture, lab. practice	Written exam s, lab. term works, final practical exam
b4. Compare <b>between</b> different types of phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g., bitter principles.		
b5. Select standard operation procedure to extract, isolate and identify phenyl propane derivatives, volatile oils, glycosides, tannins and others e.g. bitter principles from a plant sample		

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**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (Evaporator, Soxhlet, Grinder, Dryer and others) and perform experiments successfully in the laboratory.		
<b>c3.</b> Screen for phenyl propane derivatives, volatile oils, glycosides, tannins and others drugs from plant sources.		
<b>c4.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments,

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice, group project	lab. term works, final practical exam, assignments
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	Feed-back learning, lab. Practice	Assignments, lab. term works, final practical exam,

**L. Course Content:**

**A – Theoretical Aspect:**

Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Phenyl propane derivatives</b>	a1, a2, b1, b2, b3, b5	<ul style="list-style-type: none"> <li>Introduction (definition, classification, biogenesis)</li> <li><b>Hydroxycinnamic acids</b> (Definition, classification, biosynthesis, chemical structure, physic-chemical properties, extraction, pharmacological properties and uses)</li> <li><b>Cinnamic aldehydes and monolignols</b> (Definition,</li> </ul>	3	6

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			<p>classification, biosynthesis, chemical structure, physico-chemical properties, extraction, pharmacological properties and uses</p> <ul style="list-style-type: none"> <li>• <b>Coumarins</b> (Definition, classification, biosynthesis, chemical structure, physico-chemical properties, extraction, pharmacological properties and uses)</li> <li>• <b>Stilbenoids</b> (Definition, classification, biosynthesis, chemical structure, physico-chemical properties, extraction, pharmacological properties and uses)</li> </ul>		
2	<b>Volatile oils</b>	a1, a3, a4, b1, b3, b4, b5	<ul style="list-style-type: none"> <li>• Definition, classification, distribution and occurrence; Extraction: distillation methods and solvent extraction; Chemical, physical and pharmacological properties examples of crude drugs containing volatile oils</li> </ul>	3	6
<b>Midterm exam</b>				1	2
3	<b>Glycosides</b>	a1, a2, a3, a4, b1, b2, b3, b5	<ul style="list-style-type: none"> <li>• Introduction (definition, classification, distribution, extraction, isolation and pharmacological properties)</li> <li>• <b>Cardioactive glycosides</b> (cardinolides, bufadienolides, sugars, structure activity relationship, distribution, extraction, chemical and physical properties, hydrolysis of cardiac glycosides, biogenesis, pharmacological properties, mechanism of action, chemical tests.</li> <li>• Chief drugs containing cardiac glycosides (Digitalis, strophanthus, Adonis, Convalaria and squill).</li> <li>• <b>Saponin glycosides</b> (definition, classification, distribution, structures, biogenesis, chemical, physical properties, characterization, biological and pharmacological properties.</li> </ul>	3	6

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			<ul style="list-style-type: none"> <li>• Drugs as expectorant, antitussive, anti-exudative, adaptogens and diuretic)</li> <li>• <b>Anthracene glycosides</b> (classification, distribution, structures, biosynthesis, extraction, chemical, physical properties, characterization, pharmacological properties, Senna, Rhabarub and Aloe)</li> <li>• <b>Flavonoid glycosides</b> (classification, biosynthesis, chemical structure, physico-chemical properties, rutin, hesperidin and flavonoid containing drugs)</li> <li>• <b>Cynogenic glycosides</b> (cynogenesis, distribution, structures, biogenesis, detection, extraction, pharmacological activities and cynogenetic drugs)</li> <li>• <b>Glucosinolates (Thioglycosides):</b> definition, distribution, structures, biogenesis, hydrolysis, toxicity and drugs containing glucosinolates.</li> </ul>		
4	<b>Tannins</b>	a1, a3, a4, b1, b2, b4, b5	<ul style="list-style-type: none"> <li>• definition, classification, structure, distribution, biosynthesis, physico-chemical properties, extraction, biological properties, examples of crude drugs containing tannins</li> </ul>	1	2
5	<b>Steroids</b>	a1, a2, a3, b1, b2, b4, b5	<ul style="list-style-type: none"> <li>• Definition, classification, structures, biogenesis, chemical and physical properties and characterization.</li> </ul>	1	2
6	<b>Miscellaneous e.g. bitter principles</b>	a1, a2, a3, b1, b3, b4, b5	<ul style="list-style-type: none"> <li>• Definition, classification, structures, biogenesis, chemical and physical properties and characterization.</li> </ul>	1	2
	<b>Course Review</b>	a1, a2, a3, a4, b1, b2, b3, b4, b5	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32

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Number of Weeks /and Units Per Semester	16 weeks	6 Units
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B - Practical Aspect:				
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1	Phenyl propane derivatives: (Cinnamic aldehyde)	c1, c2, c3, d1, d2	1	2
2	Volatile oils (Peppermint oil)	c1, c2, c3, d1, d2	1	2
3	Volatile oils (Clove oil)	c1, c2, c3, d1, d2, d3	1	2
4	Saponins(Glycyrrhizin)	c1, c2, c3, d1, d2	1	2
5	Flavonoids (Hesperetin)	c1, c2, c3, d2, d3	1	2
6	Flavonoids (apigenin)	c1, c2, c3, d2, d3	1	2
7	Anthracin Glycoside (sennosides)	c1, c2, c3, d1, d3	1	2
8	Cardiac Glycoside (digoxin)	c1, c2, c3, d1, d2	1	2
9	Tannins in Tea	c1, c2, c3, d2, d3	1	2
10	Miscellaneous: bitter principles (Khellin)	c1, c2, c3, d1, d3	1	2
11	Review	c1, c2, c3, d1, d2, d3	1	2
PRACTICAL EXAM		c1, c2, c3, d1, d3	1	2
<b>Total</b>			<b>12</b>	<b>24</b>

#### XLVII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

#### XVIII. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
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Dr. Khalid Shamarekh	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



1	<b>Individual:</b> each student will be assigned solve the problems provided by the teacher. The problems involve nomenclature, isolation, chemical reaction, etc.	c4, d2	4-13	3
2	<b>Group:</b> each group of students will be assigned to present 2-3 videos or simulations of one of the studied extraction, isolation techniques.	c4, d1, d2, d3	14	2

### XXIX. Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	c4, d1, d2, d3
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, b1, b2, b3, b4, b5, d3
TOTAL				70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term Works	Attitude	1-12	5	5	c1, c2, c3, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, d1, d3
Total				30	30%	

### XVI. Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

- Robbers, J. E., M. K. Speedie and V.E. Tyler Pharmacognosy and Pharmacobiotechnology. Baltimore, London, Paris: Williams and Wilkins, 1996.
- J. Bruneton: "Pharmacognosy, Phytochemistry, Medicinal Plants" Lavoisier Publishing, Intercept 2nd ed., 2008.

#### 2- Essential References.

- Evans, W. C., Trease and Evans Pharmacognosy, Edinburgh, London, New York, Oxford, Philadelphia, St. Louis and Toronto: 16th. Ed. Elsevier, 2010.
- Siman Mills, Kerry Bone, Desmond Corrigan, James A. Duke and Jonathan V. Wright, Principles and Practice of Phytotherapy, Modern Herbal Medicine, Churchill Living Stone (2000).

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**3- Electronic Materials and Web Sites etc.**

<http://www.pubmed.com>  
<http://www.botanical.com>  
<http://www.herbmed.com>

**XVII. Course Policies: (Based on the Uniform Students' By law (2007))**

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Department of Pharmacy

Bachelor of Pharmacy

Course Specification of  
**COSMETIC PREPARATION**  
Course No. (PHT412)

2022



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I. Course Identification and General Information:					
1	Course Title:	Cosmetic Preparation			
2	Course Code & Number:	PHT412			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Fourth Level / 2 <sup>nd</sup> Semester			

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Khalid Shamarekh	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



5	Pre –Requisite (if any):	PHT323
6	Co –Requisite (if any):	None
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy
8	Language of Teaching the Course:	English
9	Study System:	Semester based System
10	Mode of Delivery:	Full Time
11	Location of Teaching the Course:	At University Facilities
12	Prepared by:	Dr. Khalid Shamarekh
13	Date of Approval:	2022

## II. Course Description:

This course provide the students with knowledge of cosmetics, which is one of the newer disciplines in pharmacy education since the role of pharmacists in cosmetic industry has been established. Therefore, this course is designed to provide knowledge and skills necessary for preparation of cosmetics used in cleaning, perfuming, making-up and other purposes and cosmeceuticals preparations used as antiaging, treatment of skin-pigmentation and other purposes.

The course is preceded by (pharmaceutics I & II) courses since the design of most cosmetic products depends on principles similar to that of liquid and semisolid pharmaceutical dosage forms. The practical part of the course provides with skills of preparation of cosmetics in pharmaceutics lab.

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<b>III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies</b>				
<b>60. Alignment CILOs to PILOs</b>				
<b>PILOs</b>		<b>CILOs</b>		
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>				
<b>A1.</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b>	Explain the general properties, advantages , disadvantages and requirements of cosmetics and cosmeceuticals	
<b>A4.</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a2.</b>	Discuss the principles, methods of preparation of various types of cosmetic preparations	
<b>A2.</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a3.</b>	Describe the role of pharmacist in formulation of cosmetic preparations. .	
<b>A3.</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a4.</b>	Identify the types of cosmetic preparations	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>				
<b>B5.</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance,	<b>b1.</b>	Classify cosmetic preparations according to their use and physical form.	
		<b>b2.</b>	Compare between various types of cosmetic preparations. .	
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	Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	
<b>B2.</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b3.</b> Design cosmetic preparations
		<b>b4.</b> Evaluate the quality of the prepared cosmetic preparations.
<b>B5.</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b5.</b> Select appropriate standard operation procedures for preparation and analysis of cosmetic products.
		<b>b6.</b> Calculate the amount of ingredient required to prepare an enlarged or reduced amount of a cosmetic preparation. ..
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1.</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
		<b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory
<b>C2.</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c3.</b> Employ the relevant way to prepare cosmetic preparations
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation,	<b>d1.</b> Participate efficiently with his colleagues in a teamwork.
		<b>d2.</b> Demonstrate the skills of time management and self-learning.

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entrepreneurial, delegation and organizational skills.	d3. Communicate effectively and behave in discipline with colleagues.
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61. Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Explicit the general properties, advantages , disadvantages and requirements of cosmetics and cosmeceuticals,	Active Lecture	Written exams
a2. Discuss the principles, methods of preparation of various types of cosmetic preparations		
A3. Describe the role of pharmacist in formulation of cosmetic preparations. .		
a4. Identify the types of cosmetic preparations		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Classify cosmetic preparations according to their use and physical form.	Active Lecture	Written exams
b2. Compare between various types of cosmetic preparations. .		
b3. Design cosmetic preparations	Feed-back learning	Quizzes
b4. Evaluate the quality of the prepared cosmetic preparations.	Laboratory practice	Lab, term works, final practical exam
b5. Select appropriate standard operation procedures for preparation and analysis of cosmetic products.		
b6. Calculate the amount of ingredient required to prepare an enlarged or reduced amount of a cosmetic preparation. ..	Active Lecture, Lab. Practice	Written exams , Lab, term works, final practical exam
(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	Laboratory practice	

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c2. Operate the instruments and perform experiments successfully in the laboratory		Lab, term works, final practical exam
c3. Employ the relevant way to prepare cosmetic preparations		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	Laboratory practice, Feedback learning, group project	Lab, term works, final practical exam, Assignments
d2. Demonstrate the skills of time management and self-learning.		
d3. Participate efficiently with his colleagues in a teamwork.		

Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction	a1, a2, a4, b2, b1, b6	<ul style="list-style-type: none"> <li>▪ Definitions (cosmetic preparations, cosmeceuticals)</li> <li>▪ Requirements cosmetics preparations registration,</li> <li>▪ Pharmaceutical classification of cosmetic preparations: <ul style="list-style-type: none"> <li>✓ Cosmetic solutions and oils</li> <li>✓ Cosmetic suspensions and foams</li> <li>✓ Cosmetic emulsions <ul style="list-style-type: none"> <li>○ Cosmetics solids and semisolids</li> </ul> </li> </ul> </li> </ul>	1	2
2	Skin-care cosmetic products	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations, examples of : <ol style="list-style-type: none"> <li>a) Anti-wrinkle or anti-aging products including face-masks</li> <li>b) Demulcents and moisturizing products</li> <li>c) Anti-acne products</li> <li>d) Skin- tanning products</li> </ol>	3	6

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			e) Skin-whitening products Hygienic and baby care products		
3	<b>Make-up and removing make-up products:</b>	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations: a) Lipsticks b) pencils c) Make up powder  Make up removing products	2	4
<b>Mid-term exam</b>				1	2
4	<b>Bath cleansing and products</b>	a1, a2, a3, a4, b1, b3, b6	Agents, formulations, method of preparations: a) Shampoos a) Soaps	1	2
5	<b>Hair care products</b>	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations: a) Hair tints (coloring) and bleaches (discoloring), b) Conditioning products for waving, straightening and fixing, c) Depilatories (hair removals). d) Hair cleansing products (lotions, powders, shampoo)  Shaving products (creams, foams, lotions, etc.).	2	4
6	<b>Pleasantly Odorants</b>	a1, a2, a3, b2, b4, b5	Agents, formulations, method of preparations: a) Perfumes b) Toilet waters a) Eau de Colog.	2	4
7	<b>Oral and dental hygiene products</b>	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations: a) Toothpaste b) Mouthwashes Dental gels	2	4
8	<b>Course Review</b>	a1, a2, a3, a4, b2, b3, b6	Review of the course topics by discussion session.	.	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	5 Units

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B. Practical Aspect:				
Order	Tasks/ Experiments	CILOs	Number of Weeks	contact hours
1	Introduction to lab: list of experiments, how to report, etc.	b4, b5, b6, c1, c2, c3, d1, d2	1	2
2	Preparation of anti-aging skin creams, anti-acne dermatological form.	b4, b5, b6, c1, c2, c3, d2, d3	2	2
3	Preparation of lipsticks	b4, b5, b6, c1, c2, c3, d1,	1	2
4	Preparation of antiseptic soap	b4, b5, c1, c2, c3, d1, d3	1	2
5	Preparation of antidandruff shampoo	b4, b5, b6, c1, c2, c3, d2, d3	1	2
6	Preparation of hair nutrient oil	b4, b5, b6, c1, c2, c3, d1, d2	1	2
7	Preparation of after-shaving product	b4, b5, b6, c1, c2, c3, d2, d3	1	2
8	Preparation of perfumes	b5, b6, c1, c2, c3, d1, d2	1	2
9	Preparation of toothpaste	b4, b5, b6, c1, c2, c3, d3	1	2
10	Preparation of dental gel	b4, b5, b6, c1, c2, c3, d1	1	2
Practical Exam		b4, b5, b6, c1, c2, c3, d1, d2, d3	1	2
<b>Total</b>			<b>11</b>	<b>22</b>

IV. Teaching strategies of the course:
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student's brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Laboratory practice</b>: students doing experiments in labs individually or in small groups</p>
<p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks,</p>

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topics summarizing or internet search. The teacher will provide them feedback correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

V. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied cosmetic preparations	c4, c5, d2	4-13	3
2	<b>Group:</b> every group is assigned to present illustrating videos on lab. and industrial preparation of 3 types of cosmetic preparations	c4, c5, d1, d2, d3	14	2

VI. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c4, c5, d1, d2, d3
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, a4, a5, b1, b2, b3, b6
3	Final exam (written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b2, b3, b6
TOTAL				70	70 %	

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b4, b5, b6, c1, c2, c3, d1, d2, d3
2		Accomplishments		5	5	

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3	Final exam (practical)	12	20	20	b4, b5, b6, c1, c2, c3, d1, d2, d3
Total			30		30 %

## VII. Learning Resources

### 1- Required Textbook(s) ( maximum two ).

1. Hans Mollet, Arnold Grubenmann. Formulation Technology: Emulsions, Suspensions, Solid Forms, 2001 Wiley-VCH Verlag, Wells.
2. Ernest W. Flick. Cosmetic and toiletry formulations, 1996, Noyes Publications

### 2- Essential References.

1. Saraf. Cosmetics
2. Aulton M.E., Pharmaceutics: the science of dosage form design, 2018, Elsevier Ltd

### 3- Electronic Materials and Web Sites etc.

#### Articles from:

www.emedicine.com  
www.sciencedirect.com  
www.blackwell.com  
www.ovid.com  
www.pubmed.com

<https://www.slideshare.net/prashantlpingale/introduction-to-cosmetics-138603089>

<https://www.slideshare.net/bknanjwade/cosmetic-products>

## VIII. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
6	<b>Forgery and Impersonation:</b>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of :  
**COSMETICS PREPARATION**  
Course Code No. (PHT412)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Khalid Shamarekh	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
<p>This course provide the students with knowledge of cosmetics, which is one of the newer disciplines in pharmacy education since the role of pharmacists in cosmetic industry has been established. Therefore, this course is designed to provide knowledge and skills necessary for preparation of cosmetics used in cleaning, perfuming, making-up and other purposes and cosmeceuticals preparations used as antiaging, treatment of skin-pigmentation and other purposes.</p> <p>The course is preceded by (pharmaceutics I &amp; II) courses since the design of most cosmetic products depends on principles similar to that of liquid and semisolid</p>



pharmaceutical dosage forms. The practical part of the course provides with skills of preparation of cosmetics in pharmaceutics lab.

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<b>IX. The Course Intended Learning Outcomes (CILOs)</b>		
<b>62. Alignment CILOs</b>		
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
a1. Explain the general properties, advantages , disadvantages and requirements of cosmetics and cosmeceuticals.		
a2. Discuss the principles, methods of preparation of various types of cosmetic preparations.		
a3. Describe the role of pharmacist in formulation of cosmetic preparations.		
a4. Identify the types of cosmetic preparations.		
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
b1. Classify cosmetic preparations according to their use and physical form.		
b2. Compare between various types of cosmetic preparations. .		
b3. Design cosmetic preparations		
b4. Evaluate the quality of the prepared cosmetic preparations.		
b5. Select appropriate standard operation procedures for preparation and analysis of cosmetic products.		
b6. Calculate the amount of ingredient required to prepare an enlarged or reduced amount of a cosmetic preparation. ..		
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory		
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3. Employ the relevant way to prepare cosmetic preparations		
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
d1. Participate efficiently with his colleagues in a teamwork.		
d2. Demonstrate the skills of time management and self-learning.		
d3. Communicate effectively and behave in discipline with colleagues.		

<b>63. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explicit the general properties, advantages , disadvantages and requirements of cosmetics and cosmeceuticals,	Active Lecture	Written exams
a2. Discuss the principles, methods of preparation of various types of cosmetic preparations		

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A3. Describe the role of pharmacist in formulation of cosmetic preparations. .		
a4. Identify the types of cosmetic preparations		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Classify cosmetic preparations according to their use and physical form.	<b>Active Lecture</b>	<b>Written exams</b>
b2. Compare between various types of cosmetic preparations. .		
b3. Design cosmetic preparations	<b>Feed-back learning</b>	<b>Quizzes</b>
b4. Evaluate the quality of the prepared cosmetic preparations.	<b>Laboratory practice</b>	<b>Lab, term works, final practical exam</b>
b5. Select appropriate standard operation procedures for preparation and analysis of cosmetic products.		
b6. Calculate the amount of ingredient required to prepare an enlarged or reduced amount of a cosmetic preparation. ..	<b>Active Lecture, Lab. Practice</b>	<b>Written exams , Lab, term works, final practical exam</b>
<b>(c)Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	<b>Laboratory practice</b>	<b>Lab, term works, final practical exam</b>
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3. Employ the relevant way to prepare cosmetic preparations		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	<b>Laboratory practice, Feed-back learning, group project</b>	<b>Lab, term works, final practical exam, Assignments</b>
d2. Demonstrate the skills of time management and self-learning.		
d3. Participate efficiently with his colleagues in a teamwork.		

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Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction</b>	a1, a2, a4, b2, b1, b6	<ul style="list-style-type: none"> <li>▪ Definitions (cosmetic preparations, cosmeceuticals)</li> <li>▪ Requirements cosmetics preparations registration,</li> <li>▪ Pharmaceutical classification of cosmetic preparations: <ul style="list-style-type: none"> <li>✓ Cosmetic solutions and oils</li> <li>✓ Cosmetic suspensions and foams</li> <li>✓ Cosmetic emulsions <ul style="list-style-type: none"> <li>○ Cosmetics solids and semisolids</li> </ul> </li> </ul> </li> </ul>	1	2
2	<b>Skin-care cosmetic products</b>	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations, examples of : f) Anti-wrinkle or anti-aging products including face-masks g) Demulcents and moisturizing products h) Anti-acne products i) Skin- tanning products j) Skin-whitening products  Hygienic and baby care products	3	6
3	<b>Make-up and removing make-up products:</b>	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations: d) Lipsticks e) pencils f) Make up powder  Make up removing products	2	4
<b>Mid-term exam</b>				1	2
4	<b>Bath cleansing and products</b>	a1, a2, a3, a4, b1, b3, b6	Agents, formulations, method of preparations: b) Shampoos  b) Soaps	1	2

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5	• Hair care products	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations: e) Hair tints (coloring) and bleaches (discoloring), f) Conditioning products for waving, straightening and fixing, g) Depilatories (hair removals). h) Hair cleansing products (lotions, powders, shampoo)  Shaving products (creams, foams, lotions, etc.).	2	4
6	Pleasantly Odorants	a1, a2, a3, b2, b4, b5	Agents, formulations, method of preparations: c) Perfumes d) Toilet waters b) Eau de Colog.	2	4
7	Oral and dental hygiene products	a1, a2, a3, a4, b2, b3, b6	Agents, formulations, method of preparations: c) Toothpaste d) Mouthwashes  Dental gels	2	4
8	Course Review	a1, a2, a3, a4, b2, b3, b6	Review of the course topics by discussion session.	.	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	5 Units

C. Practical Aspect:				
Order	Tasks/ Experiments	CILOs	Number of Weeks	contact hours
1	Introduction to lab: list of experiments, how to report, etc.	b4, b5, b6, c1, c2, c3, d1, d2	1	2
2	Preparation of anti-aging skin creams, anti-acne dermatological form.	b4, b5, b6, c1, c2, c3, d2, d3	2	2
3	Preparation of lipsticks	b4, b5, b6, c1, c2, c3, d1,	1	2
4	Preparation of antiseptic soap	b4, b5, c1, c2, c3, d1, d3	1	2

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5	Preparation of antidandruff shampoo	b4, b5, b6, c1, c2, c3, d2, d3	1	2
6	Preparation of hair nutrient oil	b4, b5, b6, c1, c2, c3, d1, d2	1	2
7	Preparation of after-shaving product	b4, b5, b6, c1, c2, c3, d2, d3	1	2
8	Preparation of perfumes	b5, b6, c1, c2, c3, d1, d2	1	2
9	Preparation of toothpaste	b4, b5, b6, c1, c2, c3, d3	1	2
10	Preparation of dental gel	b4, b5, b6, c1, c2, c3, d1	1	2
Practical Exam		b4, b5, b6, c1, c2, c3, d1, d2, d3	1	2
<b>Total</b>			<b>11</b>	<b>22</b>

#### X. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feedq-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

#### XI. Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to present a search report supported with images on 5 trade names (commercial preparations) of the studied cosmetic preparations	c4, c5, d2	4-13	3
2	<b>Group</b> : every group is assigned to present illustrating videos on lab. and industrial preparation of 3 types of cosmetic preparations	c4, c5, d1, d2, d3	14	2

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XII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b3
		Assignments	7, 12	5	5	c4, c5, d1, d2, d3
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, a4, a5, b1, b2, b3, b6
3	Final exam ( written exam)		16	50	50	a1, a2, a3, a4, a5, b1, b2, b3, b6
TOTAL				70	70 %	

Practical part assessment						
No .	Assessment Method		Week Due	Mar k	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b4, b5, b6, c1, c2, c3, d1, d2, d3
2		Accomplishmen ts		5	5	
3	Final exam (practical)		12	20	20	b4, b5, b6, c1, c2, c3, d1, d2, d3
Total				30	30 %	

XIII. Learning Resources	
<b>1- Required Textbook(s) ( maximum two ).</b>	
3. Hans Mollet, Arnold Grubenmann. Formulation Technology: Emulsions, Suspensions, Solid Forms, 2001 Wiley-VCH Verlag, Wells.	
4. Ernest W. Flick. Cosmetic and toiletry formulations, 1996, Noyes Publications	
<b>2- Essential References.</b>	
3. Saraf. Cosmetics	
4. Aulton M.E., Pharmaceutics: the science of dosage form design, 2018, Elsevier Ltd	
<b>3- Electronic Materials and Web Sites etc.</b>	
Articles from: www.emedicine.com www.sciencedirect.com www.blackwell.com www.ovid.com www.pubmed.com <a href="https://www.slideshare.net/prashantlpingale/introduction-to-cosmetics-138603089">https://www.slideshare.net/prashantlpingale/introduction-to-cosmetics-138603089</a> <a href="https://www.slideshare.net/bknanjwade/cosmetic-products">https://www.slideshare.net/bknanjwade/cosmetic-products</a>	

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XIV. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
2	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
3	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
4	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
5	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.</p>
6	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.</p>
7	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL INSTRUMENTAL ANALYSIS II**  
Course Code No. (PHM411)

2022



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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Instrumental Analysis II			
2	Course Code & Number:	PHM411			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Fourth Level /1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Prs: PHM325			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ahmed Al-Ghani			
13	Date of Approval:	2022			

II. Course Description:
<p>The course provides the student with knowledge and skills of advanced analytical techniques used for analysis of substances including drugs. The course focuses on the study of principles, instrumentation and applications of advanced chromatographic techniques (high performance liquid chromatography (HPLC), ultra –high performance liquid chromatography (UHPLC), gas chromatography (GC), gel filtration chromatography (GFC), electrochromatography (EC), Nuclear magnetic resonance (NMR) and advanced coupled techniques such as GC-MS. The practical part of the course provides the student with skills to operate that equipment and perform analysis of compounds by those techniques.</p>

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**3. Alignment CILOs to PILOs**

PILOs		CILOs
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy	<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a2.</b> Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	<b>b2.</b> Classify advanced analytical technique based on principles of works. <b>b3.</b> Lay out the design of advanced analytical techniques.
<b>B5</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b4.</b> Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.

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<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (HPLC chromatography, TLC, GC and GC/Mass) and perform experiments successfully in the laboratory.
		<b>c3.</b> Practice and carry out assays of number of drugs by chromatographic methods.
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c4.</b> Utilize HPLC, UPLC, Gass chromatography and mass spectrometry simulated programs to identification of drugs.
		<b>c5.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
		<b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate the skills of time management and self-learning.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d4.</b> Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.

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<b>4. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exam s
<b>a2.</b> Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.		
<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Classify advanced analytical technique based on principles of works.		
<b>b3.</b> Lay out the design of advanced analytical techniques.		
<b>b4.</b> Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (HPLC chromatography, TLC, GC and GC/Mass) and perform experiments successfully in the laboratory.		
<b>c3.</b> Practice and carry out assays of number of drugs by chromatographic methods.	feed-back learning, Group-project	Assignments
<b>c4.</b> Utilize HPLC, UPLC, Gass chromatography and mass spectrometry simulated programs to identification of drugs.		

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c5. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d4. Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.		

#### IV. Course Contents:

A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction of Chromatography	a1, a2, a3, b1	<ul style="list-style-type: none"> <li>- Basic theory</li> <li>- Plate theory</li> <li>- efficiency</li> <li>- concepts</li> <li>- Thin Layer chromatography</li> <li>- Ion exchange chromatography</li> <li>- Column chromatography</li> </ul>	2	4
2	HPLC - introduction	a1, a2, a3, b1, b2, b3, b4, c3, d1, d2	<ul style="list-style-type: none"> <li>- Basic designs</li> <li>- Components</li> <li>- function.</li> <li>- Types of stationary phase and chromatographic modes i.e., normal vs reversed phase</li> </ul>	2	4
3	HPLC and its	a1, a2, a3, b1, b2, b3,	<ul style="list-style-type: none"> <li>-specific applications,</li> <li>-drugs in dosage forms,</li> <li>-calibrations curves,</li> </ul>	2	4

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	<b>applications and TLC</b>	b4, c1, c2, d1	–external standard, drugs in plasma		
<b>4</b>	<b>UPLC - introduction</b>	a1, a2, a3, b1, b2, b3, b4, d1	–Basic designs –Components –function. –Types of stationary phase and chromatographic modes i.e., normal vs reversed phase. –difference between HPLC and UPLC	2	4
<b>5</b>	<b>Mid-Term Exam</b>	a1, a2, a3, b1, b2, b3, b4, c3, d3		1	2
<b>6</b>	<b>Gas chromatography</b>	a1, a2, a3, b1, b2, b3, b4, c3, d1, d3,	– Basic concepts – Types of stationary phase and chromatographic modes i.e., normal vs reversed phase. – Applications	2	4
<b>7</b>	<b>Advanced coupled techniques such as GC-MS.</b>	a1, a2, a3, b1, b2, b3, b4, c3, d1, d3	Theoretical principle and components, components interactions, types, instrumentation, factors affecting, output data, applications in quantitative/qualitative analysis, data interpretation: – HPLC-MS – HPLC-CD – GC-MS – Others	2	4
<b>8</b>	<b>Electrophoresis</b>	a1, a2, b1, b2, b3, b4, c3, d1, d3	– Principle, Instrumentation, working conditions, factors affecting separation and applications – Paper electrophoresis • Gel electrophoresis • Capillary electrophoresis	2	4

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			<ul style="list-style-type: none"> <li>• Zone electrophoresis</li> <li>• Moving boundary electrophoresis</li> <li>• Isoelectric focusing</li> </ul>		
9	<b>Final Theoretical Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

<b>B. Practical Aspect:</b>				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	- Introduction to separation methods	a1, a2, b1, b2, d3, d4	1	2
2	- Separation of some ions by paper chromatography	a1, b1, b2, c1, c2, c3, c4, c5, d1, d3	1	2
3	- Separation of amino acids by paper chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d2, d3	1	2
4	- Determination the purity of some drugs by thin layer chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2, d4	1	2
5	- Separation of sugars by thin layer chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d3	1	2
6	- Separation of some compounds by column chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2	1	2
7	- Separation of plant pigments by column chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2	1	2
8	- <b>Demonstration experiment on HPLC</b>	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2, d4	1	2
9	- Simulation for HPLC	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2	1	2
10	- <b>Demonstration experiment on Gas Chromatography</b>	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2, d3	1	2
11	Final exam	a1, a2, a3, b1, b2, b3, c1, c2, c3, c4, d3	1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>12</b>	<b>24</b>

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### LVIII. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

### XLI. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve the problems provided by the teacher at the end of each unit.	b2, c3, c4, d4	4-13
2	<b>Group</b> : each group of students will be assigned to provide a video of simulation of one of the analytical technique studied. The students of each group must explain the simulation for other students.	c3, c4, d1, d2, d3, d4	14

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	c3, c4, d1, d3, d4
2	Mid-semester exam of theoretical part (written exam)	7	10	10	a1, a2, a3, b1, b2, b3, b4, d3	
3	Final exam of theoretical part (written exam)	16	50	50	a1, a2, a3, b1, b2, b3, b4, d3	
TOTAL			70	70 %	70	

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Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b1, b2, b3, b4, c1, c2, c3, c4, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	a1, a2, a3, b1, b2, b3, c1, c2, c3, c4, d3
Total				30	30 %	

LVIII. Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
Satinder Ahuja and Stephen Scypinski. Handbook of Modern Pharmaceutical Analysis, 2010, Elsevier	
<b>2- Essential References.</b>	
1- er[, RuAngelie Edrada-Ebel Pharmaceutical Analysis A Textbook for Pharmacy Students and Pharmaceutical Chemists, 2012, Elsevier Churchill Livingstone	
2- USP 41-NF36, United states pharmacopeia, 2018	
<b>3- Electronic Materials and Web Sites etc.</b>	
1- <a href="https://www.slideserve.com/burian/interpreting-ir-and-nmr-spectra">https://www.slideserve.com/burian/interpreting-ir-and-nmr-spectra</a>	
2- <a href="https://www.slideshare.net/durgasairelangi/uvvisnrmrmasir">https://www.slideshare.net/durgasairelangi/uvvisnrmrmasir</a>	
<a href="https://www.slideserve.com/caridadp/identification-of-organic-compounds-by-gc-ms-ir-amp-nr">https://www.slideserve.com/caridadp/identification-of-organic-compounds-by-gc-ms-ir-amp-nr</a> <a href="#">powerpoint-ppt-presentation</a>	

LIX. Course Policies: (Based on the Uniform Students' By law (2007)	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b>

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	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.







Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
PHARMACEUTICAL INSTRUMENTAL  
ANALYSIS II

Course Code (PHM411)

XLIII.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ahmed Al-Ghani	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
The course provides the student with knowledge and skills of advanced analytical techniques used for analysis of substances including drugs. The course focuses on the study of principles, instrumentation and applications of advanced chromatographic techniques (high performance liquid chromatography (HPLC), ultra –high performance liquid chromatography (UHPLC), gas chromatography (GC), gel filtration chromatography (GFC), electrochromatography (EC), Nuclear magnetic resonance (NMR) and advanced coupled techniques such as GC-MS. The practical part of the course provides the student with skills to operate that equipment and perform analysis of compounds by those techniques.

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III. Intended learning outcomes of the course (CILOs)	
<b>5. Alignment CILOs</b>	
<b>Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:	
a1. Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	
a2. Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.	
A3. Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
b1. Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.	
B2. Classify advanced analytical technique based on principles of works.	
B3. Lay out the design of advanced analytical techniques.	
B4. Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments (HPLC chromatography, TLC, GC and GC/Mass) and perform experiments successfully in the laboratory.	
C3. Practice and carry out assays of number of drugs by chromatographic methods.	
C4. Utilize HPLC, UPLC, Gass chromatography and mass spectrometry simulated programs to identification of drugs.	
C5. Present and report his/her works correctly using appropriate writing rules and technologies media.	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
d1. Communicate effectively and behave in discipline with colleagues.	
D2. Participate efficiently with his colleagues in a team work.	
D3. Demonstrate the skills of time management and self-learning.	
D4. Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.	

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<b>6. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the physicochemical properties of substances that can be utilized for their qualitative and quantitative analysis	Active Lecture	Written exam s
<b>a2.</b> Describe the principles of advanced spectroscopic, chromatographic, NMR and coupled techniques.		
<b>a3.</b> Describe the role of pharmacist to perform accurate and precise quantitative and qualitative analysis.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret data obtained by advanced spectroscopic, chromatographic, NMR and coupled techniques.	Active Lecture, laboratory practice, Feed-back learning	Written exams, quizzes, lab. term work, practical final exam
<b>b2.</b> Classify advanced analytical technique based on principles of works.		
<b>b3.</b> Lay out the design of advanced analytical techniques.		
<b>b4.</b> Calculate the content % and identify substances in a sample using advanced spectroscopic, chromatographic, NMR and coupled technique.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (HPLC chromatography, TLC, GC and GC/Mass) and perform experiments successfully in the laboratory.		
<b>c3.</b> Practice and carry out assays of number of drugs by chromatographic methods.	feed-back learning, Group-project	Assignments
<b>c4.</b> Utilize HPLC, UPLC, Gass chromatography and mass spectrometry simulated programs to identification of drugs.		

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c5. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice, group-project	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d2. Participate efficiently with his colleagues in a team work.		
d3. Demonstrate the skills of time management and self-learning.	Lab. practice, group-project, feed-back learning	Practical assessment (Lab. attendance, attitude, practical exam), Assignments
d4. Use internet, computer-based programs to search for information that can help to solve the problems provided by the teacher at the end of each unit.		

#### IV. Course Contents:

A. Theoretical Aspect:					
No.	Units/Topics List	Learning Outcomes (CILOs)	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction of Chromatography	a1, a2, a3, b1	<ul style="list-style-type: none"> <li>- Basic theory</li> <li>- Plate theory</li> <li>- efficiency</li> <li>- concepts</li> <li>- Thin Layer chromatography</li> <li>- Ion exchange chromatography</li> <li>- Column chromatography</li> </ul>	2	4
2	HPLC - introduction	a1, a2, a3, b1, b2, b3, b4, c3, d1, d2	<ul style="list-style-type: none"> <li>- Basic designs</li> <li>- Components</li> <li>- function.</li> <li>- Types of stationary phase and chromatographic modes i.e., normal vs reversed phase</li> </ul>	2	4
3	HPLC and its	a1, a2, a3, b1, b2, b3,	<ul style="list-style-type: none"> <li>-specific applications,</li> <li>-drugs in dosage forms,</li> <li>-calibrations curves,</li> </ul>	2	4

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	<b>applications and TLC</b>	b4, c1, c2, d1	–external standard, drugs in plasma		
<b>4</b>	<b>UPLC - introduction</b>	a1, a2, a3, b1, b2, b3, b4, d1	–Basic designs –Components –function. –Types of stationary phase and chromatographic modes i.e., normal vs reversed phase. –difference between HPLC and UPLC	2	4
<b>5</b>	<b>Mid-Term Exam</b>	a1, a2, a3, b1, b2, b3, b4, c3, d3		1	2
<b>6</b>	<b>Gas chromatography</b>	a1, a2, a3, b1, b2, b3, b4, c3, d1, d3,	– Basic concepts – Types of stationary phase and chromatographic modes i.e., normal vs reversed phase. – Applications	2	4
<b>7</b>	<b>Advanced coupled techniques such as GC-MS.</b>	a1, a2, a3, b1, b2, b3, b4, c3, d1, d3	Theoretical principle and components, components interactions, types, instrumentation, factors affecting, output data, applications in quantitative/qualitative analysis, data interpretation: – HPLC-MS – HPLC-CD – GC-MS – Others	2	4
<b>8</b>	<b>Electrophoresis</b>	a1, a2, b1, b2, b3, b4, c3, d1, d3	– Principle, Instrumentation, working conditions, factors affecting separation and applications – Paper electrophoresis • Gel electrophoresis • Capillary electrophoresis	2	4

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			<ul style="list-style-type: none"> <li>• Zone electrophoresis</li> <li>• Moving boundary electrophoresis</li> <li>• Isoelectric focusing</li> </ul>		
9	<b>Final Theoretical Exam</b>			1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

<b>B. Practical Aspect:</b>				
No.	Tasks/ Experiments	Learning Outcomes (CILOs)	Week Due	Contact Hours
1	- Introduction to separation methods	a1, a2, b1, b2, d3, d4	1	2
2	- Separation of some ions by paper chromatography	a1, b1, b2, c1, c2, c3, c4, c5, d1, d3	1	2
3	- Separation of amino acids by paper chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d2, d3	1	2
4	- Determination the purity of some drugs by thin layer chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2, d4	1	2
5	- Separation of sugars by thin layer chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d3	1	2
6	- Separation of some compounds by column chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2	1	2
7	- Separation of plant pigments by column chromatography	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2	1	2
8	- <b>Demonstration experiment on HPLC</b>	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2, d4	1	2
9	- Simulation for HPLC	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2	1	2
10	- <b>Demonstration experiment on Gas Chromatography</b>	a1, a3, b1, b2, c1, c2, c3, c4, c5, d1, d2, d3	1	2
11	Final exam	a1, a2, a3, b1, b2, b3, c1, c2, c3, c4, d3	1	2
<b>Number of Weeks /and Units Per Semester</b>			<b>12</b>	<b>24</b>

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### XLIX. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

### XLII. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve the problems provided by the teacher at the end of each unit.	b2, c3, c4, d4	4-13
2	<b>Group</b> : each group of students will be assigned to provide a video of simulation of one of the analytical technique studied. The students of each group must explain the simulation for other students.	c3, c4, d1, d2, d3, d4	14

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3, b4
		Assignments	7, 12	5	5	c3, c4, d1, d3, d4
2	Mid-semester exam of theoretical part (written exam)	7	10	10	a1, a2, a3, b1, b2, b3, b4, d3	
3	Final exam of theoretical part (written exam)	16	50	50	a1, a2, a3, b1, b2, b3, b4, d3	
TOTAL			70	70 %	70	

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Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b1, b2, b3, b4, c1, c2, c3, c4, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	a1, a2, a3, b1, b2, b3, c1, c2, c3, c4, d3
Total				30	30 %	

LX. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
Satinder Ahuja and Stephen Scypinski. Handbook of Modern Pharmaceutical Analysis, 2010, Elsevier
<b>2- Essential References.</b>
1- <a href="#">er[, RuAngelie Edrada-Ebel</a> Pharmaceutical Analysis A Textbook for Pharmacy Students and Pharmaceutical Chemists, 2012, <a href="#">Elsevier Churchill Livingstone</a>
2- USP 41-NF36, United states pharmacopeia, 2018
<b>3- Electronic Materials and Web Sites etc.</b>
1- <a href="https://www.slideserve.com/burian/interpreting-ir-and-nmr-spectra">https://www.slideserve.com/burian/interpreting-ir-and-nmr-spectra</a>
2- <a href="https://www.slideshare.net/durgasairelangi/uvvisnrmrmasir">https://www.slideshare.net/durgasairelangi/uvvisnrmrmasir</a>
<a href="https://www.slideserve.com/caridadp/identification-of-organic-compounds-by-gc-ms-ir-amp-nr">https://www.slideserve.com/caridadp/identification-of-organic-compounds-by-gc-ms-ir-amp-nr</a> <a href="#">powerpoint-ppt-presentation</a>

LXI. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b>

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	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of  
PHARMACOLOGY IV**

Course Code No. (PHP418)

**2022**



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Course Specification  
**PHARMACOLOGY IV**

I. Course Identification and General Information:					
1	Course Title:	Pharmacology IV			
2	Course Code & Number:	PHP418			
3	Credit Hours: 2	Credit Hours	Theory Hours		Lab. Hours
		2	Lecture	Exercise	
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHP322 Pharmacology III			
6	Co –Requisite (if any):	-----			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Nabil Albaser			
13	Date of Approval:	2022			

**L: lecturing ; Tut: Tutorial , S: seminar ; P: practical ; Tr.: training**

II. Course Description:
<p>This is the last course in the pharmacology for pharmacists' series, which also covers the research of medication pharmacodynamics and pharmacokinetics. It is intended to address the range of therapeutic drugs that influence different systems and weren't included in the prior series. This final series' emphasis is on the medications that effect Immunosuppressants and immunomodulatory medications are examples of chemotherapeutic treatments for fungi, viruses, and parasite infections. The foundation of anticancer therapy, medications used to treat various stages of various tumors, and chemoresistance mechanisms will all be explored. In addition to unique prenatal and pediatric pharmacological elements.</p>

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**5. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge &amp; understanding :</b> Upon successful completion of the course, students will be able to:		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions. <b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Classify the drugs according to their affect to chemotherapeutic drugs for infection, parasites and cancer. <b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C5</b>	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Demonstrate time management and decision-making skills.

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<b>6. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse effects drug interactions and interactions	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics of drugs.		
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify the drugs according to their affect to chemotherapeutic drugs for infection, parasites and cancer.	Active lecture	Written exams
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Active lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate time management and decision-making skills.	Feed-back learning	Assignments

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LI. Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Chemotherapeutic drugs for fungi and viruses' infections (Antifungals &amp; antivirals)</b>	a1, a2, a3, b1,d1	Pharmacokinetics, Pharmacodynamics [ drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of: <ul style="list-style-type: none"> <li>• Antifungals (antimycotics)</li> <li>• Polyene antibiotics: nystatin, amphotericin B, griseofulvin</li> <li>• antimetabolites: Flucytosine,</li> <li>• azoles: clotrimazole, miconazoles, etc</li> <li>• Antivirals</li> <li>• anti-herpes simplex</li> <li>• anti-influenza</li> <li>• anti-AIDS</li> <li>• immunomodulators e.g., interferons</li> </ul>	3	6
2	<b>Chemotherapeutic drugs for parasitic infections</b>	a1, a2, a3, b2, c1	Pharmacokinetics, Pharmacodynamics [ drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of: <ul style="list-style-type: none"> <li>• Antiprotozoals</li> <li>• Antamoebics and anti giardials</li> <li>• Anti-leishmanial and anti-toxoplasmosis</li> <li>• Antimalarials</li> <li>• Anthelmintics</li> <li>• For common worms' infection</li> <li>• For tape worm: trematodes (taenia, H. nana) infections</li> <li>• For Schistosoma (Bilharzia)infections</li> <li>• For filariasis</li> </ul>	2	4
3		a1,a2, b1,d1	Special Aspects of Perinatal & Paediatric Pharmacology	2	4

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mid-term exam				1	2
4	<b>Chemotherapeutic drugs for cancer (Anticancers; antineoplastic )</b>	a1, a2, a3, b1, b2, c1	Pharmacokinetics, Pharmacodynamics [drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of: Classical and Novel anticancer agents • Antimetabolites: methotrexate, 5-fluorouracil. 6-mercaptopurine • Alkylating agents: nitrogen mustards, alkyl sulphonates, nitrosurea • Natural products: antibiotics, plant alkaloids, enzymes, interferons • Hormones and hormones antagonists • Radioactive isotopes • Miscellaneous: cisplatin, mitotane, etc	4	8
5	<b>Immunopharmacology</b>	a1, a2, a3, b1	• Introduction, immunosuppressive and immunomodulatory agents.	2	4
	Course Review	a1, a2, a3, b1	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>

<b>VII. Teaching strategies of the course:</b>
<p><b>Active lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.</p> <p>The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student's brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p> <p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Nabil Albaseer	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani

VIII. Assignments:			
No	Assignments	Aligned CIOs	Week Due
1	<b>Individual:</b> every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g. CVS patients, renal failure patients, etc.	b2, c2, d1	6-12

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CIOs)
1	Term Works	Quizzes	4-13, 14	5	5	b2
		Assignments	7, 12	5	5	b2, c2, d1
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, b1, d1
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, d1
TOTAL				70	70 %	70

XII. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
46. Basic & Clinical & Pharmacology, ed. Katzung, 13th edition, 2017. McGraw-Hill Medical. ISBN-13: 978-0071825054	
47. Rang, Dale and Ritter. Pharmacology, (2015), Churchill Livingstone.	
<b>2- Essential References.</b>	
11. Richard A. Harvey. Lippincott's pharmacology, 2014, Lippincott William and Wilkins.	
<b>3- Electronic Materials and Web Sites etc.</b>	
Access Pharmacy: <a href="http://accesspharmacy.mhmedical.com/">http://accesspharmacy.mhmedical.com/</a> <a href="https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4">https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4</a> <a href="https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611">https://accessmedicine.mhmedical.com/content.aspx?bookid=371&amp;sectionid=41587611</a> <a href="https://clinicalgate.com/principles-of-drug-action/">https://clinicalgate.com/principles-of-drug-action/</a> <a href="https://libguides.tulane.edu/pharm">https://libguides.tulane.edu/pharm</a>	

LXII. Course Policies: (Based on the Uniform Students' By law (2007)	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

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3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**PHARMACOLOGY IV**  
Course Code No. ( PHP418)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Nabil Albaser	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
<p>This is the last course in the pharmacology for pharmacists series, which also covers the research of medication pharmacodynamics and pharmacokinetics. It is intended to address the range of therapeutic drugs that influence different systems and weren't included in the prior series. This final series' emphasis is on the medications that effect Immunosuppressants and immunomodulatory medications are examples of chemotherapeutic treatments for fungi, viruses, and parasite infections. The foundation of anticancer therapy, medications used to treat various stages of various tumors, and chemoresistance mechanisms will all be explored. In addition to unique prenatal and pediatric pharmacological elements.</p>

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IV. Intended learning outcomes of the course (CILOs)	
<b>7. Alignment CILOs</b>	
<b>A: Knowledge &amp; understanding :</b> Upon successful completion of the course, students will be able to:	
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse drug reactions, contraindications, drug-drug/drug-food interactions.	
<b>a2.</b> Describe the pharmacokinetics, route of administration, and bioavailability of medicine in variable pharmaceutical preparations and application in pharmacy practice.	
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.	
<b>B: Intellectual skills :</b> Upon successful completion of the course, students will be able to:	
<b>b1.</b> Classify the drugs according to their affect to chemotherapeutic drugs for infection, parasites and cancer.	
<b>b2.</b> Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
<b>c1.</b> Advise the patient and healthcare professional to optimize medicine use	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
<b>d1.</b> Demonstrate time management and decision-making skills.	

8. Alignment CILOs to teaching strategies and assessment strategies		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify the actions of medicines in human body, their therapeutic uses, adverse effects drug interactions and interactions	Active lecture	Written exams
<b>a2.</b> Describe the pharmacokinetics of drugs.		
<b>a3.</b> Describe the role of pharmacist in providing correct information on rational use of medications.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Classify the drugs according to their affect to chemotherapeutic drugs for infection, parasites and cancer.	Active lecture	Written exams

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b2. Compare between therapeutically related drugs based on drug benefits (in particular efficacy and potency) and drug limitations.	Active lecture, feed-back learning	Written exam, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Advise the patient and healthcare professional to optimize medicine use	feed-back learning	assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate time management and decision-making skills.	Feed-back learning	Assignments

## LII. Course Content:

### A – Theoretical Aspect:

Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Chemotherapeutic drugs for fungi and viruses' infections (Antifungals &amp; antivirals)</b>	a1, a2, a3, b1,d1	Pharmacokinetics, Pharmacodynamics [ drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of: <ul style="list-style-type: none"> <li>• Antifungals (antimycotics)</li> <li>• Polyene antibiotics: nystatin, amphotericin B, griseofulvin</li> <li>• antimetabolites: Flucytosine, azoles: clotrimazole, miconazoles, etc</li> <li>Antivirals</li> <li>• anti-herpes simplex</li> <li>• anti-influenza</li> <li>• anti-AIDS</li> <li>• immunomodulators e.g., interferons</li> </ul>	3	6
2	<b>Chemotherapeutic drugs for parasitic infections</b>	a1, a2, a3, b2, c1	Pharmacokinetics, Pharmacodynamics [ drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions,	2	4

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			contraindications) and comparison of: <ul style="list-style-type: none"> <li>• Antiprotozoals</li> <li>• Antamoebics and anti giardials</li> <li>• Anti-leishmanial and anti-toxoplasmosis</li> <li>• Antimalarials</li> <li>• Anthelmintics</li> <li>• For common worms' infection</li> <li>• For tape worm: trematodes (taenia, H. nana) infections</li> <li>• For Schistosoma (Bilharzia)infections</li> <li>• For filariasis</li> </ul>		
3		a1,a2, b1,d1	Special Aspects of Perinatal & Paediatric Pharmacology	2	4
mid-term exam				1	2
4	<b>Chemotherapeutic drugs for cancer (Anticancers; antineoplastic )</b>	a1, a2, a3, b1, b2, c1	Pharmacokinetics, Pharmacodynamics [drug benefits: MOA, therapeutic action, indications, efficacy and potency) and drug limitation (side effects, precautions, contraindications) and comparison of: Classical and Novel anticancer agents <ul style="list-style-type: none"> <li>• Antimetabolites: methotrexate, 5-fluorouracil. 6-mercaptopurine</li> <li>• Alkylating agents: nitrogen mustards, alkyl sulphonates, nitrosurea</li> <li>• Natural products: antibiotics, plant alkaloids, enzymes, interferons</li> <li>• Hormones and hormones antagonists</li> <li>• Radioactive isotopes</li> <li>• Miscellaneous: cisplatin, mitotane, etc</li> </ul>	4	8
5	<b>Immunopharmacology</b>	a1, a2, a3, b1	<ul style="list-style-type: none"> <li>• Introduction, immunosuppressive and immunomodulatory agents.</li> </ul>	2	4
	Course Review	a1, a2, a3, b1	Review of the course topics by discussion session.	1	2
FINAL – EXAM				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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### VIII. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### IX. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve a list of problems related to advising healthcare of medicines use based comparison of drug benefits and risks for specific patients e.g. CVS patients, renal failure patients, etc.	b2, c2, d1	6-12

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b2
		Assignments	7, 12	5	5	b2, c2, d1
2	Mid-term exam (written exam)	7	10	10	a1, a2, a3, b1, d1	
3	Final exam (written exam)	16	50	50	a1, a2, a3, b1, d1	
TOTAL			70	70 %	70	

### XIII. Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

48. Basic & Clinical & Pharmacology, ed. Katzung, 13th edition, 2017. McGraw-Hill Medical. ISBN-13: 978-0071825054

49. Rang, Dale and Ritter. Pharmacology, (2015), Churchill Livingstone.

#### 2- Essential References.

12. Richard A. Harvey. Lippincott's pharmacology, 2014, Lippincott William and Wilkins.

#### 3- Electronic Materials and Web Sites etc.

Access Pharmacy: <http://accesspharmacy.mhmedical.com/>

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[https://link.springer.com/chapter/10.1007/978-981-32-9779-1\\_4](https://link.springer.com/chapter/10.1007/978-981-32-9779-1_4)  
<https://accessmedicine.mhmedical.com/content.aspx?bookid=371&sectionid=41587611>  
<https://clinicalgate.com/principles-of-drug-action/>  
<https://libguides.tulane.edu/pharm>

<b>LXIII. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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السنة الرابعة

الفصل الثاني

FOURTH level (2 <sup>nd</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr.	Cr.hr	
1	Phytotherapy	المعالجة بالأعشاب	PHG423	2	-	2	Pre: PHP417; PHG413
2	Advanced Drug Delivery Systems	أنظمة إيصال دواء متقدمة	PHT421	2	-	2	Pre: PHT412
3	Biopharmaceutics	صيدلة حيوية	PHT426	2	-	2	Pre: PHC417
4	Industrial Pharmacy	صيدلة صناعية	PHT422	3	-	3	Pre: PHT412
5	Hospital Pharmacy	صيدلة مستشفيات	PHC427	2	-	2	Pre: PHP424 Pr: PHP 228, 316, 322, 418.
6	Pharmaceutical quality Control	ضبط جودة صيدلانية	PHM425	2	2	3	Pre: PHM411
7	Toxicology	علم السموم	PHC428	2	-	2	Pre: PHP418
8	Pharmacy training I	تدريب صيدلاني 1	PHF424	-	-	*2	
Total				15	2	19	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisite ; \*: equivalent to 10 actual hours weekly at the field for 12 weeks

**\*2 credit hour of pharmacy training 2 = 320 contact hours**



المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHYTOTHERAPY**  
Course No. (PHG423)

2022



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I. Course Identification and General Information:					
1	Course Title:	Phytotherapy			
2	Course Code & Number:	PHG423			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	-
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Prs:PHP417, PHG413			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Salwa Raweh			
13	Date of Approval:	2022			

II. Course Description:
<p>This course, in its first part, provide students with knowledge in the evidence-based applications of herbal medicines and other natural types as complementary and/or alternative methods for classical Medicine for treatment of human diseases. It helps the students to utilize their knowledge and skills attained from previous courses of (Pharmacognosy I, II and phytochemistry I, II) to achieve that purpose. The second part of the course deals with the techniques and approaches employed to screen active ingredients from plants and other natural sources and to evaluate the specifications of natural products.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**1. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Describe the methods employed to screen active ingredients from plants and other natural sources and to evaluate specifications of natural products.
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a2.</b> Identify the actions of products of complementary and alternative medicine on human and their misuse or abuse.
		<b>a3.</b> Explain the basis of complementary and alternative medicine.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines	<b>b1.</b> Classify the products and methods of complementary and alternative medicine.
		<b>b2.</b> Select a suitable standard operation procedure to evaluate specifications of natural products.
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems..	<b>b3.</b> Design a suitable method to screen active ingredients from natural sources.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Assess and resolve problems independently react effectively with other health care professionals and patients
		<b>c2.</b> Take Patient history and patient assessment based upon history taken

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c3.</b> Prepare Herbal prescription and treatment plans
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Take responsibility for adaption to change misleading and adulteration that may occur in complementary and alternative medicine.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d3.</b> Retrieve the essential evidence-based references to obtain correct information relevant to complementary and alternative medicines.

<b>2. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Describe the methods employed to screen active ingredients from plants and other natural sources and to evaluate specifications of natural products.	Active Lecture	Written exams
<b>a2.</b> Identify the actions of products of complementary and alternative medicine on human and their misuse or abuse.	Active Lecture	Written exams
<b>a3.</b> Explain the basis of complementary and alternative medicine.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify the products and methods of complementary and alternative medicine.	Active Lecture	Written exams
<b>b2.</b> Select a suitable standard operation procedure to evaluate specifications of natural products.	Active Lecture, Feed-back learning	Written exams, Quizzes
<b>b3.</b> Design a suitable method to screen active ingredients from natural sources.	Group-project	Assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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c1. Assess and resolve problems independently react effectively with other health care professionals and patients.	Lectures, Tutorials, Case study, Assignments	discussion, report writing, assignments,
c2. Take Patient history and patient assessment based upon history taken.		
c3. Prepare Herbal prescription and treatment plans.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	Group work and exercises, structured learning, practical work.	Assignments, Course work, clinical assessment and exam.
d2. Take responsibility for adaption to change misleading and adulteration that may occur in complementary and alternative medicine.		
d3. Retrieve the essential evidence-based references to obtain correct information relevant to complementary and alternative medicines.		

<b>IV. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction to complementary and alternative medicines</b>	a1, a2, b2, b3, c1, c3, d2, d3	<input type="checkbox"/> The complementary and alternative: definition and concept <input type="checkbox"/> The need to complementary and alternative medicines <input type="checkbox"/> Classification of methods of complementary and alternative medicine: medicinal-based, non-medicinal based, traditional medicine, evidence-based therapies.	1	2
2	<b>Non-herbal Evidence-based Complementary and alternative therapies</b>	a1, a2, a3, b1, b2, c1, c2, d2, d3	Principles, applications, benefit/risks of different types of complementary and alternative medicine: 1- Physiotherapy techniques including Chinese acupuncture 2- Homeopathy and anthroposophy 3- Hydrotherapy	2	4

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Dr. Salwa Raweh	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



			4- Other therapies: e.g., electrotherapy		
3	<b>Herbal Evidence-based Complementary and alternative therapies:</b> Regulations, risks and specifications	a1, a2, a3, a4, b1, b2, b3, c1, c2, d1, d2	<ul style="list-style-type: none"> <li><b>Introduction:</b> Definitions: (herbal medicines, phytotherapy), global use</li> <li><b>Regulations and Reliable sources of information :</b> -International (WHO monographs), (US-FDA /Medscape), (European union regulations), ( UK regulations), other international regulations. - Local (in Yemen) Regulatory</li> <li><b>Risks of herbal medications:</b> (1) Problems of unregulated herbal medications: substitutions, adulteration, adulteration with toxic substances or synthetic drugs (2) Potential adverse effects of herbal products (3) Risks of herbal medications on: pregnant and lactating women, pediatric, older patients a, cancer patients and other patients (4) Potential Herb-drug interactions</li> <li><b>Quality specifications:</b> <ul style="list-style-type: none"> <li>Pharmacopeial and other regulatory specifications</li> <li>Licensing herbal medications</li> <li>Licensed vs unregulated herbal medical products</li> <li>Clinical-based evidences of herbal medications.</li> </ul> </li> </ul>	4	8
Mid-term exam				1	2
3	<b>Herbal Evidence-based Complementary and alternative therapies:</b> Phytotherapy	a1, a2, a3, b1, b2, b3, c1, c2, d1, d2	<ul style="list-style-type: none"> <li>Aromatherapy</li> <li>Flower remedy therapy</li> <li>Phytotherapy</li> <li>Evidence-based uses of these therapies for: <ul style="list-style-type: none"> <li>GIT disorders: peptic ulcer, constipation,</li> </ul> </li> </ul>	4	8

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			<ul style="list-style-type: none"> <li>○ diarrhea, vomiting, abdominal colic</li> <li>○ CVS diseases: hypertension, CHF, angina</li> <li>○ Respiratory diseases: Bronchial asthma</li> <li>○ Diabetes mellitus</li> <li>○ Renal disorders: Renal stones</li> <li>○ Bacterial infections</li> </ul>		
4	<b>Phytochemical screening</b>	a1, a2, a3, b1, b2, b3, c1, c3, d2, d3	<ul style="list-style-type: none"> <li>• definition and purposes</li> <li>• Techniques and approaches (from traditional-claim to experimental evidence) by schedule screening of specific types of medications including: <ul style="list-style-type: none"> <li>○ Antimicrobial</li> <li>○ Wounds-healing drugs</li> <li>○ Antioxidant and anticancer</li> <li>○ Other drugs</li> </ul> </li> </ul>	4	8
FINAL – EXAM				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	4 Units

<b>V. Teaching strategies of the course:</b>
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.</p> <p>The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student's brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Laboratory practice</b>: students doing experiments in labs individually or in small groups</p>
<p><b>Feed-back learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>
<p><b>Group projects</b>: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &amp;for promoting team work skills</p>

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VI. Assignments:			
No	Assignments	Aligned CILOs	Week Due
1	<p><b>Group:</b> each group of students will be assigned to provide a search-based report on botanical origin, potential adulteration, potential adverse effects, contraindications, therapeutic use/dose, extraction and screen of phytochemicals for one herbal medicine (each group is assigned with different herbal medicine) using evidence-based references including One or more of the following references:</p> <ul style="list-style-type: none"> <li>• WHO monographs</li> <li>• FDA/Medscape</li> <li>• Published articles</li> </ul>	b3, c2, c3, d1, d2, d3	6-10

VII. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	a1, b2
		Assignments	6-10	5	5	b3, c1, c2, d1, d2, d3
2	Mid-semester exam (written exam)		7	10	10	a2, a3, b2, c3, d2
3	Final exam (written exam)		16	50	50	a1, a2, a3, b2, d2
TOTAL				70	70 %	70

LXIV. Learning Resources:
<b>1- Required Textbook(s) (maximum two ).</b>
1. Complementary and alternative medicine, 2016 2. <b>Veitch, Nigel C, Joanne Barnes;</b> Herbal medicines, 4 <sup>rd</sup> Edition London, UK: Pharmaceutical Press; 2013.
<b>2- Essential References.</b>
1. European pharmacopeia, 2018
<b>3- Electronic Materials and Web Sites etc.</b>
1. <a href="https://www.slideshare.net/FAIMOrg/alternative-and-complementary-medicine">https://www.slideshare.net/FAIMOrg/alternative-and-complementary-medicine</a> 2. <a href="https://www.slideshare.net/pranayshelokar143/seminar-on-complementary-and-alternati-system-of-medicine">https://www.slideshare.net/pranayshelokar143/seminar-on-complementary-and-alternati-system-of-medicine</a>

LXV. Course Policies: (Based on the Uniform Students' By law (2007)
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<b>1</b>	<p><b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
PHYTOTHERAPY  
Course No. (PHG423)

KLIV.- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Salwa Raweh	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
<p>This course, in its first part, provide students with knowledge in the evidence-based applications of herbal medicines and other natural types as complementary and/or alternative methods for classical Medicine for treatment of human diseases. It helps the students to utilize their knowledge and skills attained from previous courses of (Pharmacognosy I, II and phytochemistry I, II) to achieve that purpose. The second part of the course deals with the techniques and approaches employed to screen active ingredients from plants and other natural sources and to evaluate the specifications of natural products.</p>

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**III. Intended learning outcomes of the course (CILOs)**

**3. Alignment CILOs**

**A: Knowledge and understanding: upon completion of the course, students will be able to:**

**a1.** Describe the methods employed to screen active ingredients from plants and other natural sources and to evaluate specifications of natural products.

**a2.** Identify the actions of products of complementary and alternative medicine on human and their misuse or abuse.

**a3.** Explain the basis of complementary and alternative medicine.

**B: Intellectual skills: upon completion of the course, students will be able to:**

**b1.** Classify the products and methods of complementary and alternative medicine.

**b2.** Select a suitable standard operation procedure to evaluate specifications of natural products.

**b3.** Design a suitable method to screen active ingredients from natural sources.

**C: Professional and practical skills: upon completion of the course, students will be able to:**

**c1.** Assess and resolve problems independently react effectively with other health care professionals and patients

**c2.** Take Patient history and patient assessment based upon history taken

**c3.** Prepare Herbal prescription and treatment plans

**D: Transferable skills: upon completion of the course, students will be able to:**

**d1.** Communicate effectively and behave in discipline with colleagues.

**d2.** Take responsibility for adaption to change misleading and adulteration that may occur in complementary and alternative medicine.

**d3.** Retrieve the essential evidence-based references to obtain correct information relevant to complementary and alternative medicines.

**4. Alignment CILOs to teaching strategies and assessment strategies**

**(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies**

Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Describe the methods employed to screen active ingredients from plants and other natural sources and to evaluate specifications of natural products.	Active Lecture	Written exams
<b>a2.</b> Identify the actions of products of complementary and alternative medicine on human and their misuse or abuse.	Active Lecture	Written exams
<b>a3.</b> Explain the basis of complementary and alternative medicine.		

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<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify the products and methods of complementary and alternative medicine.	Active Lecture	Written exams
<b>b2.</b> Select a suitable standard operation procedure to evaluate specifications of natural products.	Active Lecture, Feed-back learning	Written exams, Quizzes
<b>b3.</b> Design a suitable method to screen active ingredients from natural sources.	Group-project	Assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Assess and resolve problems independently react effectively with other health care professionals and patients.	Lectures, Tutorials, Case study, Assignments	discussion, report writing, assignments,
<b>c2.</b> Take Patient history and patient assessment based upon history taken.		
<b>c3.</b> Prepare Herbal prescription and treatment plans.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	Group work and exercises, structured learning, practical work.	Assignments, Course work, clinical assessment and exam.
<b>d2.</b> Take responsibility for adaption to change misleading and adulteration that may occur in complementary and alternative medicine.		
<b>d3.</b> Retrieve the essential evidence-based references to obtain correct information relevant to complementary and alternative medicines.		

<b>V. Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>

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1	<b>Introduction to complementary and alternative medicines</b>	a1, a2, , b2, b3, c1, c3, d2, d3	<input type="checkbox"/> The complementary and alternative: definition and concept <input type="checkbox"/> The need to complementary and alternative medicines <input type="checkbox"/> Classification of methods of complementary and alternative medicine: medicinal-based, non-medicinal based, traditional medicine, evidence-based therapies.	1	2
2	<b>Non-herbal Evidence-based Complementary and alternative therapies</b>	a1, a2, a3, b1, b2, c1, c2, d2, d3	Principles, applications, benefit/risks of different types of complementary and alternative medicine: 5- Physiotherapy techniques including Chinese acupuncture 6- Homeopathy and anthroposophy 7- Hydrotherapy 8- Other therapies: e.g., electrotherapy	2	4
3	<b>Herbal Evidence-based Complementary and alternative therapies:</b> Regulations, risks and specifications	a1, a2, a3, a4, b1, b2, b3, c1, c2, d1, d2	<ul style="list-style-type: none"> <li><b>Introduction:</b> Definitions: (herbal medicines, phytotherapy), global use</li> <li><b>Regulations and Reliable sources of information :</b> -International (WHO monographs), (US-FDA /Medscape), (European union regulations), ( UK regulations), other international regulations. - Local (in Yemen) Regulatory</li> <li><b>Risks of herbal medications:</b> (1) Problems of unregulated herbal medications: substitutions, adulteration, adulteration with toxic substances or synthetic drugs (2) Potential adverse effects of herbal products (3) Risks of herbal medications on: pregnant and lactating women, pediatric, older patients a, cancer patients and other patients (4) Potential Herb-drug interactions</li> <li><b>Quality specifications:</b></li> </ul>	4	8

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			<ul style="list-style-type: none"> <li>○ Pharmacopeial and other regulatory specifications</li> <li>○ Licensing herbal medications</li> <li>○ Licensed vs unregulated herbal medical products</li> <li>○ Clinical-based evidences of herbal medications.</li> </ul>		
<b>Mid-term exam</b>				1	2
3	<b>Herbal Evidence-based Complementary and alternative therapies:</b> Phytotherapy	a1, a2, a3, b1, b2, b3, c1, c2, d1, d2	<ul style="list-style-type: none"> <li>● Aromatherapy</li> <li>● Flower remedy therapy</li> <li>● Phytotherapy</li> <li>● Evidence-based uses of these therapies for: <ul style="list-style-type: none"> <li>○ GIT disorders: peptic ulcer, constipation, diarrhea, vomiting, abdominal colic</li> <li>○ CVS diseases: hypertension, CHF, angina</li> <li>○ Respiratory diseases: Bronchial asthma</li> <li>○ Diabetes mellitus</li> <li>○ Renal disorders: Renal stones</li> <li>○ Bacterial infections</li> </ul> </li> </ul>	4	8
4	<b>Phytochemical screening</b>	a1, a2, a3, b1, b2, b3, c1, c3, d2, d3	<ul style="list-style-type: none"> <li>● definition and purposes</li> <li>● Techniques and approaches (from traditional-claim to experimental evidence) by schedule screening of specific types of medications including: <ul style="list-style-type: none"> <li>○ Antimicrobial</li> <li>○ Wounds-healing drugs</li> <li>○ Antioxidant and anticancer</li> <li>○ Other drugs</li> </ul> </li> </ul>	4	8
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	4 Units

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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## VI. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

## VII. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<p><b>Group</b>: each group of students will be assigned to provide a search-based report on botanical origin, potential adulteration, potential adverse effects, contraindications, therapeutic use/dose, extraction and screen of phytochemicals for one herbal medicine (each group is assigned with different herbal medicine) using evidence-based references including One or more of the following references:</p> <ul style="list-style-type: none"> <li>• WHO monographs</li> <li>• FDA/Medscape</li> <li>• Published articles</li> </ul>	b3, c2, c3, d1, d2, d3	6-10

## VII.Schedule of Assessment Tasks for Students During the Semester

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	a1, b2
		Assignments	6-10	5	5	b3, c1, c2, d1, d2, d3
2	Mid-semester exam (written exam)		7	10	10	a2, a3, b2, c3, d2
3	Final exam (written exam)		16	50	50	a1, a2, a3, b2, d2
TOTAL				70	70 %	70

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<b>LXVI. Learning Resources:</b>	
<b>1- Required Textbook(s) (maximum two ).</b>	
3. Complementary and alternative medicine, 2016	
4. <b>Veitch, Nigel C, Joanne Barnes;</b> Herbal medicines, 4 <sup>rd</sup> Edition London, UK: Pharmaceutical Press; 2013.	
<b>2- Essential References.</b>	
2. European pharmacopeia, 2018	
<b>3- Electronic Materials and Web Sites etc.</b>	
3. <a href="https://www.slideshare.net/FAIMorg/alternative-and-complementary-medicine">https://www.slideshare.net/FAIMorg/alternative-and-complementary-medicine</a>	
4. <a href="https://www.slideshare.net/pranayshelokar143/seminar-on-complementary-and-alternative-system-of-medicine">https://www.slideshare.net/pranayshelokar143/seminar-on-complementary-and-alternative-system-of-medicine</a>	

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<b>LXVII. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<p><b>Class Attendance:</b></p> <p>Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>A student will be considered late if he/she is not in class after 10 minutes of the start time of class.</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.</p>
<b>5</b>	<p><b>Cheating:</b></p> <p>Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>6</b>	<p><b>Forgery and Impersonation:</b></p> <p>Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.</p>

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**ADVANCE DRUG DELIVERY SYSTEM**  
Course No. (PHT421)

**2022**



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XXXV.Course Identification and General Information:					
1	Course Title:	Advance Drug Delivery System			
2	Course Code & Number:	PHT421			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHT412			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Khalid Shamarekh			
13	Date of Approval:	2022			

XXXVI.Course Description:
<p>This course is complementary to (Pharmaceutics I, II and III) courses studied in the previous semesters and all these courses concern with study of designs of dosage forms capable to deliver the drug to human body. In contrast to pharmaceutics courses, which deal with conventional dosage forms, this course concerns with study of newer, unique and advanced systems, including controlled &amp; targeted delivery systems. The course, therefore, is designed in order to provide students with the last and updated knowledge in the field of dosage forms design. The course is co-requisite with Biopharmaceutics course in order to link between dosage forms and kinetics of drug in human body.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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**XXXVII. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies**

**64. Alignment CILOs to PILOs**

PILOs		CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
A1.	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Explain techniques and approaches applied in novel drug delivery systems
A4.	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	a2. Explain the principles of designing targeted drug delivery systems
A2.	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	a3. Describe the role of pharmacist in designing novel drug delivery systems
		a4. Identify the properties and objectives of novel drug delivery systems
A3.	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a5. Describe the advantages and disadvantage of novel drug delivery systems.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
B2.	B2. Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	b1. Classify Novel and novel drug delivery systems.
B5.	Merge the pharmacological knowledge about natural and synthetic medicines with	b2. Compare between conventional and novel drug delivery systems

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	policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b3.</b> Design a novel drug delivery system. <b>b4.</b> Evaluate novel drug delivery systems from its advantage/disadvantage.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1.</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Search efficiently for information using documented and electronic sources of information.
<b>C2.</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Demonstrate the skills of time management and self-learning. <b>d2.</b> Participate efficiently with his colleagues in a teamwork.

<b>65. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain techniques and approaches applied in novel drug delivery systems	<b>Active lecture</b>	<b>Written exams</b>
<b>a2.</b> Explain the principles of designing targeted drug delivery systems		
<b>a3.</b> Describe the role of pharmacist in designing novel drug delivery systems		
<b>a4.</b> Identify the properties and objectives of novel drug delivery systems		
<b>a5.</b> Describe the advantages and disadvantage of novel drug delivery systems.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Classify Novel and novel drug delivery systems.	<b>Active Lecture</b>	<b>Written exams</b>
<b>b2.</b> Compare between conventional and novel drug delivery systems	<b>Feed-back learning</b>	<b>Quizzes</b>
<b>b3.</b> Design a novel drug delivery system.	<b>Group project</b>	<b>assignments</b>
<b>b4.</b> Evaluate novel drug delivery systems from its advantage/disadvantage.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	<b>Group project</b>	<b>assignments</b>
<b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Demonstrate the skills of time management and self-learning.	<b>Group project</b>	<b>assignments</b>
<b>d2.</b> Participate efficiently with his colleagues in a teamwork.		

<b>XXXVIII. Course Content:</b>					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Introduction to Novel drug delivery systems</b>	<ul style="list-style-type: none"> <li>• The need for Novel and novel drug delivery systems               <ul style="list-style-type: none"> <li>○ Factors related to patients convenience</li> <li>○ New diseases : new challenges</li> <li>○ Diseases resistant to classical systems</li> <li>○ Other factors</li> <li>○ Comparison between Novel and classical delivery systems</li> </ul> </li> </ul>	1	2	a1, a3, a4, a5, b1, b2, c1, d1

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2	<b>Extended release systems</b>	<ul style="list-style-type: none"> <li>• Definition and purposes</li> <li>• Concepts of extended-release, sustained-release</li> <li>• Advantages and limitations,</li> <li>• Biological features affecting extended-delivery system.</li> <li>• Technology of Microencapsulation</li> <li>• multiple units coating (pellets)</li> <li>• floating tablets</li> <li>• bilayer and multiple layer-tablets</li> </ul>	3	6	a1, a2, a4, a5, b1, b2, c1,d2
3	<b>Transdermal delivery systems</b>	<ul style="list-style-type: none"> <li>• Biological features affecting transdermal delivery system.</li> <li>• Principle, components, formulation, advantages, disadvantages types and applications of : <ul style="list-style-type: none"> <li>○ Patches</li> <li>○ Phonophoresis</li> <li>○ Inotophoresis</li> <li>○ Electroporation</li> <li>○ Needle array and needleless injection systems</li> <li>○ Percutaneous enhancers</li> </ul> </li> </ul>	3	6	a1,a2, a4, b1, b3, b4 , c2, d2
<b>Mid-Term Exam</b>			1	2	
4	<b>Novel parenteral systems</b>	<p>Principle, components, formulation, advantages, disadvantages types and applications of :</p> <ul style="list-style-type: none"> <li>○ Implants</li> <li>○ Ocuserts</li> </ul>	1	2	a1, a2, a4, b3, b4, c1, d1
5	<b>Novel inhalation delivery systems</b>	<ul style="list-style-type: none"> <li>• Biological features affecting inhalation delivery system.</li> <li>• Principle, components, formulation, advantages, disadvantages types and applications of : <ul style="list-style-type: none"> <li>✓ Dry solid inhaler systems</li> </ul> </li> </ul>	1	2	a1, a2, a5, b1, b2, c2, d2
6	<b>Novel intravaginal delivery systems</b>	<ul style="list-style-type: none"> <li>• Biological features affecting newer intravaginal delivery system.</li> <li>• Principle, components, formulation, advantages, disadvantages and types of intravaginal systems</li> </ul>	1	2	a1, a3, a4, a5, b1, b3 ,c1, d1

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7	Targeted delivery systems	<ul style="list-style-type: none"> <li>• Definition</li> <li>• Purposes</li> <li>• Biological features affecting targeted delivery system.</li> <li>• Principle, components, formulation, advantages, disadvantages types and applications of : <ul style="list-style-type: none"> <li>❖ cellular Types of targeted delivery systems</li> <li>lymphocytes</li> <li>sosome</li> <li>❖ Particle Types of targeted delivery systems <ul style="list-style-type: none"> <li>○ Liposomes</li> <li>○ Monoclonal antibodies</li> <li>○ Plasma proteins</li> <li>○ Polymeric micelles</li> </ul> </li> <li>❖ Prodrug Types of targeted delivery systems <ul style="list-style-type: none"> <li>○ Conjugation with peptides</li> <li>○ Gene (or antibodies)-directed enzyme system</li> <li>○ Drug-linkage-ligand system</li> </ul> </li> </ul> </li> </ul>	3	6	a1, a2, a3, a4, b1, b4, c2, d2
		Course Review	Review of the course topics by discussion session.	1	2
FINAL – EXAM			1	2	
TOTAL			16	32	
Number of Weeks /and Units Per Semester			16 weeks	7 Units	

#### XXXIX. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

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**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

XL. Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Group</b> : each group of students will be assigned to provide a theoretical design and evaluation of new novel drug delivery system	b3, b4, c1, c2, d1, d2	14	4

XLI. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	a1, b2
		Assignments	7, 12	10	10	b3, b4, c1, c2, d1, d2
2	Mid-semester exam ( written exam)		7	20	20	a1, a3, a4, a5, b1
3	Final exam of ( written exam)		16	60	60	a1, a2, a3, a4, a5, b1, b2,b3,b4, c1,c2
TOTAL				100	100 %	

XLII. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
50. Ansel`s Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA	
51. Yie Chien Novel Drug Delivery Systems, 2019, Taylor & Francis Group	
<b>2- Essential References.</b>	
1. Aulton`s Pharmaceutics The Design and Manufacture of Medicines, 2018, Elsevier Ltd	
2. Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK	
<b>3- Electronic Materials and Web Sites etc.</b>	
Article from: <a href="http://www.emedicine.com">www.emedicine.com</a> <a href="http://www.sciencedirect.com">www.sciencedirect.com</a> <a href="http://www.blackwell.com">www.blackwell.com</a> <a href="http://www.ovid.com">www.ovid.com</a> <a href="http://www.pubmed.com">www.pubmed.com</a>	

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<https://www.slideserve.com/almaguer/novel-drug-delivery-systems-powerpoint-ppt-presentation>

<b>XLIII. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of :  
**ADVANCE DRUG DELIVERY SYSTEM**  
Course No. (PHT421)

I. - Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Khalid Shamarekh	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

II. Course Description:
<p>This course is complementary to (Pharmaceutics I, II and III) courses studied in the previous semesters and all these courses concern with study of designs of dosage forms capable to deliver the drug to human body. In contrast to pharmaceutics courses, which deal with conventional dosage forms, this course concerns with study of newer, unique and advanced systems, including controlled &amp; targeted delivery systems. The course, therefore, is designed in order to provide students with the last and updated knowledge in the field of dosage forms design. The course is co-requisite with Biopharmaceutics course in order to link between dosage forms and kinetics of drug in human body.</p>

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<b>XLIV. The Course Intended Learning Outcomes (CILOs)</b>	
<b>66. Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Explain techniques and approaches applied in novel drug delivery systems.	
a2. Explain the principles of designing targeted drug delivery systems.	
a3. Describe the role of pharmacist in designing novel drug delivery systems.	
a4. Identify the properties and objectives of novel drug delivery systems.	
a5. Describe the advantages and disadvantage of novel drug delivery systems.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Classify Novel and novel drug delivery systems.	
b2. Compare between conventional and novel drug delivery systems	
b3. Design a novel drug delivery system.	
b4. Evaluate novel drug delivery systems from its advantage/disadvantage.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Search efficiently for information using documented and electronic sources of information.	
c2. Present and report his/her works correctly using appropriate writing rules and technologies media.	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Demonstrate the skills of time management and self-learning.	
d2. Participate efficiently with his colleagues in a teamwork.	

<b>67. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explain techniques and approaches applied in novel drug delivery systems	<b>Active lecture</b>	<b>Written exams</b>
a2. Explain the principles of designing targeted drug delivery systems		
a3. Describe the role of pharmacist in designing novel drug delivery systems		
a4. Identify the properties and objectives of novel drug delivery systems		
a5. Describe the advantages and disadvantage of novel drug delivery systems.		

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**(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Classify Novel and novel drug delivery systems.	<b>Active Lecture</b>	<b>Written exams</b>
<b>b2.</b> Compare between conventional and novel drug delivery systems	<b>Feed-back learning</b>	<b>Quizzes</b>
<b>b3.</b> Design a novel drug delivery system.	<b>Group project</b>	<b>assignments</b>
<b>b4.</b> Evaluate novel drug delivery systems from its advantage/disadvantage.		

**(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	<b>Group project</b>	<b>assignments</b>
<b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.		

**(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:**

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Demonstrate the skills of time management and self-learning.	<b>Group project</b>	<b>assignments</b>
<b>d2.</b> Participate efficiently with his colleagues in a teamwork.		

**XLV. Course Content:**

Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Introduction to Novel drug delivery systems</b>	<ul style="list-style-type: none"> <li>• The need for Novel and novel drug delivery systems                             <ul style="list-style-type: none"> <li>○ Factors related to patients convenience</li> <li>○ New diseases : new challenges</li> <li>○ Diseases resistant to classical systems</li> <li>○ Other factors</li> </ul> </li> </ul>	1	2	a1, a3, a4, a5, b1, b2, c1, d1

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		<ul style="list-style-type: none"> <li>○ Comparison between Novel and classical delivery systems</li> </ul>			
2	<b>Extended release systems</b>	<ul style="list-style-type: none"> <li>● Definition and purposes</li> <li>● Concepts of extended-release, sustained-release</li> <li>● Advantages and limitations,</li> <li>● Biological features affecting extended-delivery system.</li> <li>● Technology of Microencapsulation</li> <li>● multiple units coating (pellets)</li> <li>● floating tablets</li> <li>● bilayer and multiple layer-tablets</li> </ul>	3	6	a1, a2, a4, a5, b1, b2, c1,d2
3	<b>Transdermal delivery systems</b>	<ul style="list-style-type: none"> <li>● Biological features affecting transdermal delivery system.</li> <li>● Principle, components, formulation, advantages, disadvantages types and applications of :                             <ul style="list-style-type: none"> <li>○ Patches</li> <li>○ Phonophoresis</li> <li>○ Inotophoresis</li> <li>○ Electroporation</li> <li>○ Needle array and needleless injection systems</li> <li>○ Percutaneous enhancers</li> </ul> </li> </ul>	3	6	a1,a2, a4, b1, b3, b4 , c2, d2
<b>Mid-Term Exam</b>			1	2	
4	<b>Novel parenteral systems</b>	<p>Principle, components, formulation, advantages, disadvantages types and applications of :</p> <ul style="list-style-type: none"> <li>○ Implants</li> <li>○ Ocuserts</li> </ul>	1	2	a1, a2, a4, b3, b4, c1, d1
5	<b>Novel inhalation delivery systems</b>	<ul style="list-style-type: none"> <li>● Biological features affecting inhalation delivery system.</li> <li>● Principle, components, formulation, advantages, disadvantages types and applications of :                             <ul style="list-style-type: none"> <li>✓ Dry solid inhaler systems</li> </ul> </li> </ul>	1	2	a1, a2, a5, b1, b2, c2, d2
6	<b>Novel intravaginal delivery systems</b>	<ul style="list-style-type: none"> <li>● Biological features affecting newer intravaginal delivery system.</li> <li>● Principle, components, formulation, advantages,</li> </ul>	1	2	a1, a3, a4, a5, b1, b3 ,c1, d1

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		disadvantages and types of intravaginal systems			
7	<b>Targeted delivery systems</b>	<ul style="list-style-type: none"> <li>• Definition</li> <li>• Purposes</li> <li>• Biological features affecting targeted delivery system.</li> <li>• Principle, components, formulation, advantages, disadvantages types and applications of : <ul style="list-style-type: none"> <li>❖ cellular Types of targeted delivery systems</li> <li>lymphocytes</li> <li>sosome</li> <li>❖ Particle Types of targeted delivery systems <ul style="list-style-type: none"> <li>○ Liposomes</li> <li>○ Monoclonal antibodies</li> <li>○ Plasma proteins</li> <li>○ Polymeric micelles</li> </ul> </li> <li>❖ Prodrug Types of targeted delivery systems <ul style="list-style-type: none"> <li>○ Conjugation with peptides</li> <li>○ Gene (or antibodies)-directed enzyme system</li> <li>○ Drug-linkage-ligand system</li> </ul> </li> </ul> </li> </ul>	3	6	a1, a2, a3, a4, b1, b4, c2, d2
	<b>Course Review</b>	Review of the course topics by discussion session.	1	2	all
	<b>FINAL – EXAM</b>		1	2	
	<b>TOTAL</b>		16	32	
	<b>Number of Weeks /and Units Per Semester</b>		16 weeks	7 Units	

#### XLVI. Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brainstorming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

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**Feedback learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

XLVII.Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Group</b> : each group of students will be assigned to provide a theoretical design and evaluation of new novel drug delivery system	b3, b4, c1, c2, d1, d2	14	4

XLVIII.Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	a1, b2
		Assignments	7, 12	10	10	b3, b4, c1, c2, d1, d2
2	Mid-semester exam ( written exam)		7	20	20	a1, a3, a4, a5, b1
3	Final exam of ( written exam)		16	60	60	a1, a2, a3, a4, a5, b1, b2,b3,b4, c1,c2
TOTAL				100	100 %	

XLIX. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
52. Ansel`s Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA	
53. Yie Chien Novel Drug Delivery Systems, 2019, Taylor & Francis Group	
<b>2- Essential References.</b>	
3. Aulton`s Pharmaceutics The Design and Manufacture of Medicines, 2018, Elsevier Ltd	
4. Linda Felton. Remington Essentials of Pharmaceutics, 2012, Pharmaceutical press, UK	
<b>3- Electronic Materials and Web Sites etc.</b>	
Article from: <a href="http://www.emedicine.com">www.emedicine.com</a>	

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www.blackwell.com  
www.ovid.com  
[www.pubmed.com](http://www.pubmed.com)  
<https://www.slideserve.com/almaguer/novel-drug-delivery-systems-powerpoint-ppt-presentation>

L. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Khalid Shamarekh	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



المعهد اليمني للدراسات والبحوث  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**BIOPHARMACEUTICS**  
Course No. (PHT426)

2022



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I. Course Identification and General Information:					
1	Course Title:	Biopharmaceutics			
2	Course Code & Number:	PHT426			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	Fourth Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHC417			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Ameen Alwossabi			
13	Date of Approval:	2022			

II. Course Description:
<p>The course examines the factors that influence medication pharmacokinetics and bioavailability, which can have a significant impact on the medicine's therapeutic efficacy. These aspects include biological factors such as anatomical/physiological, pathological, pharmacological factors such as physicochemical features of the medicine, roles of excipients contained, and dosage form type, as well as the impact of genetic variation and concurrent use of other drugs and foods. The course also covers basic biopharmaceutical information, such as in vitro, ex vivo, and in vivo correlation investigations.</p>

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<b>III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>68. Alignment CILOs to PILOs</b>		
	<b>PILOs</b>	<b>CILOs</b>
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A1.</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b> Show understanding of the influence of human body structure including physiological/anatomical, pathological and genetic characters on drug pharmacokinetics and bioavailability.
<b>A2.</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a2.</b> Explain the physicochemical properties of the drug, excipients, dosage forms, co-administered drugs and food that affect drug pharmacokinetics and bioavailability.
<b>A3.</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Explain the relationship of drug absorption, distribution and elimination to its bioavailability
<b>A1.</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a4.</b> Describe the principles of biopharmaceutics, pharmacokinetics, biopharmaceutics, bioavailability, and bioequivalence.
<b>A4.</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a5.</b> Describe the biopharmaceutical classification system (BCS) of drugs.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2.</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing,	<b>b1.</b> Interpret figures and graphs of biopharmaceutical studies.

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	preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b2</b> .Classify drugs biopharmaceutically.
<b>B1.</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<b>b3.</b> Examine the effect of different formulation, different pathological factors affecting on absorption
		<b>b4.</b> Explore the appropriate dosage form for a specific absorption
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1.</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Instruction patients and other health care professionals about safe and effective use of drugs and medicines.
		<b>c2.</b> Choose rationally the appropriate dosage form and route of drug administration for specific bioavailability
		<b>c3.</b> Demonstrate critical thinking, synthesis and interpretation of pharmaceutical information, and responsibility.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Demonstrate the skills of time management and self-learning.

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<b>69. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Show understanding of the influence of human body structure including physiological/anatomical, pathological and genetic characters on drug pharmacokinetics and bioavailability.	Active lecture, Feed-back learning	Written exams, quizzes
<b>a2.</b> Explain the physicochemical properties of the drug, excipients, dosage forms, co-administered drugs and food that affect drug pharmacokinetics and bioavailability.		
<b>a3.</b> Explain the relationship of drug absorption, distribution and elimination to its bioavailability		
<b>a4.</b> Describe the principles of biopharmaceutics, pharmacokinetics, biopharmaceutics, bioavailability, and bioequivalence.		
<b>a5.</b> Describe the biopharmaceutical classification system (BCS) of drugs.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret figures and graphs of biopharmaceutical studies.	Active lecture	Written exams
<b>b2.</b> Classify drugs biopharmaceutically.		
<b>b3.</b> Examine the effect of different formulation, different pathological factors affecting on absorption		
<b>b4.</b> Explore the appropriate dosage form for a specific absorption		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Instruction patients and other health care professionals about safe and effective use of drugs and medicines.	Feed-back learning	assignments
<b>c2.</b> Choose rationally the appropriate dosage form and route of drug administration for specific bioavailability		

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c3. Demonstrate critical thinking, synthesis and interpretation of pharmaceutical information, and responsibility.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate the skills of time management and self-learning.	Feed-back learning	Assignments

<b>IV. Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>Contact hours</b>	<b>CILOs</b>
1	<b>Introduction to biopharmaceutics</b>	<ul style="list-style-type: none"> <li>• Definition and significance of biopharmaceutics and bioavailability.</li> <li>• relation of biopharmaceutics to other pharmaceutical sciences</li> <li>• correlation between bioavailability &amp; drug efficacy</li> <li>• Expressions of drug bioavailability</li> <li>• factors affecting bioavailability</li> <li>• Introduction to steps for drug bioavailability</li> </ul>	1	2	a3, a4, b1, b2
2	<b>Steps and pharmacokinetic processes involved in drug bioavailability</b>	<p><b>1. Pre-absorption steps (For Non-I.V route)</b></p> <p><b>Drug Release</b> Definition, significance, Expression parameters (cumulative % release, drug release rate)</p> <ul style="list-style-type: none"> <li>• Mechanisms and governing equations : Fick`s law, Higuchi equation, Peppas equation (matrix diffusion, membrane diffusion, Fickian, Non-Fickian, controlled)</li> </ul> <p><b>Drug dissolution</b></p> <ul style="list-style-type: none"> <li>• Definition, significance, Expression parameters (cumulative % dissolved, dissolution rate), Mechanisms</li> </ul>	1	2	a2, a3, a4, a5, b1, b2, c1, c2, c4, d1

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		and governing equations : Noyes-Whitney equation			
		<p><b>2. Pharmacokinetics processes</b> <b>Drug absorption</b></p> <ul style="list-style-type: none"> <li>• Definition, significance</li> <li>• Expression parameters (cumulative % absorbed, absorption rate, absorption rate constant)</li> <li>• Mechanisms and governing equations, properties and examples of drugs absorbed by each mechanism. Passive diffusion (transcellular): Fick`s law.</li> <li>• Carrier-mediated: Active transport, facilitated diffusion,</li> <li>• Convective (paracellular) transport, ion-pair transport, endocytosis</li> </ul>	2	4	a1, a2, a5 , b1, b4, c1,
		<p><b>metabolism (biotransformation)</b> Definition, significance of , Expression parameters: volume of distribution and related equations (related to blood flow, dose and plasma concentration, Mechanisms (passive diffusion, active transport), steps and sites of distribution</p> <ul style="list-style-type: none"> <li>• Definition, significance of drug biotransformation, Outcomes (products: active, inactive metabolite) with examples of drugs</li> <li>• Sites of metabolism: presystemic (first-pass effect), hepatic with examples of drugs highly influenced by presystemic metabolism.</li> <li>• Mechanisms (phases Reaction): phase I and phase II: types of reactions, examples of drugs , Affecting factors : Biological Factors , pharmaceutical factors and Exogenous factors</li> </ul>	2	4	a1, a2, a3, b3, b4, c2, c3, d1

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		<p><b>drug excretion</b></p> <ul style="list-style-type: none"> <li>• Definition, significance</li> <li>• Renal excretion : the nephron anatomy</li> <li>• Properties of drugs excreted by the kidneys, Mechanisms: glomerular filtration, active tubular secretion, Tubular reabsorption, Factors affecting each excretion mechanism: biological, pharmaceutical and exogenous factors</li> <li>• Excretion from the liver and other organs and the enterhepatic circulation</li> </ul>			
<b>Mid-Term Exam</b>			1	2	
3	<b>Biological factors affecting drug pharmacokinetics and bioavailability</b>	<ul style="list-style-type: none"> <li>• Anatomical/Physiological factors affecting drug absorption, distribution metabolism, excretion and bioavailability.</li> <li>• Pathological (Disease) factors affecting drug absorption, distribution metabolism, excretion and bioavailability. biological factors affecting drug metabolism "</li> <li>• Genetic factors affecting drug absorption, distribution metabolism, excretion and bioavailability.</li> </ul>	3	6	a1, a2, a3, b3, b4, c2, c3, d1
4	<b>Pharmaceutical factors affecting drug pharmacokinetics and bioavailability</b>	<ul style="list-style-type: none"> <li>• factors affecting related to drug physicochemical properties</li> <li>• factors related to excipients</li> <li>• factors related to formulation (dosage forms)</li> <li>• Factors related to manufacturing method.</li> </ul>	2	4	a1, a2, a3, b2, b3, b4 c1, c2, d1
5	<b>Influence of food and co-administered drugs on a drug pharmacokinetics and bioavailability</b>	<ul style="list-style-type: none"> <li>• Food drug-interactions &amp; Drug-drug interactions</li> </ul>	1	2	a2, a3, b1, b3, c1, c2, c3, d1

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6	<b>Biopharmaceutica l studies</b>	<ul style="list-style-type: none"> <li>• Biopharmaceutical classification scheme</li> <li>• In vivo studies: Pharmacokinetic and pharmacodynamics Bioavailability study ( For a new drug): absolute bioavailability, definition, equation,</li> <li>• Bioequivalence study : relative bioavailability, definition, equation</li> <li>• □ In vitro studies : Drug release and dissolution studies (in fasted and feed state) in fluid simulant to that the g.i.t fluid, In vitro Stability of drug in fluid simulant to those of g.i.t, Permeability studies (partition coefficient determination, Ex vivo permeation studies</li> <li>• IVIVC : in vivo in vitro correlation studies</li> </ul>	2	4	a1, a2, a3, a4, a5, b2, b3, b4, c1, c2, c3, d1
<b>FINAL - EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	6 Units	

#### V. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

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VI. Assignments:			
No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> every student is assigned to provide electronic-based report on research articles related to biopharmaceutical studies of one drug	c1, c2, d1	4-13

VII. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	a1, a2, b1, b2
		Assignments	7, 12	10	10	c1, c2, d1
2	Mid-semester exam ( written exam)		7	20	20	a1, a2, a3, b1, b2, c1, c3
3	Final exam of ( written exam)		16	60	60	a1, a2, a3, a4, a5, b1, b2, b3, c1, c2, c3, d1
TOTAL				100	100 %	

VIII. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
54. Applied biopharmaceutics and pharmacokinetics (Lion Shargel), 7th edition, 2016.	
55. Pharmacokinetics (Milo Gibaldi), 2nd edition, 2007.	
<b>2- Essential References.</b>	
5. International Journal of Pharmaceutics	
6. Journal of drug targeting	
<b>3- Electronic Materials and Web Sites etc.</b>	
Articles from: www.emedicine.com www.sciencedirect.com www.blackwell.com www.ovid.com www.pubmed.com	

IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b>

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	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.







Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**BIOPHARMACEUTICS**  
Course Code No. ( PHT426)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Ameen Alwossabi	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

X. Course Description:
The course examines the factors that influence medication pharmacokinetics and bioavailability, which can have a significant impact on the medicine's therapeutic efficacy. These aspects include biological factors such as anatomical/physiological, pathological, pharmacological factors such as physicochemical features of the medicine, roles of excipients contained, and dosage form type, as well as the impact of genetic variation and concurrent use of other drugs and foods. The course also covers basic biopharmaceutical information, such as in vitro, ex vivo, and in vivo correlation investigations.

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<b>XI. The Course Intended Learning Outcomes (CILOs)</b>	
<b>70. Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Show understanding of the influence of human body structure including physiological/anatomical, pathological and genetic characters on drug pharmacokinetics and bioavailability.	
a2. Explain the physicochemical properties of the drug, excipients, dosage forms, co-administered drugs and food that affect drug pharmacokinetics and bioavailability.	
a3. Explain the relationship of drug absorption, distribution and elimination to its bioavailability	
a4. Describe the principles of biopharmaceutics, pharmacokinetics, biopharmaceutics, bioavailability, and bioequivalence.	
a5. Describe the biopharmaceutical classification system (BCS) of drugs.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Interpret figures and graphs of biopharmaceutical studies.	
b2. Classify drugs biopharmaceutically.	
b3. Examine the effect of different formulation, different pathological factors affecting on absorption	
b4. Explore the appropriate dosage form for a specific absorption	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Instruction patients and other health care professionals about safe and effective use of drugs and medicines.	
c2. Choose rationally the appropriate dosage form and route of drug administration for specific bioavailability	
c3. Demonstrate critical thinking, synthesis and interpretation of pharmaceutical information, and responsibility.	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Demonstrate the skills of time management and self-learning.	

<b>71. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Show understanding of the influence of human body structure including physiological/anatomical, pathological and genetic characters on drug pharmacokinetics and bioavailability.	Active lecture, Feed-back learning	Written exams, quizzes

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a2. Explain the physicochemical properties of the drug, excipients, dosage forms, co-administered drugs and food that affect drug pharmacokinetics and bioavailability.		
a3. Explain the relationship of drug absorption, distribution and elimination to its bioavailability		
a4. Describe the principles of biopharmaceutics, pharmacokinetics, biopharmaceutics, bioavailability, and bioequivalence.		
a5. Describe the biopharmaceutical classification system (BCS) of drugs.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret figures and graphs of biopharmaceutical studies.	Active lecture	Written exams
b2. Classify drugs biopharmaceutically.		
b3. Examine the effect of different formulation, different pathological factors affecting on absorption		
b4. Explore the appropriate dosage form for a specific absorption		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Instruction patients and other health care professionals about safe and effective use of drugs and medicines.	Feed-back learning	assignments
c2. Choose rationally the appropriate dosage form and route of drug administration for specific bioavailability		
c3. Demonstrate critical thinking, synthesis and interpretation of pharmaceutical information, and responsibility.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate the skills of time management and self-learning.	Feed-back learning	Assignments

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XII. Course Content:					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Introduction to biopharmaceutics</b>	<ul style="list-style-type: none"> <li>• Definition and significance of biopharmaceutics and bioavailability.</li> <li>• relation of biopharmaceutics to other pharmaceutical sciences</li> <li>• correlation between bioavailability &amp; drug efficacy</li> <li>• Expressions of drug bioavailability</li> <li>• factors affecting bioavailability</li> <li>• Introduction to steps for drug bioavailability</li> </ul>	1	2	a3, a4, b1, b2
2	<b>Steps and pharmacokinetic processes involved in drug bioavailability</b>	<b>3. Pre-absorption steps (For Non-I.V route)</b>  <b>Drug Release</b> Definition, significance, Expression parameters (cumulative % release, drug release rate) <ul style="list-style-type: none"> <li>• Mechanisms and governing equations : Fick`s law, Higuchi equation, Peppas equation (matrix diffusion, membrane diffusion, Fickian, Non-Fickian, controlled)</li> </ul> <b>Drug dissolution</b> <ul style="list-style-type: none"> <li>• Definition, significance, Expression parameters (cumulative % dissolved, dissolution rate), Mechanisms and governing equations : Noyes-Whitney equation</li> </ul>	1	2	a2, a3, a4, a5, b1, b2, c1, c2, c4, d1
		<b>4. Pharmacokinetics processes</b> <b>Drug absorption</b> <ul style="list-style-type: none"> <li>• Definition, significance</li> <li>• Expression parameters (cumulative % absorbed, absorption rate, absorption rate constant)</li> </ul>	2	4	a1, a2, a5, b1, b4, c1,

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		<ul style="list-style-type: none"> <li>Mechanisms and governing equations, properties and examples of drugs absorbed by each mechanism. Passive diffusion (transcellular): Fick`s law.</li> <li>Carrier-mediated: Active transport, facilitated diffusion,</li> <li>Convective (paracellular) transport, ion-pair transport, endocytosis</li> </ul>			
		<p><b>metabolism (biotransformation)</b> Definition, significance of , Expression parameters: volume of distribution and related equations (related to blood flow, dose and plasma concentration, Mechanisms (passive diffusion, active transport), steps and sites of distribution</p> <ul style="list-style-type: none"> <li>Definition, significance of drug biotransformation, Outcomes (products: active, inactive metabolite) with examples of drugs</li> <li>Sites of metabolism: presystemic (first-pass effect), hepatic with examples of drugs highly influenced by presystemic metabolism.</li> <li>Mechanisms (phases Reaction): phase I and phase II: types of reactions, examples of drugs , Affecting factors : Biological Factors , pharmaceutical factors and Exogenous factors</li> </ul> <p><b>drug excretion</b></p> <ul style="list-style-type: none"> <li>Definition, significance</li> <li>Renal excretion : the nephron anatomy</li> <li>Properties of drugs excreted by the kidneys, Mechanisms: glomerular filtration, active tubular secretion, Tubular reabsorption, Factors affecting each excretion</li> </ul>	2	4	a1, a2, a3, b3, b4, c2, c3, d1

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		<p>mechanism: biological, pharmaceutical and exogenous factors</p> <ul style="list-style-type: none"> <li>Excretion from the liver and other organs and the enterhepatic circulation</li> </ul>			
<b>Mid-Term Exam</b>			1	2	
3	<b>Biological factors affecting drug pharmacokinetics and bioavailability</b>	<ul style="list-style-type: none"> <li>Anatomical/Physiological factors affecting drug absorption, distribution metabolism, excretion and bioavailability.</li> <li>Pathological (Disease) factors affecting drug absorption, distribution metabolism, excretion and bioavailability. biological factors affecting drug metabolism "</li> <li>Genetic factors affecting drug absorption, distribution metabolism, excretion and bioavailability.</li> </ul>	3	6	a1, a2, a3, b3, b4, c2, c3, d1
4	<b>Pharmaceutical factors affecting drug pharmacokinetics and bioavailability</b>	<ul style="list-style-type: none"> <li>factors affecting related to drug physicochemical properties</li> <li>factors related to excipients</li> <li>factors related to formulation (dosage forms)</li> <li>Factors related to manufacturing method.</li> </ul>	2	4	a1, a2, a3, b2, b3, b4, c1, c2, d1
5	<b>Influence of food and co-administered drugs on a drug pharmacokinetics and bioavailability</b>	<ul style="list-style-type: none"> <li>Food drug-interactions &amp; Drug-drug interactions</li> </ul>	1	2	a2, a3, b1, b3, c1, c2, c3, d1
6	<b>Biopharmaceutical studies</b>	<ul style="list-style-type: none"> <li>Biopharmaceutical classification scheme</li> <li>In vivo studies: Pharmacokinetic and pharmacodynamics Bioavailability study ( For a new drug): absolute bioavailability, definition, equation,</li> </ul>	2	4	a1, a2, a3, a4, a5, b2, b3, b4, c1, c2, c3, d1

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	<ul style="list-style-type: none"> <li>• Bioequivalence study : relative bioavailability, definition, equation</li> <li>• □ In vitro studies : Drug release and dissolution studies (in fasted and feed state) in fluid simulant to that the g.i.t fluid, In vitro Stability of drug in fluid simulant to those of g.i.t, Permeability studies (partition coefficient determination, Ex vivo permeation studies</li> <li>• IVIVC : in vivo in vitro correlation studies</li> </ul>			
<b>FINAL - EXAM</b>		1	2	
<b>TOTAL</b>		16	32	
<b>Number of Weeks /and Units Per Semester</b>		16 weeks	6 Units	

### XIII. Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, home works, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### XIV. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to provide electronic-based report on research articles related to biopharmaceutical studies of one drug	c1, c2, d1	4-13

### XV. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
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1	Term Works	Quizzes	4-13, 14	10	10	a1, a2, b1, b2
		Assignments	7, 12	10	10	c1, c2, d1
2	Mid-semester exam ( written exam)		7	20	20	a1, a2, a3, b1, b2, c1, c3
3	Final exam of ( written exam)		16	60	60	a1, a2, a3, a4, a5, b1, b2, b3, c1, c2, c3, d1
TOTAL				100	100 %	

#### XVI. Learning Resources:

##### 1- Required Textbook(s) ( maximum two ).

56. Applied biopharmaceutics and pharmacokinetics (Lion Shargel), 7th edition, 2016.  
57. Pharmacokinetics (Milo Gibaldi), 2nd edition, 2007.

##### 2- Essential References.

7. International Journal of Pharmaceutics  
8. Journal of drug targeting

##### 3- Electronic Materials and Web Sites etc.

###### Articles from:

- [www.emedicine.com](http://www.emedicine.com)  
[www.sciencedirect.com](http://www.sciencedirect.com)  
[www.blackwell.com](http://www.blackwell.com)  
[www.ovid.com](http://www.ovid.com)  
[www.pubmed.com](http://www.pubmed.com)

#### XVII. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
6	<b>Forgery and Impersonation:</b>

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	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**INDUSTRIAL PHARMACY**  
Course Code No. (PHT422)

2022



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I. Course Identification and General Information:					
1	Course Title:	Industrial Pharmacy			
2	Course Code & Number:	PHT422			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		4	3	--	1
4	Study Level/ Semester at which this Course is offered:	Fourth Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	PHT412			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Khalid Shamarekh			
13	Date of Approval:	2022			

II. Course Description:
<p>This course deals with the study of criteria of good practices relevant to manufacturing of medications in drug plants. These criteria include current good manufacturing practice (cGMP), good storage practice (cGSP) and good laboratory practice (cGLP) that are based on global guidelines such as ICH, WHO and ISO. The course also concerns with and the substantial unit operations utilized during manufacturing of these products including those involved in transfer of materials, those applied prior and after mixing of ingredients and those employed in filling and packaging of finished products. The second part also deals with the steps that accompany the drug manufacturing processes in the factory, such as mixing, drying, evaporation, extraction, distillation, grinding and granulation, as well as crystallization processes, the study of heat transfer in bodies, and examples of devices used in all these processes and their advantages and disadvantages.</p>

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<b>III. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>72. Alignment CILOs to PILOs</b>		
<b>PILOs</b>		<b>CILOs</b>
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2.</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<p><b>a1.</b> Identify criteria for good practice of pharmaceutical manufacturing including cGMP, cGSP, cGLP based on ICH, WHO and ISO guidelines.</p> <p><b>a2.</b> Describe the role of pharmacist in employment GMP criteria and to operate unit operations for manufacturing of drug products</p>
<b>A3.</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Describe the different types unit-operation methods used for pharmaceutical manufacturing and their advantages/disadvantages
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2.</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Select standard operation procedure to obtain in-process and finished products with specific criteria
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1.</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including	<p><b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory</p> <p><b>c2.</b> Operate the instruments and perform experiments successfully in the laboratory</p>

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	drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	c3. Search efficiently for information using documented and electronic sources of information. c4. Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	d1. Participate efficiently with his colleagues in a teamwork. d2. Demonstrate the skills of time management and self-learning. d3. Communicate effectively and behave in discipline with colleagues.

Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Identify criteria for good practice of pharmaceutical manufacturing including cGMP, cGSP, cGLP based on ICH, WHO and ISO guidelines.	Active Lecture	written exams
a2. Describe the different types unit-operation methods used for pharmaceutical manufacturing and their advantages/disadvantages		
a3. Describe the role of pharmacist in employment GMP criteria and to operate unit operations for manufacturing of drug products.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Select standard operation procedure to obtain in-process and finished products with specific criteria	Active lecture, feed-back learning	Written exam, quizzes
(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	Lab. Practice	Lab. term works, final practical exam
c2. Operate the instruments and perform experiments successfully in the laboratory		

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c3 .Search efficiently for information using documented and electronic sources of information.	Lab. Practice, group-project	Lab. term works, final practical exam , assignment
c4. Present and report his/her works correctly using appropriate writing rules and technologies media.		
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	Lab. Practice, group-project	Lab. term works, final practical exam , assignment
d2. Demonstrate the skills of time management and self-learning.		
d3. Participate efficiently with his colleagues in a teamwork.		

IV. Course Content:					
A. Theoretical aspect					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	Contact hours
1	<b>Introduction to industrial pharmacy and criteria of good practices</b>	a1, a2, a3, b1	<ul style="list-style-type: none"> <li>The need and Significance for large-scale production of drugs</li> <li>History of large-scale manufacturing of drug products.</li> <li>Criteria of current good practices : good manufacturing practice (cGMP), good storage practice(cGSP)and good laboratory practice (cGLP) to be employed in drug plants based on specific guidelines such as WHO, ICH and ISO</li> </ul>	3	6
2	<b>General principles of flow and transfer</b>	a1, a2, a3, b1	Design, types, advantages, disadvantage, selection of machines used for: <ol style="list-style-type: none"> <li>Mass transfer</li> <li>Fluid flow</li> <li>Heat transfer</li> </ol>	2	4
3	<b>Fundamental premixing unit operations</b>	a1, a2, a3, b1	Design, types, advantages, disadvantage, selection of machines used for: <ol style="list-style-type: none"> <li>Fluid clarification               <ul style="list-style-type: none"> <li>Filtration</li> </ul> </li> </ol>	2	4

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	(applied to fluids)		<ul style="list-style-type: none"> <li>▪ Centrifugation</li> <li>b. Solvent extraction</li> <li>c. Evaporation</li> <li>d. Distillation</li> </ul>		
<b>MID-TERM EXAM</b>				1	2
4	<b>Fundamental premixing unit operations (applied to solids)</b>	a1, a2, a3, b1	Types, advantages, disadvantage, machine design and operation used for: <ul style="list-style-type: none"> <li>a. Crystallization</li> <li>b. Drying</li> <li>c. Particle size reduction (milling)</li> <li>d. Particle size enlargement (granulation)</li> </ul>	3	6
5	<b>Mixing unit operation</b>	a1, a2, a3, b1	Types, advantages, disadvantage, machine design and operation used for: <ul style="list-style-type: none"> <li>a. Solid-solid mixing</li> <li>b. Solid-fluid and fluid-fluid mixing</li> <li>c. Semisolid mixing</li> </ul>	2	4
6	<b>Filling and packaging Processes</b>	a1, a2, a3, b1	Types, advantages, disadvantage, machine design and operation used for: <ul style="list-style-type: none"> <li>a. Filling of finished product</li> <li>b. Packaging. (including types of packaging materials)</li> </ul>	2	4
<b>Course Review</b>		a1, a2, a3, b1	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	

**a. Practical Aspect:**

Practice will be done using virtual instruments which mimics those applied in drug plant

Order	Tasks/ Experiments	CILOs	Number of Weeks	Contact hours
1.	Working in drug plants: requirements and GMP criteria	b1, c1, c2, d1, d3	1	2
2.	Powder flow and determination of flowability	b1, c1, c2, c3, d2, d3	1	2

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3.	Drying of solids using different models of dryers such as oven , spray drier + evaluation of drying efficiency by determination of moist content	c1, c2, c4, d2, d3	2	4
4.	particle size reduction (milling) using different models of millers such as hammer-mill, ball-mill + evaluation of milling efficiency by determination of particle size of powder	b1, c1, c3, c4, d1, d2	2	4
5.	Mixing of solids using different models of mixer such as V-mixer, Y-mixer + evaluation of mixing efficiency.	b1, c1, c2, c4, d2, d3	1	2
6.	Mixing of liquids and semisolids + evaluation of mixing efficiency.	c1, c3, c4, d1, d2,	1	2
7.	Filling of liquids	b1, c1, c2, d1, d2	1	2
<b>Practical Exam</b>			1	2
<b>Total</b>			10	20
<b>Number of Weeks /and Units Per Semester</b>				6 units

#### V. Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

#### VI. Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Group</b> : The teacher will provide the students with a number of problems related to operation and production studied in this course. The student group is assigned to provide a search-based technical solutions of one of those problems	c3, c4, d1, d2, d3	5-12

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**VII. Schedule of Assessment Tasks for Students During the Semester**

Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	c3, c4, d1
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, b1
3	Final exam ( written exam)		16	50	50	a1, a2, a3, b1
TOTAL				70	70 %	70

**Practical part assessment**

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b1, c1, c2, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	b1, c1, c2, d1, d2, d3
Total				30	30 %	

**VIII. Learning Resources:**

**1- Required Textbook(s) ( maximum two ).**

1. Aulton's Pharmaceuticals: The Design and Manufacture of Medicines, 5<sup>th</sup> edition, 2018.
2. Lachman/Lieberman's The Theory and Practice of Industrial Pharmacy, 4<sup>th</sup> edition, 2016.

**2- Essential References.**

1. Vidya. pharmaceutical industrial management, 2<sup>nd</sup> edition, 2017.
2. Jyothi. PRACTICAL MANUAL OF PHARMACEUTICAL ENGINEERING. 5<sup>th</sup> edition, 2019

**3- Electronic Materials and Web Sites etc.**

Article from:

www.emedicine.com

www.sciencedirect.com

www.blackwell.com

www.ovid.com

www.pubmed.com

<https://www.slideshare.net/AswaNasir/industrial-pharmacy-ppt>

<https://www.slideshare.net/WilliamDube1/industrial-pharmacy>

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IX. Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of :  
**INDUSTRIAL PHARMACY**  
Course Code No. (PHT422 )

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Khalid Shamarekh	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

II. Course Description:
<p>This course deals with the study of criteria of good practices relevant to manufacturing of medications in drug plants. These criteria include current good manufacturing practice (cGMP), good storage practice (cGSP) and good laboratory practice (cGLP) that are based on global guidelines such as ICH, WHO and ISO. The course also concerns with and the substantial unit operations utilized during manufacturing of these products including those involved in transfer of materials, those applied prior and after mixing of ingredients and those employed in filling and packaging of finished products. The second part also deals with the steps that accompany the drug manufacturing processes in the factory, such as mixing, drying, evaporation, extraction, distillation, grinding and granulation, as well as crystallization processes, the study of heat transfer in bodies, and examples of devices used in all these processes and their advantages and disadvantages</p>

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<b>X. The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>73. Alignment CILOs to PILOs</b>		
<b>PILOs</b>	<b>CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
a1. Identify criteria for good practice of pharmaceutical manufacturing including cGMP, cGSP, cGLP based on ICH, WHO and ISO guidelines.		
a2. Describe the role of pharmacist in employment GMP criteria and to operate unit operations for manufacturing of drug products.		
a3. Describe the different types unit-operation methods used for pharmaceutical manufacturing and their advantages/disadvantages.		
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
b1. Select standard operation procedure to obtain in-process and finished products with specific criteria.		
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory		
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3. Search efficiently for information using documented and electronic sources of information.		
c4. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
d1. Participate efficiently with his colleagues in a teamwork.		
d2. Demonstrate the skills of time management and self-learning.		
d3. Communicate effectively and behave in discipline with colleagues.		
<b>74. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Identify criteria for good practice of pharmaceutical manufacturing including cGMP, cGSP, cGLP based on ICH, WHO and ISO guidelines.	Active Lecture	written exams

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a2. Describe the different types unit-operation methods used for pharmaceutical manufacturing and their advantages/disadvantages		
a3. Describe the role of pharmacist in employment GMP criteria and to operate unit operations for manufacturing of drug products.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Select standard operation procedure to obtain in-process and finished products with specific criteria	Active lecture, feed-back learning	Written exam, quizzes
(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	Lab. Practice	Lab. term works, final practical exam
c2. Operate the instruments and perform experiments successfully in the laboratory		
c3 .Search efficiently for information using documented and electronic sources of information.	Lab. Practice, group-project	Lab. term works, final practical exam
c4. Present and report his/her works correctly using appropriate writing rules and technologies media.		assignment
(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Communicate effectively and behave in discipline with colleagues.	Lab. Practice, group-project	Lab. term works, final practical exam
d2. Demonstrate the skills of time management and self-learning.		assignment
d3. Participate efficiently with his colleagues in a teamwork.		

## XI. Course Content:

### B. Theoretical aspect

Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	Contact hours
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1	<b>Introduction to industrial pharmacy and criteria of good practices</b>	a1, a2, a3, b1	<ul style="list-style-type: none"> <li>The need and Significance for large-scale production of drugs</li> <li>History of large-scale manufacturing of drug products.</li> <li>Criteria of current good practices : good manufacturing practice (cGMP), good storage practice(cGSP)and good laboratory practice (cGLP) to be employed in drug plants based on specific guidelines such as WHO, ICH and ISO</li> </ul>	3	6
2	<b>General principles of flow and transfer</b>	a1, a2, a3, b1	Design, types, advantages, disadvantage, selection of machines used for: d. Mass transfer e. Fluid flow f. Heat transfer	2	4
3	<b>Fundamental premixing unit operations (applied to fluids)</b>	a1, a2, a3, b1	Design, types, advantages, disadvantage, selection of machines used for: e. Fluid clarification <ul style="list-style-type: none"> <li>Filtration</li> <li>Centrifugation</li> </ul> f. Solvent extraction g. Evaporation h. Distillation	2	4
<b>MID-TERM EXAM</b>				1	2
4	<b>Fundamental premixing unit operations (applied to solids)</b>	a1, a2, a3, b1	Types, advantages, disadvantage, machine design and operation used for: e. Crystallization f. Drying g. Particle size reduction (milling) h. Particle size enlargement (granulation)	3	6
5	<b>Mixing unit operation</b>	a1, a2, a3, b1	Types, advantages, disadvantage, machine design and operation used for: d. Solid-solid mixing e. Solid-fluid and fluid-fluid mixing	2	4

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			f. Semisolid mixing		
6	<b>Filling and packaging Processes</b>	a1, a2, a3, b1	Types, advantages, disadvantage, machine design and operation used for: c. Filling of finished product d. Packaging. (including types of packaging materials)	2	4
	<b>Course Review</b>	a1, a2, a3, b1	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	

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a. Practical Aspect:				
Practice will be done using virtual instruments which mimics those applied in drug plant				
Order	Tasks/ Experiments	CILOs	Number of Weeks	Contact hours
8.	Working in drug plants: requirements and GMP criteria	b1, c1, c2, d1, d3	1	2
9.	Powder flow and determination of flowability	b1, c1, c2, c3, d2, d3	1	2
10.	Drying of solids using different models of dryers such as oven , spray drier + evaluation of drying efficiency by determination of moist content	c1, c2, c4, d2, d3	2	4
11.	particle size reduction (milling) using different models of millers such as hammer-mill, ball-mill + evaluation of milling efficiency by determination of particle size of powder	b1, c1, c3, c4, d1, d2	2	4
12.	Mixing of solids using different models of mixer such as V-mixer, Y-mixer + evaluation of mixing efficiency.	b1, c1, c2, c4, d2, d3	1	2
13.	Mixing of liquids and semisolids + evaluation of mixing efficiency.	c1, c3, c4, d1, d2,	1	2
14.	Filling of liquids	b1, c1, c2, d1, d2	1	2
<b>Practical Exam</b>			1	2
<b>Total</b>			10	20
<b>Number of Weeks /and Units Per Semester</b>				6 units

XII. Teaching strategies of the course:
<p><b>Active Lecture</b> It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as <b>Brain-storming</b>: It depends on stimulation of the student`s brain through a group of questions &amp;/or <b>Concepts map</b>: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations &amp; by using <b>learning aids</b> such as Data show projector</p>
<p><b>Feedback learning</b>: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction &amp; evaluation</p>
<p><b>Group projects</b>: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &amp;for promoting team work skills</p>

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XIII. Assignments:			
No	Assignments	Aligned CILOs	Week Due
1	<b>Group:</b> The teacher will provide the students with a number of problems related to operation and production studied in this course. The student group is assigned to provide a search-based technical solutions of one of those problems	c3, c4, d1, d2, d3	5-12

XIV. Schedule of Assessment Tasks for Students During the Semester						
Theoretical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1
		Assignments	7, 12	5	5	c3, c4, d1
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, b1
3	Final exam ( written exam)		16	50	50	a1, a2, a3, b1
TOTAL				70	70 %	70

Practical part assessment						
No .	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b1, c1, c2, d1, d2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	b1, c1, c2, d1, d2, d3
Total				30	30 %	

XV. Learning Resources:
<b>2- Required Textbook(s) ( maximum two ).</b>
3. Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 5 <sup>th</sup> edition, 2018.
4. Lachman/Lieberman's The Theory and Practice of Industrial Pharmacy, 4 <sup>th</sup> edition, 2016.
<b>2- Essential References.</b>
3. Vidya. pharmaceutical industrial management, 2 <sup>nd</sup> edition, 2017.

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4. Jyothi. PRACTICAL MANUAL OF PHARMACEUTICAL ENGINEERING. 5<sup>th</sup> edition, 2019

### 3- Electronic Materials and Web Sites etc.

Article from:

www.emedicine.com

www.sciencedirect.com

www.blackwell.com

www.ovid.com

www.pubmed.com

<https://www.slideshare.net/AswaNasir/industrial-pharmacy-ppt>

<https://www.slideshare.net/WilliamDube1/industrial-pharmacy>

## XVI. Course Policies: (Based on the Uniform Students' By law (2007))

	<b>Class Attendance:</b>
1	Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
	<b>Tardiness:</b>
2	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
	<b>Exam Attendance/Punctuality:</b>
3	No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
	<b>Assignments &amp; Projects:</b>
4	Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
	<b>Cheating:</b>
5	Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
	<b>Forgery and Impersonation:</b>
6	Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
	<b>Other policies:</b>
7	The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor Program of Pharmacy**

Course Specification of:

**Hospital Pharmacy**

Course No. (PHC427)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.



I. Course Identification and General Information:					
1	Course Title:	Hospital Pharmacy			
2	Course Code & Number:	PHC427			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	4 <sup>th</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	-----			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Credit Hour System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Ali Alyahawi			
13	Date of Approval:				

II. Course Description:
The course provides students with the knowledge and skills necessary to undertake all aspects of hospital pharmacy. It includes organizational structure of the hospital pharmacy, patient-care activities, hospital formulary, purchasing, drugs storage, medication distribution system, handling of controlled substances, dispensing of emergency drugs, and pharmacist technical services in hospital pharmacy.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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III. program Intended Learning Outcomes (PILOs) :		Course Intended Learning (CILOs) :
<b>A: Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences	a1. Define the principles of different aspects of hospital pharmacy
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a2. Describe the role of the pharmacist in hospital pharmacy (procurement, storage, prescribing, transcription, dispensing, administration, monitoring and documentation).
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
B5	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems	b1. Distinguish the tasks of different hospital pharmacy organizations in hospital setting b2. Identify the components of typical medication use systems in different pharmacy practice settings.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	c1. Apply properly regulations, policies, and standard guidelines in practice processes to optimize medication use. c2. Correctly use human, financial, and physical resources to optimize the medication use system.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
D2	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	d1. Display self-learning and decision making skills to improve his problem solving abilities
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d2. Communicate effectively with healthcare team and patients.

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<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
a1	Define the principles of different aspects of hospital pharmacy	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
a2	Describe the role of the pharmacist in hospital pharmacy (procurement, storage, prescribing, transcription, dispensing, administration, monitoring and documentation).	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
b1	Distinguish the tasks of different hospital pharmacy organizations in hospital setting	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
b2	Identify the components of typical medication use systems in different pharmacy practice settings.	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
c1	Apply properly regulations, policies, and standard guidelines in practice processes to optimize medication use.	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz

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c2	Correctly use human, financial, and physical resources to optimize the medication use system.	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Display self-learning and decision making skills to improve his problem solving abilities	Interactive discussion Seminar	Oral Presentation
d2	Communicate effectively with healthcare team and patients.	Interactive discussion Seminar	Oral Presentation

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction	a 1, a2, b1, b2, c1, c2	Definition of Hospital pharmacy Goals for Hospital Pharmacy Minimum standards for pharmacies in institutions/Hospitals Role of Pharmacist in Pharmaceutical Services The five "rights" for correct drug administration	2	4
2	Drugs and Therapeutics Committee	a2, b1, b2	Objectives of DTC Composition of DTC Operation of DTC Role DTC in Drug safety Role of DTC in developing formulary system and emergency drugs list	1	2
3	The Hospital Formulary	a2, b1, b2, d1, d2	General Principles and guidelines to develop Formulary Format Preparation of the Formulary Role of Pharmacist Benefits and problems Keeping up to date Formulary	1	2

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4	Drug distribution system in hospitals	b2, c2,d1	Dispensing of drugs to inpatients, types of drug distribution systems, charging policy, labeling Dispensing of drugs to ambulatory patients. Dispensing of controlled drugs.	3	6
6	<b>Midterm Exam</b>	a 1, a2, b1, b2,d1		1	2
7	Sterile medication doses and preparation of I.V. admixtures	a2, b1, b2	Definition, composition, advantages, incompatibilities. Chart of incompatibilities, measures to avoid incompatibilities, aseptic techniques of preparation	2	4
9	Safe Use of Medication in the Hospital	a 1, a2, b1, b2	Medication error Evaluation & Precautions of Medication Error Role of Pharmacist in Controlling Medication Error.	1	2
10	Drug store management and Inventory control	a 1, a2, b1, b2, c1, c2, d1, d2	Ordering and Receiving Medication Policies of drugs storage and distributions Drug product recalls and handling of expired and defective drugs.	3	6
11	Workshop		Class discussion for selected course topics	1	2
12	<b>Final Exam</b>	a1, a2, b1, b2,c1,c2		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

### C. Tutorial Aspect:

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Not applicable			
<b>Number of Weeks /and Units Per Semester</b>				

### V. Teaching Strategies of the Course:

Lectures  
Assignment  
Interactive discussion  
Self-learning  
Seminar  
Office hour

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VI. Assessment Methods of the Course:	
<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Quiz</li> <li>- Oral Discussion</li> </ul>	

VII. Assignments:				
No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	<b>Assignment 1:</b> Steps of Preparation of the Hospital Formulary	Week 6	5	a1, a2, b1, b2, c1, c2, d1, d2
2	<b>Assignment 2:</b> The storage conditions for selected IV drugs	Week 12	5	a1, a2, b1, b2, c1, c2, d1, d2
<b>Total</b>			<b>10</b>	

VIII. Schedule of Assessment Tasks for Students During the Semester:					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 6,12	10	10%	a1, a2, b1, b2, c1, c2, d1, d2
2	Quiz1	Week 6	5	5%	a1, a2, b1, b2, c1, c2, d1
3	Midterm Exam	Week 8	20	20%	a1, a2, b1, b2, c1, c2, d1
4	Quiz2	Week 12	5	5%	a1, a2, b1, b2, c1, c2, d1,
5	Final Exam	Week 16	60	60%	a1, a2, b1, b2, c1, c2, d1
<b>Total</b>			<b>100</b>	<b>100%</b>	

IX. Learning Resources:	
Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).	
<b>1- Required Textbook(s) ( maximum two ).</b>	
Marie Chisholm-Burns (2016), Pharmacotherapy Principles and Practice, 4 <sup>th</sup> Edition, New York: McGraw-Hill Medical, United States of America. Lexicomp, (2018). Drug Information Handbook, 27h edition, Lexi-Comp, U.S.A	
<b>2- Essential References.</b>	
Stephen, M., 2011. Hospital Pharmacy. 2nd Ed. Pharmaceutical Press, London, UK. Taylor, K. and G. Harding, 2001. Pharmacy Practice. CRC press, USA. Bukhari, N.I., 2000. Hospital Pharmacy. Aziz Book Depot, Lahore, Pakistan.	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="http://www.uptodate.com">www.uptodate.com</a> <a href="http://www.medscape.com">www.medscape.com</a>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



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وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة

## Second Part of Course Specification

Faculty of Medicine and Health Sciences

Department of Pharmacy

Bachelor Program of Pharmacy

Course Specification of:

# Hospital Pharmacy

Course Code No. (PHC427)

2022

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Alyahawi						
Location & Telephone No.:	775957401						
E-mail:	alyahawipharm@yahoo.com	SA T	SU N	MO N	TUE	WE D	THU
Office Hours							

II. Course Description:
The course provides students with the knowledge and skills necessary to undertake all aspects of hospital pharmacy. It includes organizational structure of the hospital pharmacy, patient-care activities, hospital formulary, purchasing, drugs storage, medication distribution system, handling of controlled substances, dispensing of emergency drugs, and pharmacist technical services in hospital pharmacy.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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III. Course Intended Learning Outcomes (CILOs) :	
<b>A. Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:	
a1	Define the principles of different aspects of hospital pharmacy
a2	Describe the role of the pharmacist in hospital pharmacy (procurement, storage, prescribing, transcription, dispensing, administration, monitoring and documentation).
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:	
b1	Distinguish the tasks of different hospital pharmacy organizations in hospital setting
b2	Identify the components of typical medication use systems in different pharmacy practice settings.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:	
c1	Apply properly regulations, policies, and standard guidelines in practice processes to optimize medication use.
c2	Correctly use human, financial, and physical resources to optimize the medication use system.
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:	
d1	Display self-learning and decision making skills to improve his problem solving abilities
d2	Communicate effectively with healthcare team and patients.

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Define the principles of different aspects of hospital pharmacy	Lectures Assignment Interactive discussion Office hour Seminar Self-learning
a2	Describe the role of the pharmacist in hospital pharmacy (procurement, storage, prescribing, transcription, dispensing, administration, monitoring and documentation).	Exam Assignment Quiz

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ali Alyahawi	Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani





<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
b1	Distinguish the tasks of different hospital pharmacy organizations in hospital setting	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
b2	Identify the components of typical medication use systems in different pharmacy practice settings.	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
c1	Apply properly regulations, policies, and standard guidelines in practice processes to optimize medication use.	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
c2	Correctly use human, financial, and physical resources to optimize the medication use system.	Lectures Assignment Interactive discussion Office hour Seminar Self-learning	Exam Assignment Quiz
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
d1	Display self-learning and decision making skills to improve his problem solving abilities	Interactive discussion Seminar	Oral Presentation
d2	Communicate effectively with healthcare team and patients.	Interactive discussion Seminar	Oral Presentation

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IV. Course Contents:					
A. Theoretical Aspect:					
Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	contact hours
1	Introduction	a 1, a2, b1, b2, c1, c2	Definition of Hospital pharmacy Goals for Hospital Pharmacy Minimum standards for pharmacies in institutions/Hospitals Role of Pharmacist in Pharmaceutical Services The five "rights" for correct drug administration	2	4
2	Drugs and Therapeutics Committee	a2, b1, b2	Objectives of DTC Composition of DTC Operation of DTC Role DTC in Drug safety Role of DTC in developing formulary system and emergency drugs list	1	2
3	The Hospital Formulary	a2, b1, b2, d1, d2	General Principles and guidelines to develop Formulary Format Preparation of the Formulary Role of Pharmacist Benefits and problems Keeping up to date Formulary	1	2
4	Drug distribution system in hospitals	b2, c2,d1	Dispensing of drugs to inpatients, types of drug distribution systems, charging policy, labeling Dispensing of drugs to ambulatory patients. Dispensing of controlled drugs.	3	6
6	<b>Midterm Exam</b>	a 1, a2, b1, b2,d1		1	2
7	Sterile medication doses and preparation of I.V. admixtures	a2, b1, b2	Definition, composition, advantages, incompatibilities. Chart of incompatibilities, measures to avoid incompatibilities, aseptic techniques of preparation	2	4
9	Safe Use of Medication in the Hospital	a 1, a2, b1, b2	Medication error Evaluation & Precautions of Medication Error Role of Pharmacist in Controlling Medication Error.	1	2

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10	Drug store management and Inventory control	a 1, a2, b1, b2, c1, c2, d1, d2	Ordering and Receiving Medication Policies of drugs storage and distributions Drug product recalls and handling of expired and defective drugs.	3	6
11	Workshop		Class discussion for selected course topics	1	2
12	<b>Final Exam</b>	a1, a2, b1, b2, c1, c2		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

<b>C. Tutorial Aspect:</b>				
No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Not applicable			
<b>Number of Weeks /and Units Per Semester</b>				

<b>V. Teaching Strategies of the Course:</b>
Lectures Assignment Interactive discussion Self-learning Seminar Office hour

<b>VI. Assessment Methods of the Course:</b>
<ul style="list-style-type: none"> <li>- Exam</li> <li>- Assignment</li> <li>- Quiz</li> <li>- Oral Discussion</li> </ul>

<b>VII. Assignments:</b>				
No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	<b>Assignment 1:</b> Steps of Preparation of the Hospital Formulary	Week 6	5	a1, a2, b1, b2, c1, c2, d1, d2
2	<b>Assignment 2:</b> The storage conditions for selected IV drugs	Week 12	5	a1, a2, b1, b2, c1, c2, d1, d2
<b>Total</b>			<b>10</b>	

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### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	Week 6,12	10	10%	a1, a2, b1, b2, c1, c2, d1, d2
2	Quiz1	Week 6	5	5%	a1, a2, b1, b2, c1, c2, d1
3	Midterm Exam	Week 8	20	20%	a1, a2, b1, b2, c1, c2, d1
4	Quiz2	Week 12	5	5%	a1, a2, b1, b2, c1, c2, d1,
5	Final Exam	Week 16	60	60%	a1, a2, b1, b2, c1, c2, d1
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

Written in the following order: ( Author - Year of publication – Title – Edition – Place of publication – Publisher).

#### 1- Required Textbook(s) ( maximum two ).

Marie Chisholm-Burns (2016), Pharmacotherapy Principles and Practice, 4<sup>th</sup> Edition, New York: McGraw-Hill Medical, United States of America.  
Lexicomp, (2018). Drug Information Handbook, 27h edition, Lexi-Comp, U.S.A

#### 2- Essential References.

Stephen, M., 2011. Hospital Pharmacy. 2nd Ed. Pharmaceutical Press, London, UK.  
Taylor, K. and G. Harding, 2001. Pharmacy Practice. CRC press, USA.  
Bukhari, N.I., 2000. Hospital Pharmacy. Aziz Book Depot, Lahore, Pakistan.

#### 3- Electronic Materials and Web Sites etc.

[www.uptodate.com](http://www.uptodate.com)  
[www.medscape.com](http://www.medscape.com)

### X. Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.

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6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

**PHARMACEUTICAL QUALITY CONTROL**

Course No. (60)

Course Code No. (PHM425)

2022



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Course Specification

**PHARMACEUTICAL QUALITY CONTROL**

Course Identification and General Information:							
1	Course Title:	Pharmaceutical Quality Control					
2	Course Code & Number:	PHM425					
3	Credit hours:	Credit Hour					
		Theoretical			P	Tr.	TOTAL
		L.	Tut.	S.			
2	-	-	2	-	3		
4	Study level/ semester at which this course is offered:	4 <sup>th</sup> level – 2 <sup>nd</sup> Semester					
5	Pre –requisite (if any):	PHM411					
6	Co –requisite (if any):	---					
7	Program (s) in which the course is offered:	Bachelor of Pharmacy					
8	Study System:	Semester based System					
9	Mode of delivery:	Full Time					
10	Language of teaching the course:	ENGLISH					
11	Location of teaching the course:	At The University Facility					
12	Prepared By:	Dr. Ahmed Al-Ghani					
13	Date of Approval:	2022					

L: lecturing; Tut: Tutorial, S: seminar; P: practical; Tr.: training

Course Description:
<p>This course provides the students with the knowledge and capability to control the quality of drugs and other medical substances by the study of quality tests and knowledge of allowed limits in pharmacopeia. Also, this course deals with the study of the quality management, requirements, procedures as well as pharmacopeia tests to evaluate the quality of raw materials, in-process products and finished pharmaceutical products and QC tests of raw finished products, package and labels. The practical part of the course provides with skills of quality control of drugs that done in pharmaceutical instrumental analysis and pharmaceuticals lab.</p>

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**Alignment CILOs to PILOs**

PILOs	CILOs
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**A: Knowledge and understanding: upon completion of the course, students will be able to:**

<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy	<b>a1.</b> Identify the physicochemical properties of raw materials, in-process products and finished products that are used to evaluate their qualities.
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a2.</b> Explain the analytical methods and procedures applied to evaluate the quality of pharmaceutical raw materials, in-process products and finished products.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness	<b>a3.</b> Describe the role of pharmacists in implementing quality control rules and in evaluating the quality of pharmaceutical products.

**B: Intellectual skills: upon completion of the course, students will be able to:**

<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Interpret the out-coming data obtained after qualitative or quantitative analysis of raw materials, in-process products and finished pharmaceutical products <b>b2.</b> Select suitable standard operation procedures to investigate quality of pharmaceutical raw materials, in-process products and finished products
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	<b>b3.</b> Evaluate different types of pharmaceutical dosage forms.
<b>B5</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance,	<b>b4.</b> Apply calculations to assess the quality of raw materials, in-process products and finished pharmaceutical products

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	Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
<b>C2</b>	Practice extraction/synthesis and analysis of pharmaceutical potential agents.	<b>c2.</b> Operate the instruments (UV-Visible, HPLC, Hardness, Disintegrator, Dissolution and others) and perform experiments successfully in the laboratory
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c3.</b> Carry out quality control tests for different dosage forms of number of drugs.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Communicate effectively and behave in discipline with colleagues. <b>d2.</b> Participate efficiently with his colleagues in a team work.
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate the skills of time management and self-learning.

Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>a1.</b> Identify the physicochemical properties of raw materials, in-process products and finished products that are used to evaluate their qualities.	Active Lecture	written exams
<b>a2.</b> Explain the analytical methods and procedures applied to evaluate the quality of		

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pharmaceutical raw materials, in-process products and finished products.		
a3. Describe the role of pharmacists in implementing quality control rules and in evaluating the quality of pharmaceutical products.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Interpret the out-coming data obtained after qualitative or quantitative analysis of raw materials, in-process products and finished pharmaceutical products	Active Lecture, feed-back learning	Written exams, quizzes, assignment
b2. Select suitable standard operation procedures to investigate quality of pharmaceutical raw materials, in-process products and finished products		
B3. Evaluate different types of pharmaceutical dosage forms.		
b4. Apply calculations to assess the quality of raw material, in-process products and finished pharmaceutical products	Active Lecture, laboratory practice	Written exam, Lab. term works, final practical exam
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
c2. Operate the instruments (UV-Visible, HPLC, Hardness, Disintegrator, Dissolution and others) and perform experiments successfully in the laboratory		
c3. Carry out quality control tests for different dosage forms of number of drugs.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	laboratory practice	Lab. term works, final practical exam
d2. Participate efficiently with his colleagues in a team work.		

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d3. Demonstrate the skills of time management and self-learning.	laboratory practice, Feedback learning	Lab. term works, final practical exam, Assignments
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Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to Quality control	a1, a2, a3, b1,b2	definition of quality, quality control QC, specifications (qualitative and quantitative), governmental and drug plant QC lab, Relation and mission of quality management system (QMS), quality assurance (QA), GMP and QC Pharmacopeias: The References of quality control: BP, USP: contents, volumes, understanding monographs	2	4
2	Units of QC lab	a1, a2, a3, b1,b2	<b>missions of</b> a) Raw materials unit b) In-process unit c) Validation unit d) Microbiology unit e) Finished-product unit	1	2
3	Procedures of QC	a1, a2, a3, b1,b2	sampling methods, number of samples based on batch size Checking and calibration of equipment Validation of results: accuracy, precision Documenting and reporting Quarantine, releasing and rejecting	2	4
4	QC tests of raw materials	a1, a2, a3, b1, b2, b4	<b>Tests of pharmacopeial specification of raw materials</b> identification, assay, microbial content, impurities content, other tests with examples from the pharmacopeia	2	4
MID-TERM EXAM				1	2
5	QC tests of raw In-process products	a1, a2,a3, b1, b2, b4	Evaluation of specification of products resulting from unit-operations: drying, evaporation, filtration, milling, granulation, mixing	2	4

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6	QC tests of raw finished products, package and labels	a1, a2, a3, b1, b2, b4	<p><b>specific Tests (pharmacopeial specification) finished products including:</b> Solutions Suspensions &amp; emulsions Semisolid products Suppositories Powders Granules Tablets Capsules Sterile products: parenteral, ophthalmic preparations</p> <p><b>Testing of pharmacopeial specifications of:</b> Package Labels: information</p>	4	8
<b>Course Review</b>		a1, a2, a3, b1, b2, b4	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

**B - Practical Aspect:**

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours
1	QC sampling, checking of equipment & reporting	c1, c2, c3, d1, d2, d3	1	2
2	QC of raw materials: paracetamol BP	c1, c2, c3, d1, d2, d3	1	2
3	QC of in-process products after: mixing	c1, c2, c3, d1, d2, d3	1	2
4	QC of in-process finished products: solution chlorpheniramine syrup BP	c1, c2, c3, d1, d2, d3	1	2
5	QC of in-process finished products: suspension metronidazole suspension USP	c1, c2, c3, d1, d2, d3	1	2
6	QC of in-process finished products: creams miconazole cream BP	c1, c2, c3, d1, d2, d3	1	2
7	QC of in-process finished products: suppositories	c1, c2, c3, d1, d2, d3	1	2

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	paracetamol suppositories			
8	QC of in-process finished products: paracetamol tablet friability hardness	c1, c2, c3, d1, d2, d3	1	2
9	QC of in-process finished products: paracetamol tablet (dissolution, disintegration)	c1, c2, c3, d1, d2, d3	1	2
10	QC of in-process finished products: capsules amoxicillin capsules USP	c1, c2, c3, d1, d2, d3	1	2
11	QC labels of labels & package	c1, c2, c3, d1, d2, d3	1	2
PRACTICAL EXAM			1	2
Total			12	24

### Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve the problems provided by the teacher at the end of each unit	b4, d2	7

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	b4, d2
2	Mid-term exam (written exam)		7	10	10	a1, a2, a3, b1, b2, b4, d3
3	Final exam (written exam)		16	50	50	a1, a2, a3, b1, b2, b4, d3

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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TOTAL	70	70 %	70
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Practical part assessment						
No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b3, c1, c2, d1, d2, d3
2		Accomplishments		5	5	
		Final exam (practical)	12	20	20	b3, c1, c2, d1, d3
Total				30	30 %	

Learning Resources:	
<b>1- Required Textbook(s) (maximum two).</b>	
Quality Assurance and Quality Management in Pharmaceutical Industry, Y Anjaneyulu and R Marayya Published by Pharma Book Syndicate, Hyderabad (2005) ISBN 10: 8188449148 ISBN 13: 9788188449149 USP, 2020	
<b>2- Essential References.</b>	
BP, 2016 A. P. Kulkarni. Process instrumentation and control Ansel's pharmaceutical dosage forms and drug delivery system, 2011, Lippincott Williams and Wilkins, USA	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.slideshare.net/PrashantTomar7/quality-control-59141900">https://www.slideshare.net/PrashantTomar7/quality-control-59141900</a> <a href="https://slideplayer.com/slide/5199515/">https://slideplayer.com/slide/5199515/</a>	

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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
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6	<b>Forgery and Impersonation:</b>

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Second Part of Course Specification  
Faculty of Medicine and Health Science

**Department of Pharmacy  
Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**PHARMACEUTICAL QUALITY CONTROL**  
Course No. (60)

Course Code No. (PHM425)

- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>Course Description:</b>
<p>This course provides the students with the knowledge and capability to control the quality of drugs and other medical substances by the study of quality tests and knowledge of allowed limits in pharmacopeia. Also, this course deals with the study of the quality management, requirements, procedures as well as pharmacopeia tests to evaluate the quality of raw materials, in-process products and finished pharmaceutical products and QC tests of raw finished products, package and labels.</p> <p>The practical part of the course provides with skills of quality control of drugs that done in pharmaceutical instrumental analysis and pharmaceutics lab.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Anes Thabit	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	D. Turki Alqabbani



<b>III. Intended learning outcomes of the course (CILOs)</b>
<b>Alignment CILOs</b>
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>
a1. Identify the physicochemical properties of raw materials, in-process products and finished products that are used to evaluate their qualities.
a2. Explain the analytical methods and procedures applied to evaluate the quality of pharmaceutical raw materials, in-process products and finished products.
a3. Describe the role of pharmacists in implementing quality control rules and in evaluating the quality of pharmaceutical products.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>
b1. Interpret the out-coming data obtained after qualitative or quantitative analysis of raw materials, in-process products and finished pharmaceutical products
b2. Select suitable standard operation procedures to investigate quality of pharmaceutical raw materials, in-process products and finished products
b3. Evaluate different types of pharmaceutical dosage forms.
b4. Apply calculations to assess the quality of raw materials, in-process products and finished pharmaceutical products
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory
c2. Operate the instruments (UV-Visible, HPLC, Hardness, Disintegrator, Dissolution and others) and perform experiments successfully in the laboratory
c3. Carry out quality control tests for different dosage forms of number of drugs.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>
d1. Communicate effectively and behave in discipline with colleagues.
d2. Participate efficiently with his colleagues in a team work.
d3. Demonstrate the skills of time management and self-learning.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Identify the physicochemical properties of raw materials, in-process products and finished products that are used to evaluate their qualities.	Active Lecture	written exams
a2. Explain the analytical methods and procedures applied to evaluate the quality of pharmaceutical raw materials, in-process products and finished products.		
a3. Describe the role of pharmacists in implementing quality control rules and in		

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evaluating the quality of pharmaceutical products.		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret the out-coming data obtained after qualitative or quantitative analysis of raw materials, in-process products and finished pharmaceutical products	Active Lecture, feed-back learning	Written exams, quizzes, assignment
<b>b2.</b> Select suitable standard operation procedures to investigate quality of pharmaceutical raw materials, in-process products and finished products		
<b>B3.</b> Evaluate different types of pharmaceutical dosage forms.		
<b>b4.</b> Apply calculations to assess the quality of raw material, in-process products and finished pharmaceutical products	Active Lecture, laboratory practice	Written exam, Lab. term works, final practical exam
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	laboratory practice	Lab. term works, final practical exam
<b>c2.</b> Operate the instruments (UV-Visible, HPLC, Hardness, Disintegrator, Dissolution and others) and perform experiments successfully in the laboratory		
<b>c3.</b> Carry out quality control tests for different dosage forms of number of drugs.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	laboratory practice	Lab. term works, final practical exam
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d3.</b> Demonstrate the skills of time management and self-learning.	laboratory practice, Feed-back learning	Lab. term works, final practical exam, Assignments

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Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to Quality control	a1, a2, a3, b1,b2	definition of quality, quality control QC, specifications (qualitative and quantitative), governmental and drug plant QC lab, Relation and mission of quality management system (QMS), quality assurance (QA), GMP and QC Pharmacopeias: The References of quality control: BP, USP: contents, volumes, understanding monographs	2	4
2	Units of QC lab	a1, a2, a3, b1,b2	<b>missions of</b> a) Raw materials unit b) In-process unit c) Validation unit d) Microbiology unit e) Finished-product unit	1	2
3	Procedures of QC	a1, a2, a3, b1,b2	sampling methods, number of samples based on batch size Checking and calibration of equipment Validation of results: accuracy, precision Documenting and reporting Quarantine, releasing and rejecting	2	4
4	QC tests of raw materials	a1, a2, a3, b1, b2, b4	<b>Tests of pharmacopeial specification of raw materials</b> identification, assay, microbial content, impurities content, other tests with examples from the pharmacopeia	2	4
MID-TERM EXAM				1	2
5	QC tests of raw In-process products	a1, a2,a3, b1, b2, b4	Evaluation of specification of products resulting from unit-operations: drying, evaporation, filtration, milling, granulation, mixing	2	4
6	QC tests of raw finished products,	a1, a2,a3, b1, b2, b4	<b>specific Tests (pharmacopeial specification) finished products including:</b> Solutions	4	
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	package and labels		Suspensions & emulsions Semisolid products Suppositories Powders Granules Tablets Capsules Sterile products: parenteral, ophthalmic preparations <b>Testing of pharmacopeial specifications of:</b> Package Labels: information		8
<b>Course Review</b>	a1,a2,a3, b1, b2, b4	Review of the course topics by discussion session.		1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

B - Practical Aspect:					
Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes (CILOs)	Number of Weeks	contact hours	
1	<b>QC sampling, checking of equipment &amp; reporting</b>	c1, c2, c3, d1, d2, d3	1	2	
2	<b>QC of raw materials: paracetamol BP</b>	c1, c2, c3, d1, d2, d3	1	2	
3	<b>QC of in-process products after: mixing</b>	c1, c2, c3, d1, d2, d3	1	2	
4	<b>QC of in-process finished products: solution chlorpheniramine syrup BP</b>	c1, c2, c3, d1, d2, d3	1	2	
5	<b>QC of in-process finished products: suspension metronidazole suspension USP</b>	c1, c2, c3, d1, d2, d3	1	2	
6	<b>QC of in-process finished products: creams miconazole cream BP</b>	c1, c2, c3, d1, d2, d3	1	2	
7	<b>QC of in-process finished products: suppositories paracetamol suppositories</b>	c1, c2, c3, d1, d2, d3	1	2	
8	<b>QC of in-process finished products: paracetamol tablet friability hardness</b>	c1, c2, c3, d1, d2, d3	1	2	

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9	QC of in-process finished products: paracetamol tablet (dissolution, disintegration)	c1, c2, c3, d1, d2, d3	1	2
10	QC of in-process finished products: capsules amoxicillin capsules USP	c1, c2, c3, d1, d2, d3	1	2
11	QC labels of labels & package	c1, c2, c3, d1, d2, d3	1	2
PRACTICAL EXAM			1	2
Total			12	24

### Teaching strategies of the course:

**Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to solve the problems provided by the teacher at the end of each unit	b4, d2	7

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	5	5	b1, b2, b3
		Assignments	7, 12	5	5	b4, d2
2	Mid-term exam (written exam)	7	10	10	a1, a2, a3, b1, b2, b4, d3	
3	Final exam (written exam)	16	50	50	a1, a2, a3, b1, b2, b4, d3	
TOTAL			70	70 %	70	

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Practical part assessment						
No	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	b3, c1, c2, d1, d2, d3
2		Accomplishments		5	5	
		Final exam (practical)		12	20	20
Total				30	30 %	

Learning Resources:	
<b>1- Required Textbook(s) (maximum two).</b>	
Quality Assurance and Quality Management in Pharmaceutical Industry, Y Anjaneyulu and R Marayya Published by Pharma Book Syndicate, Hyderabad (2005) ISBN 10: 8188449148 ISBN 13: 9788188449149 USP, 2020	
<b>2- Essential References.</b>	
A. P. Kulkarni. Process instrumentation and control Ansel's pharmaceutical dosage forms and drug delivery system, 2011, Lippincott Williams and Wilkins, USA	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.slideshare.net/PrashantTomar7/quality-control-59141900">https://www.slideshare.net/PrashantTomar7/quality-control-59141900</a>	
<a href="https://slideplayer.com/slide/5199515/">https://slideplayer.com/slide/5199515/</a>	

Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**TOXICOLOGY**  
Course No. (PHC428)

2022



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I. Course Identification and General Information:					
1	Course Title:	Toxicology			
2	Course Code & Number:	PHC428			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	Fourth Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Prs: Pr:PHP418			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhawlani			
13	Date of Approval:	2022			

Course Description:
<p>This course deals with the study of sources, mode of action, toxic pathophysiological effects, detection, diagnosis and management of poisonous materials including acids, alkalis, metals, metalloids, pesticides, heavy metals, specific chemicals, simple organic compounds, poisoning with materials killing harmful Living organisms and Poisoning with some medicinal agents. The course also involves several methods for management of poisoning with some medicinal agents.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**Alignment CILOs to PILOs**

PILOs	CILOs
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**A: Knowledge and understanding: upon completion of the course, students will be able to:**

<b>A1</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<p><b>a1.</b> Identify the mechanism of toxicity with poisonous materials.</p> <p><b>a2.</b> Identify the types of poisonous materials that can threaten human life.</p> <p><b>a3.</b> Describe the clinical features associated with poisoning</p> <p><b>a4.</b> Discuss the methods of poisons detection, diagnosis and management.</p>
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a5.</b> Describe the role of pharmacist in detection, preventing and management of poisoning.

**B: Intellectual skills: upon completion of the course, students will be able to:**

<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Classify poisonous materials.
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**C: Professional and practical skills: upon completion of the course, students will be able to:**

<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c1.</b> Search efficiently for information using documented and electronic sources of information.
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**D: Transferable skills: upon completion of the course, students will be able to:**

<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d1.</b> Demonstrate the skills of time management and self-learning.
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**Alignment CILOs to teaching strategies and assessment strategies**

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Dr. Mohammed Alkhwilani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the mechanism of toxicity with poisonous materials.	Active Lecture	Written exams
<b>a2.</b> Identify the types of poisonous materials that can threaten human life.		
<b>a3.</b> Describe the clinical features associated with poisoning		
<b>a4.</b> Describe the role of pharmacist in detection, preventing and management of poisoning.		
<b>a5.</b> Discuss the methods of poisons detection, diagnosis and management.	Active Lecture, feed-back learning	Written exams, quizzes
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify poisonous materials.	Active Lecture	Written exams
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning	Assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate the skills of time management and self-learning.	Feed-back learning	Assignments

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Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to toxicology	a1, a2, a3, a4, a5, b1	Definitions fundamentals and scope of toxicology. Classification of poisons Causes of toxicity: accidental, commit suicidal, criminal General harmful effects of poisons Approaches to manage poisoning Mode of actions of poisons Diagnosis and detection of poisoning General procedure of management of poisoning	1	2
Sources, mode of action, toxic pathophysiological effects, detection, diagnosis and management of the following types of toxicity					
2	Poisoning with acids and alkalis	a1, a2, a3, a4, a5, b1	Acids toxicity Alkalis toxicity Salts toxicity	1	2
3	Poisoning with metals and metalloids	a1, a2, a3, a4, a5, b1	Toxicity of copper, selenium, Molybdenum, phosphorus Iron toxicity	2	4
4	Poisoning with heavy metals	a1, a2, a3, a4, a5, b1	Toxicity of Lead, Mercury and Arsenic	2	4
<b>MID-TERM EXAM</b>				1	2
5	Poisoning with specific chemicals	a1, a2, a3, a4, a5, b1	Cynide Hydrogen sulfide Carbon monoxide	2	4
6	Poisoning with simple organic compounds	a1, a2, a3, a4, a5, b1	Methanol and Isopropyl Alcohols hydrocarbons fuel materials: petroleum, gasoline, etc	2	4
7	Poisoning with materials killing harmful	a1, a2, a3, a4, a5, b1	Rodenticides, insecticides herbicides Fungicides	2	4

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	Living organisms				
8	Poisoning with some medicinal agents	a1, a2, a3, a4, a5, b1	Poisoning with opiates, benzodiazepines Poisoning with paracetamol and aspirin	1	2
	Course Review	a1, a2, a3, a4, a5, b1	Review	1	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	8 Units

### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to provide a search-based report on toxicity and management of one poison not included in the study topics.	c1, d1	7

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Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	a4
		Assignments	7, 12	10	10	c1, d1
2	Mid-semester (written exam)		7	20	20	a1, a2, a3, a4, a5, b1
3	Final exam (written exam)		16	60	60	a1, a2, a3, a4, a5, b1
TOTAL				100		

Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
Textbook Of Forensic Pharmacy, St Ed by C. K. Kokate, Pharmamed Press, 2017, ISBN-10 -9390211166	
Modern Medical Toxicology, Jaypee Brothers Medical Publishers (P) Ltd 4/e. Publish Year, 2013.	
<b>2- Essential References.</b>	
Casarett & Doull's , Essentials of Toxicology third Ed. eBook, Publisher: McGraw Hill LLC. 2015.	
Frank A. Barile, Principles of toxicology Testing R.S. Gaud G.T. Gupta practical physical	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.slideshare.net/TSOLEMAN/1-introduction-15583147">https://www.slideshare.net/TSOLEMAN/1-introduction-15583147</a>	
<a href="https://www.slideshare.net/DeepakKumar2053/assignment-on-toxicology">https://www.slideshare.net/DeepakKumar2053/assignment-on-toxicology</a>	

Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.

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4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





**Second Part of Course Specification**  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
Toxicology

Course Code No. (PHC428 )

- Information about Faculty Member Responsible for the Course:							
<b>Name of Faculty Member</b>	Dr. Mohammed Alkhawlani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>							

<b>Course Description:</b>
<p>This course deals with the study of sources, mode of action, toxic pathophysiological effects, detection, diagnosis and management of poisonous materials including acids, alkalis, metals, metalloids, pesticides, heavy metals, specific chemicals, simple organic compounds, poisoning with materials killing harmful Living organisms and Poisoning with some medicinal agents. The course also involves several methods for management of poisoning with some medicinal agents.</p>

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**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**Alignment CILOs to PILOs**

PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Identify the mechanism of toxicity with poisonous materials.	
a2. Identify the types of poisonous materials that can threaten human life.	
a3. Describe the clinical features associated with poisoning	
a4. Discuss the methods of poisons detection, diagnosis and management.	
a5. Describe the role of pharmacist in detection, preventing and management of poisoning.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Classify poisonous materials.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Search efficiently for information using documented and electronic sources of information.	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Demonstrate the skills of time management and self-learning.	

**Alignment CILOs to teaching strategies and assessment strategies**

<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Identify the mechanism of toxicity with poisonous materials.	Active Lecture	Written exams
a2. Identify the types of poisonous materials that can threaten human life.		
a3. Describe the clinical features associated with poisoning		
a4. Describe the role of pharmacist in detection, preventing and management of poisoning.		
a5. Discuss the methods of poisons detection, diagnosis and management.	Active Lecture, feedback learning	Written exams, quizzes
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Classify poisonous materials.	Active Lecture	Written exams
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
c1. Search efficiently for information using documented and electronic sources of information.	feed-back learning	Assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Demonstrate the skills of time management and self-learning.	Feed-back learning	Assignments

Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to toxicology	a1, a2, a3, a4, a5, b1	Definitions fundamentals and scope of toxicology. Classification of poisons Causes of toxicity: accidental, commit suicidal, criminal General harmful effects of poisons Approaches to manage poisoning Mode of actions of poisons Diagnosis and detection of poisoning General procedure of management of poisoning	1	2
Sources, mode of action, toxic pathophysiological effects, detection, diagnosis and management of the following types of toxicity					
2	Poisoning with acids and alkalis	a1, a2, a3, a4, a5, b1	Acids toxicity Alkalis toxicity Salts toxicity	1	2
3	Poisoning with metals and metalloids	a1, a2, a3, a4, a5, b1	Toxicity of copper, selenium, Molybdenum, phosphorus Iron toxicity	2	4
4	Poisoning with heavy metals	a1, a2, a3, a4, a5, b1	Toxicity of Lead, Mercury and Arsenic	2	4
MID-TERM EXAM				1	2

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5	Poisoning with specific chemicals	a1, a2, a3, a4, a5, b1	Cynide Hydrogen sulfide Carbon monoxide	2	4
6	Poisoning with simple organic compounds	a1, a2, a3, a4, a5, b1	Methanol and Isopropyl Alcohols hydrocarbons fuel materials: petroleum, gasoline, etc	2	4
7	Poisoning with materials killing harmful Living organisms	a1, a2, a3, a4, a5, b1	Rodenticides, insecticides herbicides Fungicides	2	4
8	Poisoning with some medicinal agents	a1, a2, a3, a4, a5, b1	Poisoning with opiates, benzodiazepines Poisoning with paracetamol and aspirin	1	2
Course Review		a1, a2, a3, a4, a5, b1	Review	1	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	8 Units

### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

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Assignments:			
No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> every student is assigned to provide a search-based report on toxicity and management of one poison not included in the study topics.	c1, d1	7

Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	a4
		Assignments	7, 12	10	10	c1, d1
2	Mid-semester (written exam)		7	20	20	a1, a2, a3, a4, a5, b1
3	Final exam (written exam)		16	60	60	a1, a2, a3, a4, a5, b1
TOTAL				100		

Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
Textbook Of Forensic Pharmacy, St Ed by C. K. Kokate, Pharmamed Press, 2017, ISBN-10 -9390211166	
Modern Medical Toxicology, Jaypee Brothers Medical Publishers (P) Ltd 4/e. Publish Year, 2013.	
<b>2- Essential References.</b>	
Casarett & Doull's , Essentials of Toxicology third Ed. eBook, Publisher: McGraw Hill LLC. 2015.	
Frank A. Barile, Principles of toxicology Testing R.S. Gaud G.T. Gupta practical physical	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.slideshare.net/TSOLEMAN/1-introduction-15583147">https://www.slideshare.net/TSOLEMAN/1-introduction-15583147</a>	
<a href="https://www.slideshare.net/DeepakKumar2053/assignment-on-toxicology">https://www.slideshare.net/DeepakKumar2053/assignment-on-toxicology</a>	

Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b>

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	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Program of Pharmacy**

Course Specification of  
**Pharmacy Training 1**  
Course No. (PHF424)

2022



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I. Course <b>Identification</b> and General Information:		
1	<b>Course Title:</b>	Pharmacy Training 1
2	<b>Course Code &amp; Number:</b>	PHF516
3	<b>Credit Hours:</b>	2 Credit hours Equivalent to 320 Contact hours
3	<b>Credit Hours:</b>	320 hours (14weeks/ 3 days/week, 8hours/ day): 80 hours (Pharmaceutical industries) b) 240 hours (Hospital Pharmacy): (i) 120 hours (Hospital Pharmacy) (ii) 120 hours (Clinical <b>Pharmacy part I</b> )
4	<b>Study Level/ Semester at which this Course is offered:</b>	At the beginning of 2 <sup>nd</sup> semester- 4 <sup>th</sup> Year
5	<b>Pre –Requisite (if any):</b>	All courses of the first four years
6	<b>Co –Requisite (if any):</b>	None
7	<b>Program (s) in which the Course is Offered:</b>	Bachelor of degree of pharmacy
8	<b>Language of Teaching the Course:</b>	English
9	<b>Study System:</b>	Semester
10	<b>Mode of Delivery:</b>	Full Time
11	<b>Location of Training:</b>	Pharmaceutical plants and Hospitals
12	<b>Prepared by:</b>	Dr. Abdullah Al-Bajali + Dr. Nabil Al-baseer + Dr. Amin Alwosabi + Dr. Anes Thabit
13	<b>Date of Approval:</b>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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## II. Course Description:

The student is assigned to complete 320 hours in 2 pharmacy practice fields': (1) drug plant and (2) Hospital. The drug plant training is designed to acquire the student skills of how to practice and control preparation of pharmaceutical dosage forms in industrial scale. Training at hospital focuses on pharmaceutical care services offered by pharmacist and involves training in two sections (i) Hospital pharmacy (ii) Clinical pharmacy (part I). The first section is designed to acquire the students skills of Hospital pharmacy practice including dispensing and checking of medical prescriptions and distributing of drugs to inpatients , storing and management of medical supply administration, while the second section focuses on clinical pharmacy skills at Internal Medicine , Cardiology, pediatric and emergency departments including designing therapeutic regimens and drug therapy monitoring.. The Through active participation in day-to-day services, students will have the opportunity to apply knowledge and skills previously learned in related courses.

## III. Course Intended Learning Outcomes (CILOs)

### A. Knowledge and Understanding:

a1	Explain the standards of GMP and principles of pharmaceutical unit-processes applied in manufacturing different types of dosage forms in drug plants.
a2	Show knowledge and understanding of the concepts of pharmaceutical quality control applied during manufacturing different types of dosage forms in drug plants.
a3	Describe the responsibilities of hospital and clinical pharmacists in ensuring rational drug use in healthcare facilities.
a4	Explains first aid in some emergency situations, such as exposure to emergency situations.

### B. Intellectual Skills:

b1	Interpret terms, symbols and abbreviations used in medical prescriptions, patient's medication administration records and during pharmaceutical industry practice
b2	Perform accurate pharmaceutical calculations related to drug dosing, dispensing , administration and dosage form preparation and quality control.

### C. Professional and Practical Skills:

c1	Practice missions in R &D, QC/OA and production area departments in a drug plant
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c2	Employ clinical skills to design appropriate therapeutic regimens for in-patients admitted from Internal Medicine, Cardiology, pediatric and Emergency departments.
c3	Monitor drug therapy in order to assess drug benefit (patient response to drug) and risk (side and adverse effects)
c4	Check medication prescriptions for errors in particular (drug interactions- Contraindications- drug dose) and dispense them using the rules of Good Dispensing practice (GDP)
<b>D. Transferable Skills:</b>	
d1	Efficiently practice team-work with his colleagues, trainer, patients and healthcare workers.
d2	Use reliable Internet websites, computer-based programs Smart phone-applications (e.g. Medscape, Micromedix, Lexicomb) to search for drug information

<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1	Field Training Seminar Direct Patient Contact Problem-based learning	Attendance Attitude Assignments Seminar Assessment Oral Exam Written Exam Log-Book
a2		
a3		
a4		

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<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Interpret terms, symbols and abbreviations used in medical prescriptions, patient`s medication administration records and during pharmaceutical industry practice	Field Training Case-studies.  Problem-based learning	Attendance Assignments Written Exam Log-Book
b2	Perform accurate pharmaceutical calculations related to drug dosing, dispensing , administration and dosage form preparation and quality control.		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Practice missions in R &D, QC/OA and production area departments in a drug plant	Field Training Seminars	Attendance Attitude Log-Book Oral Exam Written Exam
c2	Employ clinical skills to design appropriate therapeutic regimens for in-patients admitted from Internal Medicine, cardiology, pediatric and Emergency departments.	Problem-based Learning Direct-patient Contact	Attendance Attitude Assignment Oral Exam Written Exam
c3	Monitor drug therapy in order to assess drug benefit (patient response to drug) and risk (side and adverse effects)		
c4	Check medication prescriptions for errors in particular (drug interactions- Contraindications- drug dose) and dispense them using the rules of Good Dispensing practice (GDP)		

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<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>					
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>		<b>Assessment Strategies</b>	
d1	Efficiently practice team-work with his colleagues, trainer, patients and healthcare workers.	Field Training Problem-based learning		Attitude Assignments Oral Exam	
d2	Use computer-based and reliable Smart phone-applications (e.g. Medscape, Micromedix, Lexicomb) to search for drug information				

<b>IV. Course Contents:</b>					
<b>Training at Drug plant ( 80 Hours)</b>					
<b>No.</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>Number of Weeks</b>	<b>Contact Hours</b>	<b>Learning Outcomes (CILOs)</b>
1	Identification of the drug plant departments, missions and employees of each department	Research & development (R & D) Quality control department Quality assurance Production area	Week 1 Day: 1	(8 hours)	a1, a2 , c1,d1
2	Training at R & D department	Preformulation studies Formulations designing Formulations primary evaluation Stability studies Master File	Week 1 Days: 2,3	(16 hours)	a1, a2, b1,b2,c 1,d1
3	Training at Q C department	Types of analytical instruments Protocol of testing raw materials Protocols of testing finished products In-process Quality control Microbiological evaluation	Week 2 Days: 1,2,3	(24 hours)	a1,a2,b 1,b2,c1, d1

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		Documentations			
4	Training at production areas (lines)	Liquid dosage forms lines Semisolid dosage forms line Solid dosage forms line Sterile dosage forms line	Week 3 Day: 1,2,3 + Week 4 Days: 1	(32 hours)	a1,a2,b 1,b2,c1, d1
<b>2- Hospital (a). Hospital Pharmacy ( 120 Hours)</b>					
5	Hospital pharmacy (Inpatient pharmacy)	Drug distribution systems Sterile medication area (IV admixtures and total parenteral nutrition) Prepackaging area Controlled medications Compounding extemporaneous preparations Stores	Week 4 Days :2,3 Week 5 Days: 1,2,3	(40 hours)	a3,b1,b 2,c4,d1
6	Hospital pharmacy (Outpatient pharmacy)	Medications arrangements Dispensing of prescriptions Hospital formulary: generic & trade names Controlled-drugs Regulations	Week 6 Days : 1,2,3 Week 7 Days: 1,2	(40 hours)	a3,b1,b 2,c4,d1
7	Hospital pharmacy (Medical stores & Medical supply administration)	•Inventory control •Systems of storing •Systems of issuing •Reception of medications Documents	Week 7 Days : 3 Week 8 Days: 1,2,3 Week 9 Days :1	(40 hours)	a3,b1,b 2,d1
<b>2- Hospital (b). Clinical Pharmacy part I ( 120 Hours)</b>					
8	Hospital training: Clinical pharmacy: Inpatients (Internal medicine, cardiology ward)	Morning Rotation (Round) Reading and understanding medical file and medication administration records of patients Review therapeutic regimen Drug therapy monitoring	Week 9 Day: 2, 3 Week 10 Days: 1,2,3	(40 hours)	a3, b1,b2,c 2,c3,d1

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9	Clinical pharmacy: Inpatients (Pediatrics ward)	Morning Rotation Reading and understanding medical file and medication administration records of patients Review therapeutic regimen Drug therapy monitoring	Week 11 days: 1,2,3 Week 12 Days: 1,2	(40 hours)	a3, b1,b2, c2,c3,d 1
10	Clinical pharmacy; Emergency ward)	Morning Rotation Reading and understanding medical file and medication administration records of patients Review therapeutic regimen Drug therapy monitoring	Weeks 12 Days: 3 Weeks 13 Days: 1,2,3 Weeks 14 Days: 1	24 hours	a3, a4, b1,b2, c2,c3,d 1,d2
	Final Oral and Written exam		Week 14 Days: 2,3	16 hours	a1, a2, a3, a4, b1, b2 ,c2,c3,c 4,d2
Number of Weeks /and Units Per Semester			14	320	

#### V. Teaching Strategies of the Course:

Field-Training  
Direct-patient contact  
Seminar  
Problem-Based Learning  
Case Studies

#### VI. Assessment Methods of the Course:

- Attendance
- Attitude
- Assignments
- Seminar Assessment
- Log-Book
- Oral Exam
- Written Exam

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VII. Assessment:				
No.	Method	Week Due	Mark	Aligned CILOs (symbols)
1	Attendance	All Weeks	10	a1,a2,a3,a4
2	Attitude	All Weeks	10	a3, c1,c2,c3,c4, d1
3	Assignments	All Weeks	20	b1,b2,c1,c2,c3,c4,d2
4	Seminar Assessment	Week 14	10	a1,a2,a3,a4, b1,b2,c2,c3,c4,d2
5	Log-Book	Week 14	10	a1,a2,b1,b2,c2,c3,c4,d2
6	Final Oral Exam	Week 14	20	a1, a2, a3, a4, b1, b2,c2,c3,c4
7	Final Written Exam	Week 14	20	a1, a2, a3, a4, b1, b2,c2,c3,c4
<b>Total</b>			<b>100</b>	

IX. Learning Resources:
<b>1- Required Textbook(s) (maximum two) :</b>
Ca, Francisco. 2017, Pharmaceutical Dosage Forms and Drug Delivery, Third Edition - Revised And. Apple , Academic Press Inc. Filipa Alves Da Costa, et al. 2018, The Pharmacist Guide to Implementing Pharmaceutical Care. Cham, Switzerland, Springer.
<b>2- Essential References:</b>
James, E.F, Reynolds, Parfitt, K., 2020, Martindale, "The extra pharmacopeia", 40 <sup>st</sup> edition, Royal Pharmaceutical Society, London. Zeind, Caroline S, and Michael G Carvalho. 2018, Applied Therapeutics : The Clinical Use of Drugs. 11th ed., Philadelphia, Wolters Kluwer
<b>3- Electronic Materials and Web Sites etc.:</b>
1. <a href="http://www.mhra.gov.uk/index.htm">http://www.mhra.gov.uk/index.htm</a> . 2. <a href="http://jpet.aspetjournals.org">http://jpet.aspetjournals.org</a> . 3. <a href="http://www.jpharmacol.com">http://www.jpharmacol.com</a> . 4. <a href="http://www.sciencedirect.com">http://www.sciencedirect.com</a> . 5. <a href="http://www.ncbi.nlm.nih.gov/pubmed">http://www.ncbi.nlm.nih.gov/pubmed</a> .

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X. Course Policies:	
1	<p><b>Class Attendance:</b> such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused. -In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.</p>
2	<p><b>Tardiness:</b> Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent</p>
3	<p><b>Exam Attendance/Punctuality:</b> It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination. -A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination).-A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course.</p>
4	<p><b>Assignments &amp; Projects:</b> a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course. -The submission date extension will not be granted only by the consent of the faculty member concerned. In the case of late submission, the student must provide a reasonable explanation to the faculty member. Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.</p>
5	<p><b>Cheating:</b> -If a student is found cheating in the final and med-term examinations and quizzes (copying from un authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses. If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.</p>
6	<p><b>Plagiarism:</b> Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source.</p>

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	<p>- Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment.</p> <p>All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.</p>
7	<p><b>Other policies:</b></p> <p>Students must switch off their mobile phones, laptops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent.</p> <p>Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.</p>

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## السنة الخامسة

### الفصل الأول

FIFTH level ( 1 <sup>st</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr.	Cr.hr	
1	Biostatistics	إحصاء حيوي	MSC512	2	-	2	Co: MSC513
2	Research methodology	طرق بحث	MSC513	2	-	2	Co: MSC512
3	Community Pharmacy	صيدلة مجتمع	PHC514	2	-	2	Co:PHP516
4	Pharmacogenomics and Gene therapy	جينوما دوائية و معالجة جينية	PHP515	2	-	2	Pr:PHT511
5	Pharmacy Training II	تدريب صيدلاني 2	PHF516	-	-	*2	Co:PHP514
6	Pharmacokinetics	حركية الدواء	PHT517	2	-	2	Pr:PHT426
7	Nuclear Pharmacy	صيدلة نووية	PHT518	2	-	2	Co :PHC515
8	Pharmaceutical Biotechnology	تقنية حيوية صيدلانية	PHT511	2	-	2	Pr: PHT421
Total				14	-	16	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisite ; \*: equivalent to 10 actual hours weekly at the field for 12 weeks  
**\*2 credit hour of pharmacy training 2 = 320 contact hours**



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

Department of Pharmacy

Bachelor of Pharmacy

Course Specification of

## **BIOSTATISTICS**

Course Code No. (MSC512)

**2022**



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Course Specification

**BIOSTATISTICS**

Course Identification and General Information:					
1	Course Title:	Biostatistics			
2	Course Code & Number:	----			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	FIFTH) Year – ( 1 <sup>ST</sup> ) semester			
5	Pre –Requisite (if any):	Mathematics			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Turki AL-qabbani			
13	Date of Approval:				

Course Description:
This course is designed to acquire students with basic principles of statistics and how to deal with different data at various clinical settings and researches. Also this course focuses on descriptive inferential statistics as applied to health sciences student.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>	
<b>Alignment CILOs to PILOs</b>	
PILOs	CILOs
<b>A: Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:	
A1. Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1: Recall the basic concepts of sample selection, data collection and interpretation of results needed for the research.
	a2: Identify the types of variables, method of collecting data and hypothesis
	a3: Describe the knowledge and understanding from scientific research to practice evidence-based pharmacy.
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
B4. Determine possible strategies to support the national pharmaceutical industries (technologies/formulations) based on potential business opportunities in meeting medical needs of the patient and community.	b1: Analysis the data and tabulation and interpret the results.
	b2: Impart basic principles of biostatistics into research.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
C6. Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	c1: Implement the principles of research methodology to evaluate the prevalence of diseases in community and the effectiveness of preventive measures.
	c2: Apply the different methods of data processing and analysis.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
D3. Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	d1: Employ modern technology and informatics in pharmacy practice.
	d2: Performing survey observations, data collection which is a fundamental part in the team work experience.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1	Recall the basic concepts of sample selection, data collection and interpretation of results needed for the research.	<ul style="list-style-type: none"> <li>Lectures with power point slide show.</li> </ul>	<ul style="list-style-type: none"> <li>Written exam.</li> </ul>
a2	Identify the types of variables, method of collecting data and hypothesis	<ul style="list-style-type: none"> <li>Lectures</li> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Written exam.</li> </ul>
a3	Describe the knowledge and understanding from scientific research to practice evidence-based dentistry.	<ul style="list-style-type: none"> <li>Lectures</li> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Written exam.</li> <li>Assignments.</li> </ul>
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Analysis the data and tabulation and interpret the results.	<ul style="list-style-type: none"> <li>Discussion</li> </ul>	Research projects.
b2	Impart basic principles of biostatistics into research.	<ul style="list-style-type: none"> <li>Discussion</li> </ul>	Research projects.
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Implement the principles of research methodology to evaluate the prevalence of diseases in community and the effectiveness of preventive measures.	<ul style="list-style-type: none"> <li>Class activities &amp; problem solving discussions</li> </ul>	Theoretical exams Practical Test Assignments
c2	Apply the different methods of data processing and analysis.		
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Employ modern technology and informatics in dental practice.	<ul style="list-style-type: none"> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Research projects.</li> </ul>

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d2	Performing survey observations, data collection which is a fundamental part in the team work experience.	<ul style="list-style-type: none"> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Research projects.</li> </ul>
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Course Content:					
A – Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CIOS)
1	Introduction	<ul style="list-style-type: none"> <li>Concept of statistical and biostatistics</li> <li>Types of data and information</li> </ul> <p>Types of variables, difference between nominal and ordinal , differences between discrete and continuous</p>	1	2	a1,a2
2	Sampling methods	<ul style="list-style-type: none"> <li>Method of collecting data</li> <li>Random sample and randomization</li> <li>Sampling and non sampling errors</li> <li>Survey condition</li> </ul>	1	2	a1,b1,c1, d1
3	Describing data by table	<ul style="list-style-type: none"> <li>Relative, cumulative and percentage frequency for ungrouped data tables</li> <li>Relative, cumulative and percentage frequency for grouped data tables</li> </ul>	1	2	a2,b1,b2
4	Describing data by chart	<ul style="list-style-type: none"> <li>Charting ungrouped data by, pie, simple, clustered, stacked bar, step chars, time series</li> <li>Charting grouped data by histogram, carve and ogive</li> </ul>	1	2	a3,b2,c2, d1
5	Describe data by numeric value	<ul style="list-style-type: none"> <li>Measure of location and dispersion</li> <li>Mode, median, means, range, variance, standard deviation and coefficient of variation.</li> </ul>	2	4	a1,a2,b1, c1,d2

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		– Prevalence and Incidence, sensitivity and specificity, odds ratio			
6	Mid-Term Theoretical Exam		1	2	All ILOs
7	Correlation	– Linear relationship between two variables( $r_{xy}$ ) – Types of correlation coefficient, $R^2$	2	4	a2,a3,b2, c2,d2
8	Regression	• Simple learner regression model Equation regression using it in diagnostics	1	2	a2,a3,b1, c1,d1
9	<b>Introduction to hypothesis testing</b>	• Test hypothesis, null and alternative hypothesis • Significance level and p-value • Test the population mean when the population standard deviation is known Inference the population mean when the population standard deviation is unknown (T and Z test)	2	4	a3,b2,c2, d2
10	<b>Introduction to hypothesis testing</b>	– Inference about the differences between two means: independent sample – Inference about the differences between two means: matched pairs experiment chi-square test – F-test analysis of variance sample	2	4	a3,b2,c2, d2
11	Final Theoretical Exam		1	2	All ILOs
<b>Number of Weeks /and Units Per Semester</b>			<b>15</b>	<b>30</b>	

### Teaching strategies of the course:

**lecture - Discussion:** a short lecture/ address followed by discussion

**Seminars:** these are mainly used with small groups of students (20-30) students in which they find better chances for discussing and participating in the teaching process.

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

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**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills.

Exercises:

Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to solve statistical problems during Tutorial at the class .	a1, b1, c1, d1	4-7	6
2	<b>Group :</b> each group of students will be assigned to solve statistical problems during as homework	a2, a3, b2, c2, d2	8-12	4

Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	5th and 12th week	5	5%	All ILOs
2	Quizzes 1 & 2		5	5%	a1,a2,b1,b2
3	Mid-Term Theoretical Exam	7th or 8th week	20	20%	All ILOs
4	Mid-Term Practical Exam	-	-	-	
5	Final Practical Exam including Project Presentation & Evaluation		10	10%	c1,c2,d1,d2
6	Final Theoretical Exam	16 <sup>th</sup> week	60	60%	All ILOs
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>1- Required Textbook(s) ( maximum two ):</b>
<p>9. Daniel, wayne and cross. C,L. (2013). Biostatistics: A fundamental for analysis in the health sciences, student solution manual. 10th edition, John wiley, Canada.</p> <p>2. David Bowers (2008). Medical statistics from scratch an introduction for health professionals, Johan wiley and Sons, England.</p>
<b>2- Essential References:</b>
<p>10. . Kanishka Bhattachary (2004). Introduction to statistics for medical students, University of Oxford.</p>
<b>3- Electronic Materials and Web Sites etc.:</b>
<b>Websites:</b> <a href="http://www.MikeMiddleton.com">http://www.MikeMiddleton.com</a>

<b>X. Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





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Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**BIOSTATSTICS**  
Course Code No. (MSC512)

<b>X. - Information about Faculty Member Responsible for the Course:</b>							
<b>Name of Faculty Member</b>	Dr. Turki Alqabbani	<b>Office Hours</b>					
<b>Location &amp; Telephone No.</b>	770841011	<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>
<b>E-mail</b>	Turki3765@gmail.com						

<b>Course Description:</b>
This course is designed to acquire students with basic principles of statistics and how to deal with different data at various clinical settings and researches. Also this course focuses on descriptive inferential statistics as applied to health sciences student.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs)	
<b>Alignment CILOs</b>	
<b>A: Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:	
a1: Recall the basic concepts of sample selection, data collection and interpretation of results needed for the research.	
a2: Identify the types of variables, method of collecting data and hypothesis	
a3: Describe the knowledge and understanding from scientific research to practice evidence-based dentistry.	
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:	
b1: Analysis the data and tabulation and interpret the results.	
b2: Impart basic principles of biostatistics into research.	
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:	
c1: Implement the principles of research methodology to evaluate the prevalence of diseases in community and the effectiveness of preventive measures.	
c2: Apply the different methods of data processing and analysis.	
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:	
d1: Employ modern technology and informatics in dental practice.	
d2: Performing survey observations, data collection which is a fundamental part in the team work experience.	

**(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:**

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Recall the basic concepts of sample selection, data collection and interpretation of results needed for the research.	<ul style="list-style-type: none"> <li>Lectures with power point slide show.</li> </ul>	<ul style="list-style-type: none"> <li>Written exam.</li> </ul>
a2	Identify the types of variables, method of collecting data and hypothesis	<ul style="list-style-type: none"> <li>Lectures</li> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Written exam.</li> </ul>
a3	Describe the knowledge and understanding from scientific research to practice evidence-based dentistry.	<ul style="list-style-type: none"> <li>Lectures</li> <li>Discussion</li> </ul>	<ul style="list-style-type: none"> <li>Written exam.</li> <li>Assignments.</li> </ul>

**(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:**

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Analysis the data and tabulation and interpret the results.	▪ Discussion	Research projects.
b2	Impart basic principles of biostatistics into research.	▪ Discussion	Research projects.
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Implement the principles of research methodology to evaluate the prevalence of diseases in community and the effectiveness of preventive measures.	▪ Class activities & problem solving discussions	Theoretical exams Practical Test Assignments
c2	Apply the different methods of data processing and analysis.		
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Employ modern technology and informatics in dental practice.	▪ Discussion	▪ Research projects.
d2	Performing survey observations, data collection which is a fundamental part in the team work experience.	▪ Discussion	▪ Research projects.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

Course Content:					
A – Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction	<ul style="list-style-type: none"> <li>▪ Concept of statistical and biostatistics</li> <li>▪ Types of data and information</li> </ul> <p>Types of variables, difference between nominal and ordinal , differences between discrete and continuous</p>	1	2	a1,a2
2	Sampling methods	<ul style="list-style-type: none"> <li>– Method of collecting data</li> <li>– Random sample and randomization</li> <li>– Sampling and non sampling errors</li> <li>– Survey condition</li> </ul>	1	2	a1,b1,c1,d1
3	Describing data by table	<ul style="list-style-type: none"> <li>• Relative, cumulative and percentage frequency for ungrouped data tables</li> <li>Relative, cumulative and percentage frequency for grouped data tables</li> </ul>	1	2	a2,b1,b2
4	Describing data by chart	<ul style="list-style-type: none"> <li>• Charting ungrouped data by, pie, simple, clustered, stacked bar, step chars, time series</li> <li>Charting grouped data by histogram, carve and ogive</li> </ul>	1	2	a3,b2,c2,d1
5	Describe data by numeric value	<ul style="list-style-type: none"> <li>– Measure of location and dispersion</li> <li>– Mode, median, means, range, variance, standard deviation and coefficient of variation.</li> <li>– Prevalence and Incidence, sensitivity and specificity, odds ratio</li> </ul>	2	4	a1,a2,b1,c1,d2
6	Mid-Term Theoretical Exam		1	2	All ILOs
7	Correlation	– Linear relationship between two variables( $r_{xy}$ )	2	4	a2,a3,b2,c2,d2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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		– Types of correlation coefficient, R <sup>2</sup>			
8	Regression	<ul style="list-style-type: none"> <li>• Simple linear regression model Equation regression using it in diagnostics</li> </ul>	1	2	a2,a3,b1, c1,d1
9	<b>Introduction to hypothesis testing</b>	<ul style="list-style-type: none"> <li>• Test hypothesis, null and alternative hypothesis</li> <li>• Significance level and p-value</li> <li>• Test the population mean when the population standard deviation is known</li> </ul> <p>Inference the population mean when the population standard deviation is unknown (T and Z test)</p>	2	4	a3,b2,c2, d2
10	<b>Introduction to hypothesis testing</b>	<ul style="list-style-type: none"> <li>– Inference about the differences between two means: independent sample</li> <li>– Inference about the differences between two means: matched pairs experiment chi-square test</li> <li>– F-test analysis of variance sample</li> </ul>	2	4	a3,b2,c2, d2
11	Final Theoretical Exam		1	2	All ILOs
<b>Number of Weeks /and Units Per Semester</b>			<b>15</b>	<b>30</b>	

### Teaching strategies of the course:

**lecture - Discussion:** a short lecture/ address followed by discussion

**Seminars:** these are mainly used with small groups of students (20-30) students in which they find better chances for discussing and participating in the teaching process.

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills.

Exercises:

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> every student is assigned to solve statistical problems during Tutorial at the class .	a1, b1, c1, d1	4-7	6
2	<b>Group :</b> each group of students will be assigned to solve statistical problems during as homework	a2, a3, b2, c2, d2	8-12	4

Schedule of Assessment Tasks for Students During the Semester					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	5th and 12th week	5	5%	All ILOs
2	Quizzes 1 & 2		5	5%	a1,a2,b1,b2
3	Mid-Term Theoretical Exam	7th or 8th week	20	20%	All ILOs
4	Mid-Term Practical Exam	-	-	-	
5	Final Practical Exam including Project Presentation & Evaluation		10	10%	c1,c2,d1,d2
6	Final Theoretical Exam	16 <sup>th</sup> week	60	60%	All ILOs
<b>Total</b>			<b>100</b>	<b>100%</b>	

IX. Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ):</b>	
<p>11. Daniel, wayne and cross. C,L. (2013). Biostatistics: A fundamental for analysis in the health sciences, student solution manual. 10th edition, John wiley, Canada.</p> <p>2. David Bowers (2008). Medical statistics from scratch an introduction for health professionals, Johan wiley and Sons, England.</p>	
<b>2- Essential References:</b>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





12. . Kanishka Bhattachary (2004). Introduction to statistics for medical students, University of Oxford.

### 3- Electronic Materials and Web Sites etc.:

**Websites:** <http://www.MikeMiddleton.com>

## X. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Turki Alqabbani	Dr. Hassan Thabet	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Science

**All Department**

**Faculty Requirements**  
Course Specification of  
**Research Methodology**  
Course Code No. (MSC513)

**2022**



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I. Course Identification and General Information:					
1	Course Title:	Research Methodology			
2	Course Code & Number:	MSC513			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2		--
4	Study Level/ Semester at which this Course is offered:	Level 4/ Semester 1			
5	Pre –Requisite (if any):	Biostatistics			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	All department			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Science			
12	Prepared by:	Dr. Anes Thabit			
13	Date of Approval:	2022			

II. Course Description:
<p>The research methodology course deals with the principles of research methods at the undergraduate level. It encompasses the understanding of presentation, analysis, interpretation of collected data and philosophy of medicine and health science research methods with the application of each type to various research questions and community problems.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
CILOs		PILOs
<b>A: Knowledge &amp; Understanding:</b> Upon successful completion of the course, students will be able to:		
a1	- Identify methods of data collection	A1
a2	- Describe different methods of data presentations	A2
a3	- List the different sampling techniques	A3
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
b1	- Apply the mean, median, mode, range, variance and standard deviation according to their characteristics and indications	B1
b2	- Apply observational and experimental studies to different research topics according to characteristics, advantages and disadvantages of each method	B2
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
c1	- Choose the research topic, with the professor's prior agreement.	C1
c2	- Apply conceptual and theoretical frameworks to the chosen research topic	C2
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
d1	Work effectively with their colleagues	D1
d2	Use computer and internet as tool for self-learning and getting information	D2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani

<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
a1	Describe the principle concept of research methodology and the conceptual issues related to the chosen health research topic.	Illustrated audio- visual aided lectures	Written exam utilizing objective Multiple Choice Questions as well as long and short essay form of questions
a2	Identify theories, hypotheses, and methods used in health and social science research as well as sample and different types of samples.	Student's interactive discussion and tutorials.	Written exam utilizing objective Multiple Choice Questions as well as long and short essay form of questions
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
b1	Compare basic study designs as well as select a relevant research topic based on medicine and health science literature review	- Demonstration of internet search	Discussion for the proper application of different research methods by periodicals
b2	Create the oral and written communication skills and produce an advanced literature review which reflects in-depth research and analysis.	- Role play for presenting certain topics - Problem-based and thinking-based learning	Questioning techniques during & at the end of each lecture
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>	
c1	Write a research proposal in team work	- Conducting a net search for a limited number of articles	Evaluation and grading according to the level

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



		- Writing a research proposal	of compliance of group work and protocol writing. Certain elements that should be fulfilled in a protocol are set as markers for grading the protocol.
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Utilize internet sources for getting scientific information	Group work for effective internet search to select a scientific topic familiar to students to clarify and explicate writing methods and understanding of statistic terms.	Using the scientific topic as a model, the students are assigned to freely choose a medicine and health science research topic, read related articles and prepare a research proposal to verify their writing ability and statistical interpretation.
d2	Evaluate reports in the medicine and health science literature		
d3	Write a preliminary research proposal		

IV. Course Contents:					
A. Theoretical Aspect:					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction	Definition, objectives and phases of Research. Introduction, definition and uses of methods of collection of data Types of data	1 <sup>st</sup> W 2 <sup>nd</sup> W	4	a1,a2, a3 d2
2	Literature Review	- Preparatory phase (reading medicine and health science Literature)	3 <sup>rd</sup> W	2	a1,a2, a3 b1, d2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



3	<b>Research plan</b>	- Selecting a research topic - Internet searching -How to prepare research plan ( proposal, protocol, etc.)			a1,a2, a3 b1, d2
4	<b>Data Presentation</b>	Methods of presentation of data (Graphical presentation) Methods of presentation of data (Tabular presentation)	4 <sup>th</sup> W	2	a1,a2, a3 b1, d2
5	<b>Study Designs</b>	- Cross-sectional design - Case- control design	5 <sup>th</sup> W	2	a1,a2, a3 b1, d2
6	<b>Experimental Methods in Pharmacy</b>	- Clinical trials - Sampling - Population - Sample	6 <sup>th</sup> W 7 <sup>th</sup> W	4	a1,a2, a3 b1, d2
7	<b>Mid-Term Theoretical Exam</b>	<b>MCQs and essay questions</b>	8 <sup>th</sup> W	2	a1,a2, b1, b2, c1, c2, d1,d2
8	<b>Ethics</b>	- Adopt ethical considerations on conducting research in medicine and health science settings - Anti-Plagiarism Policy	9 <sup>th</sup> W	2	b1, d2
9	<b>Scientific Writing</b>	- Steps of write a research proposal and thesis (introduction, objectives	11 <sup>th</sup> W 12 <sup>th</sup> W	2	b1, d2
10	<b>Writing a Research report</b>	How to report and present your work to your supervisor or committee.	13 <sup>th</sup> W 14 <sup>th</sup> W	2	a1,a2, a3
11	<b>Revision</b>		15 <sup>th</sup> W	2	a1,a2, b1, b2, c1, c2, d1,d2
12	<b>Final Theoretical Exam</b>	<b>MCQs and essay questions</b>	16 <sup>th</sup> W	2	a1,a2, b1, b2, c1, c2, d1,d2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



#### V. Teaching Strategies of the Course:

- Lectures
- Active Learning
- Essay or Self-Study
- Assignment
- Presentation
- Group discussion

#### VI. Assessment Methods of the Course:

- Two Quizzes during the 5<sup>th</sup> and 11<sup>th</sup> weeks.
- Midterm exam during 8<sup>th</sup> week.
- Writing a research proposal during 10<sup>th</sup> week.
- Final exam includes MCQs and Essay.

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Quiz	4 <sup>th</sup> , 12 <sup>th</sup>	10	10%	A1,A2,B1
2	Mid-term exam	8 <sup>th</sup>	30	30%	A1-A3,B1
3	Assignments	2 <sup>nd</sup> - 15 <sup>th</sup>	10	10%	B1,C1,D1
4	Final theory	16 <sup>th</sup>	50	50%	A1-A3, B1
<b>Total</b>			<b>100</b>	<b>100%</b>	

#### IX. Learning Resources:

##### 1- Required Textbook(s) :

- Peres M et al. (2022). Oral Epidemiology, 1<sup>st</sup> Edition, Springer International Publishing
- Kaurani P (2020). Research Methodology in medicine. BlueRose Publishers
- Health Research Methodology (2005).WHO Manual.
- Kothari C.R. (2004). Research Methodology, 2nd Edt. New Age International Pub

##### 2- Essential References:

- Levine R, Stillman-Lowe C (2019). The Scientific Basis of Oral Health Education, 1<sup>st</sup> Edition, Springer International Publishing

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Kothari (2007). Research Methodology, Newage Publishers  
Jagadeesh(2009). Bio Medical Research, WoltersKluwer.  
Macnee(2007). Understanding Nursing Research,LWW  
Burns (2009). Practice of Nursing Research,Elsevier  
Stubert(2010). Qualitative Research in nursing , LWW.

### 3- Electronic Materials and Web Sites etc.:

[www.pubmed.com](http://www.pubmed.com)

[www.nursing center.com](http://www.nursing center.com)

[www.edul.elu.edu](http://www.edul.elu.edu)

## X. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



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**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Second Part of Course Specification  
Faculty of Medicine and Health Science

All Department

Faculty Requirements  
Course Specification of  
**Research Methodology**  
Course No. (MSC513)

I. Information about Faculty Member Responsible for the Course:									
Name of Faculty Member:	Dr. Anes Thabit			Office Hours					
Location & Telephone No.:				S A T	S U N	M O N	T U E	W E D	T H U
E-mail:									

2022



**II. Course Description:**



The research methodology course deals with the principles of research methods at the undergraduate level. It encompasses the understanding of presentation, analysis, interpretation of collected data and philosophy of medicine and health science research methods with the application of each type to various research questions and community problems.

### III. Course Intended Learning Outcomes (CILOs):

**A: Knowledge & Understanding:** Upon successful completion of the course, students will be able to:

- |    |  |
|----|--|
| a1 | - Identify methods of data collection              |
| a2 | - Describe different methods of data presentations |
| a3 | - List the different sampling techniques           |

**B: Intellectual skills:** Upon successful completion of the course, students will be able to:

- |    |   |
|----|---|
| b1 | - Apply the mean, median, mode, range, variance and standard deviation according to their characteristics and indications                             |
| b2 | - Apply observational and experimental studies to different research topics according to characteristics, advantages and disadvantages of each method |

**C: Professional & practical skills:** Upon successful completion of the course, students will be able to:

- |    |  |
|----|--|
| c1 | - Choose the research topic, with the professor's prior agreement.         |
| c2 | - Apply conceptual and theoretical frameworks to the chosen research topic |

**D: Transferable skills:** Upon successful completion of the course, students will be able to:

- |    |   |
|----|---|
| d1 | Work effectively with their colleagues                                      |
| d2 | Use computer and internet as tool for self-learning and getting information |

#### (A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Describe the principle concept of research methodology and the conceptual issues related to the chosen health research topic.	Illustrated audio- visual aided lectures	Written exam utilizing objective Multiple Choice Questions as well as long and short essay form of questions
a2	Identify theories, hypotheses, and methods used in health and social science research as well as sample and different types of samples.	Student's interactive discussion and tutorials.	Written exam utilizing objective Multiple Choice Questions as well as long and short essay form of questions
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Compare basic study designs as well as select a relevant research topic based on medicine and health science literature review	- Demonstration of internet search	Discussion for the proper application of different research methods by periodicals
b2	Create the oral and written communication skills and produce an advanced literature review which reflects in-depth research and analysis.	- Role play for presenting certain topics - Problem-based and thinking-based learning	Questioning techniques during & at the end of each lecture
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
c1	Write a research proposal in team work	- Conducting a net search for a limited number of articles	Evaluation and grading according to the level of compliance of group work

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



		- Writing a research proposal	and protocol writing. Certain elements that should be fulfilled in a protocol are set as markers for grading the protocol.
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Utilize internet sources for getting scientific information	Group work for effective internet search to select a scientific topic familiar to students to clarify and explicate writing methods and understanding of statistic terms.	Using the scientific topic as a model, the students are assigned to freely choose a medicine and health science research topic, read related articles and prepare a research proposal to verify their writing ability and statistical interpretation.
d2	Evaluate reports in the medicine and health science literature		
d3	Write a preliminary research proposal		

<b>IV. Course Contents:</b>					
<b>A. Theoretical Aspect:</b>					
No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	<b>Introduction</b>	Definition, objectives and phases of Research. Introduction, definition and uses of methods of collection of data Types of data	1 <sup>st</sup> W 2 <sup>nd</sup> W	4	a1,a2, a3 d2
2	<b>Literature Review</b>	- Preparatory phase (reading medicine and health science Literature)	3 <sup>rd</sup> W	2	a1,a2, a3 b1, d2
3	<b>Research plan</b>	- Selecting a research topic - Internet searching -How to prepare research plan ( proposal, protocol, etc.)			a1,a2, a3 b1, d2

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





4	<b>Data Presentation</b>	Methods of presentation of data (Graphical presentation) Methods of presentation of data (Tabular presentation)	4 <sup>th</sup> W	2	a1,a2, a3 b1, d2
5	<b>Study Designs</b>	- Cross-sectional design - Case- control design	5 <sup>th</sup> W	2	a1,a2, a3 b1, d2
6	<b>Experimental Methods in Pharmacy</b>	- Clinical trials - Sampling - Population - Sample	6 <sup>th</sup> W 7 <sup>th</sup> W	4	a1,a2, a3 b1, d2
7	<b>Mid-Term Theoretical Exam</b>	<b>MCQs and essay questions</b>	8 <sup>th</sup> W	2	a1,a2, b1, b2, c1, c2, d1,d2
8	<b>Ethics</b>	- Adopt ethical considerations on conducting research in medicine and health science settings - Anti-Plagiarism Policy	9 <sup>th</sup> W	2	b1, d2
9	<b>Scientific Writing</b>	- Steps of write a research proposal and thesis (introduction, objectives	11 <sup>th</sup> W 12 <sup>th</sup> W	2	b1, d2
10	<b>Writing a Research report</b>	How to report and present your work to your supervisor or committee.	13 <sup>th</sup> W 14 <sup>th</sup> W	2	a1,a2, a3
11	<b>Revision</b>		15 <sup>th</sup> W	2	a1,a2, b1, b2, c1, c2, d1,d2
12	<b>Final Theoretical Exam</b>	<b>MCQs and essay questions</b>	16 <sup>th</sup> W	2	a1,a2, b1, b2, c1, c2, d1,d2
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

#### V. Teaching Strategies of the Course:

- Lectures

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





- Active Learning
- Essay or Self-Study
- Assignment
- Presentation
- Group discussion

#### VI. Assessment Methods of the Course:

- Two Quizzes during the 5<sup>th</sup> and 11<sup>th</sup> weeks.
- Midterm exam during 8<sup>th</sup> week.
- Writing a research proposal during 10<sup>th</sup> week.
- Final exam includes MCQs and Essay.

#### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Quiz	4 <sup>th</sup> , 12 <sup>th</sup>	10	10%	A1,A2,B1
2	Mid-term exam	8 <sup>th</sup>	30	30%	A1-A3,B1
3	Assignments	2 <sup>nd</sup> - 15 <sup>th</sup>	10	10%	B1,C1,D1
4	Final theory	16 <sup>th</sup>	50	50%	A1-A3, B1
<b>Total</b>			<b>100</b>	<b>100%</b>	

#### IX. Learning Resources:

##### 1- Required Textbook(s) :

- Peres M et al. (2022). Oral Epidemiology, 1<sup>st</sup> Edition, Springer International Publishing
- Kaurani P (2020). Research Methodology in medicine. BlueRose Publishers
- Health Research Methodology (2005).WHO Manual.
- Kothari C.R. (2004). Research Methodology, 2nd Edt. New Age International Pub

##### 2- Essential References:

- Levine R, Stillman-Lowe C (2019). The Scientific Basis of Oral Health Education, 1<sup>st</sup> Edition, Springer International Publishing
- Kothari (2007). Research Methodology, Newage Publishers
- Jagadeesh(2009). Bio Medical Research, WoltersKluwer.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Macnee(2007). Understanding Nursing Research,LWW  
Burns (2009). Practice of Nursing Research,Elsevier  
Stubert(2010). Qualitative Research in nursing , LWW.

### 3- Electronic Materials and Web Sites etc.:

[www.pubmed.com](http://www.pubmed.com)

[www.nursing center.com](http://www.nursing center.com)

[www.edul.elu.eg](http://www.edul.elu.eg)

## X. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Anes Thabit	Dr. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



المعهد العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**COMMUNITY PHARMACY**  
Course No. (PHP514)

2022



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I. Course Identification and General Information:					
1	Course Title:	COMMUNITY PHARMACY			
2	Course Code & Number:	PHP514			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	5 <sup>th</sup> Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	Pr: PHP 228, 316, 322, 418.			
6	Co –Requisite (if any):	Co: PHP516			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and Health Sciences			
12	Prepared by:	Dr. Nabil Albaser			
13	Date of Approval:	2022			

II. Course Description:
<p>This course deals with the role of pharmacist in the “community pharmacy” as providers of pharmaceutical care services, including dispensing of medication and counseling, to patients and as administrators of the pharmacy. The course also provides students the essential knowledge and skills in order to properly recommend safe and effective over the counter (OTC) medications to patients based on benefit: risk evaluation and also to promote drug safety in the community and avoid drug abuse/misuse. The course follows completion of (pharmacology I, II) courses in which the student attain knowledge in actions of drugs covered in this course.</p>

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Dr. Nabil Albaser	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
	PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Explain the impact of good behavior of pharmacists on their communication and relationship to patients and healthcare professionals.
A3	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a2. Identify the actions of OTC medications on patients and abuse/misuse of different types of those and other medications.
A5	Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, Pharmacoconomics, pharmacoinformatic etc) to optimize the therapeutic outcomes	a3. Define the basis of effective pharmacy administration.
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a4. Describe the pharmacist's role in community pharmacists to dispense and recommend safe and effective OTC medications to patients.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems	b1. Plan a modern system to effectively administer the "community pharmacy"
B5	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmacoeconomic factors to enhance the healthcare systems.	b2. Formulate and evaluate a plan of patient need and rational use of OTC medications to improve patient safety and efficacy
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
C5	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic	c1. Advise the patient to optimize medicine use.

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	medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	
<b>C6</b>	Contribute in creating/improving national drug policies, laws and regulations related to the health care systems.	<b>c2.</b> Apply rules for effective" pharmacy administration"
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Communicate effectively and behave in discipline with colleagues.
		<b>d2.</b> Participate efficiently with his colleagues in a team work.
		<b>d3.</b> Take responsibility for adaption to change needs in pharmacy practice
<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d4.</b> Demonstrate the skills of time management and self-learning.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>d5.</b> Use essential references of evidence-based practice to achieve maximum safety and efficacy of medicines.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the impact of good behavior of pharmacists on their communication and relationship to patients and healthcare professionals.	Active Lecture	Written exams
<b>a2.</b> Identify the actions of OTC medications on patients and abuse/misuse of different types of those and other medications.		
<b>a4.</b> Describe the pharmacist role in community pharmacists to dispense and recommend safe and effective OTC medications to patients.		
<b>a3.</b> Define the basis of effective pharmacy administration.	Virtual lab. Practice	Lab. term works, final practical exam
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Plan a modern system to effectively administer the “community pharmacy”	lab. Practice	Lab. term works, final practical exam
<b>b2.</b> Formulate and evaluate a plan of patient need and rational use of OTC medications to improve patient safety and efficacy	Active Lecture, feed-back learning	Written exams, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Advise the patient to optimize medicine use.	lab. Practice	Lab. term works, final practical exam
<b>c2.</b> Apply rules for effective” pharmacy administration”		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	lab. Practice	Lab. term works, final practical exam
<b>d3.</b> Demonstrate the skills of time management and self-learning.		
<b>d2.</b> Participate efficiently with his colleagues in a team work.		
<b>d5.</b> Use essential references of evidence-based practice to achieve maximum safety and efficacy of medicines.		
<b>d4.</b> Take responsibility for adaption to change needs in pharmacy practice	Feed-back learning	Quizzes

Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	<b>Introduction to community pharmacy</b>	a1, a3, a4, b2	Brief history Pharmaceutical care Services offered to patients in community pharmacies Patient counseling: general rules, response to patients,	2	4
2	<b>Drug benefit: risk and selection of drugs to</b>	a1, b2	Drug benefit: risk ratio Dealing with specific groups of patients: general rules Selection of medication to pregnant women	4	8

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	specific group of patients		Selection of medications for breastfeeding women Safe drugs and dose for children Misleading of herbal medications		
3	Drug information sources	a1, d5	Reliable foundations and references drug information sources	1	2
<b>MID-TERM EXAM</b>				1	2
4	Introduction to OTC medications	a2, a4, b1, b2	Definition How approve OTC medications Types of medications (OTC) dispensed without a prescription. Referral to physician	1	2
5	OTC medications for pain and fever	a2, a4, b2	Types of pain Types of OTC analgesics/antipyretics Risks Selection for specific groups of patients Selection for toothache, headache, musculoskeletal pain, migraine, dysmenorrhea Selection for fever List of trade names	2	4
6	OTC for oral healthcare	a1, a2, a4, b2	Definition and types of mouth ulcers OTC for different types of mouth ulcer OTC for bad breath	1	2
7	OTC products for alimentary system: part 1	a1, a2, a4, b2	Types of OTC, community cases, selection for specific groups of patients and list of trade names for the following cases: Hyperacidity Nausea and vomiting Colic	3	6
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>7 Units</b>

**B - Practical Aspect:**

The practical sections are carried out in the " Virtual pharmacy Lab"

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	Drug product specification	c1, c2, d1, d2, d3, d5	1	2
2	Arrangement and classification of medications in community pharmacy	c1, c2, d1, d2, d3, d5	2	4

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3	Using "Medscape" application and other reliable sources to search about drug safety and efficacy	c1, c2, d1, d2, d3, d5	1	2
4	Patient's counseling: OTC and community cases for pain fever, mouth ulcer, hyperacidity, vomiting and colic	c1, c2, d1, d2, d3, d5	2	4
5	Patient counseling: (role play) How to use specific dosage forms? eye drops, ear drops, inhalers, effervescent, dermal preparations,	c1, c2, d1, d2, d3, d5	1	2
6	Skills of Dispensing of prescriptions: example of written prescriptions	c1, c2, d1, d2, d3, d5	2	4
7	Pharmacy administration skills: Documentation & indexing, requisition of medications, ordering and receiving products pharmaceutical agent's manufacturers in Yemen	c1, c2, d1, d2, d3, d5	3	6
PRACTICAL EXAM		c1, c2, d1, d2, d3, d5	1	2
Total			12	24

### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector.

**Laboratory practice**: students doing experiments in labs individually or in small groups

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due	
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1	<b>Individual:</b> every student is assigned to search using Medscape on risk and benefit of a type OTC medication for one specific case	b2	8	
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### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b2, d4
		Assignments	7, 12	5	5	b2
2	Mid-semester exam (written exam)		7	10	10	a1, a4, b2
3	Final exam (written exam)		16	50	50	a1, a2, a4, b2
TOTAL				70	70 %	70

#### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d5
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	b1, c1, c2, d1, d2, d3, d5
Total				30	30%	

#### Learning Resources:

##### 1- Required Textbook(s) (maximum two ).

Lillian M Azzopardi. Lecture notes on pharmacy practice, 2010, Pharmaceutical press. Christopher Community pharmacy (Symptoms, Diagnosis and Treatment) 5th Edition - May 27, 2020

##### 2- Essential References.

Agarwal. Dispensing and community pharmacy-2016

Jain. A text book of professional pharmacy 2009

##### 3- Electronic Materials and Web Sites etc.

<https://www.slideshare.net/iamkarthika/community-pharmacy-78949878>

<https://www.slideshare.net/sonushanno/community-pharmacy-64829089>

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Course Policies: (Based on the Uniform Students' By law (2007))	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





**Faculty of Medicine and Health Sciences**

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**COMMUNITY PHARMACY**  
Course No. (PHP514)

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Nabil Albaseer			Office Hours			
Location & Telephone No.:		S A T	S U N	M O N	T U E	W E D	T H U
E-mail:							

II. Course Description:
<p>This course deals with the role of pharmacist in the “community pharmacy” as providers of pharmaceutical care services, including dispensing of medication and counseling, to patients and as administrators of the pharmacy. The course also provides students the essential knowledge and skills in order to properly recommend safe and effective over the counter (OTC) medications to patients based on benefit: risk evaluation and also to promote drug safety in the community and avoid drug abuse/misuse. The course follows completion of (pharmacology I, II) courses in which the student attain knowledge in actions of drugs covered in this course.</p>

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<b>III. Intended learning outcomes of the course (CILOs)</b>
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>
a1. Explain the impact of good behavior of pharmacists on their communication and relationship to patients and healthcare professionals.
a2. Identify the actions of OTC medications on patients and abuse/misuse of different types of those and other medications.
a3. Define the basis of effective pharmacy administration.
a4. Describe the pharmacist's role in community pharmacists to dispense and recommend safe and effective OTC medications to patients.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>
b1. Plan a modern system to effectively administer the “community pharmacy”
b2. Formulate and evaluate a plan of patient need and rational use of OTC medications to improve patient safety and efficacy
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>
c1. Advise the patient to optimize medicine use.
c2. Apply rules for effective” pharmacy administration”
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>
d1. Communicate effectively and behave in discipline with colleagues.
d2. Participate efficiently with his colleagues in a team work.
d3. Take responsibility for adaption to change needs in pharmacy practice
d4. Demonstrate the skills of time management and self-learning.
d5. Use essential references of evidence-based practice to achieve maximum safety and efficacy of medicines.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explain the impact of good behavior of pharmacists on their communication and relationship to patients and healthcare professionals.	Active Lecture	Written exams
a2. Identify the actions of OTC medications on patients and abuse/misuse of different types of those and other medications.		

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a4. Describe the pharmacist role in community pharmacists to dispense and recommend safe and effective OTC medications to patients.		
a3. Define the basis of effective pharmacy administration.	Virtual lab. Practice	Lab. term works, final practical exam
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
b1. Plan a modern system to effectively administer the “community pharmacy”	lab. Practice	Lab. term works, final practical exam
b2. Formulate and evaluate a plan of patient need and rational use of OTC medications to improve patient safety and efficacy	Active Lecture, feed-back learning	Written exams, quizzes, assignments
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Advise the patient to optimize medicine use.	lab. Practice	Lab. term works, final practical exam
c2. Apply rules for effective” pharmacy administration”		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Communicate effectively and behave in discipline with colleagues.	lab. Practice	Lab. term works, final practical exam
d3. Demonstrate the skills of time management and self-learning.		
d2. Participate efficiently with his colleagues in a team work.		
d5. Use essential references of evidence-based practice to achieve maximum safety and efficacy of medicines.		
d4. Take responsibility for adaption to change needs in pharmacy practice	Feed-back learning	Quizzes

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Course Content:					
A – Theoretical Aspect:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to community pharmacy	a1, a3, a4, b2	Brief history Pharmaceutical care Services offered to patients in community pharmacies Patient counseling: general rules, response to patients,	2	4
2	Drug benefit: risk and selection of drugs to specific group of patients	a1, b2	Drug benefit: risk ratio Dealing with specific groups of patients: general rules Selection of medication to pregnant women Selection of medications for breastfeeding women Safe drugs and dose for children Misleading of herbal medications	4	8
3	Drug information sources	a1, d5	Reliable foundations and references drug information sources	1	2
<b>MID-TERM EXAM</b>				1	2
4	Introduction to OTC medications	a2, a4, b1, b2	Definition How approve OTC medications Types of medications (OTC) dispensed without a prescription. Referral to physician	1	2
5	OTC medications for pain and fever	a2, a4, b2	Types of pain Types of OTC analgesics/antipyretics Risks Selection for specific groups of patients Selection for toothache, headache, musculoskeletal pain, migraine, dysmenorrhea Selection for fever List of trade names	2	4
6	OTC for oral healthcare	a1, a2, a4, b2	Definition and types of mouth ulcers OTC for different types of mouth ulcer OTC for bad breath	1	2
7	OTC products for alimentary system: part 1	a1, a2, a4, b2	Types of OTC, community cases, selection for specific groups of patients and list of trade names for the following cases: Hyperacidity Nausea and vomiting	3	6
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			Colic		
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	7 Units

### B - Practical Aspect:

The practical sections are carried out in the " Virtual pharmacy Lab"

Order	Tasks/ Experiments	Aligned Course Intended Learning Outcomes CILOs	Number of Weeks	contact hours
1	Drug product specification	c1, c2, d1, d2, d3, d5	1	2
2	Arrangement and classification of medications in community pharmacy	c1, c2, d1, d2, d3, d5	2	4
3	Using "Medscape" application and other reliable sources to search about drug safety and efficacy	c1, c2, d1, d2, d3, d5	1	2
4	Patient`s counseling: OTC and community cases for pain fever, mouth ulcer, hyperacidity, vomiting and colic	c1, c2, d1, d2, d3, d5	2	4
5	Patient counseling: (role play) How to use specific dosage forms? eye drops, ear drops, inhalers, effervescent, dermal preparations,	c1, c2, d1, d2, d3, d5	1	2
6	Skills of Dispensing of prescriptions: example of written prescriptions	c1, c2, d1, d2, d3, d5	2	4
7	Pharmacy administration skills: Documentation & indexing, requisition of medications, ordering and receiving products pharmaceutical agent's manufacturers in Yemen	c1, c2, d1, d2, d3, d5	3	6
PRACTICAL EXAM		c1, c2, d1, d2, d3, d5	1	2
Total			12	24

### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts**

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**map:** which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector.

**Laboratory practice:** students doing experiments in labs individually or in small groups

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner & for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> every student is assigned to search using Medscape on risk and benefit of a type OTC medication for one specific case	b2	8

### VII. Schedule of Assessment Tasks for Students During the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b2, d4
		Assignments	7, 12	5	5	b2
2	Mid-semester exam (written exam)		7	10	10	a1, a4, b2
3	Final exam (written exam)		16	50	50	a1, a2, a4, b2
TOTAL				70	70 %	70

#### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, d1, d2, d3, d5
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	b1, c1, c2, d1, d2, d3, d5
Total				30	30%	

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Learning Resources:	
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<b>2- Essential References.</b>	
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<a href="https://www.slideshare.net/iamkarthika/community-pharmacy-78949878">https://www.slideshare.net/iamkarthika/community-pharmacy-78949878</a> <a href="https://www.slideshare.net/sonushanno/community-pharmacy-64829089">https://www.slideshare.net/sonushanno/community-pharmacy-64829089</a>	

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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Nabil Albaseer	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



المعهد العالي للدراسات والبحوث  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

**PHARMACOGENOMICS & GENE THERAPY**

Course Code No. (PHC 515)

2022



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Course Specification

**PHARMACOGENOMICS & GENE THERAPY**

<b>I. Course Identification and General Information:</b>					
1	<b>Course Title:</b>	Pharmacogenomics & Gene Therapy			
2	<b>Course Code &amp; Number:</b>	PHC515			
3	<b>Credit Hours: 2</b>	<b>Credit Hours</b>	<b>Theory Hours</b>		<b>Lab. Hours</b>
			<b>Lecture</b>	<b>Exercise</b>	
		2	2	--	---
4	<b>Study Level/ Semester at which this Course is offered:</b>	5 <sup>th</sup> Level / 1 <sup>st</sup> Semester			
5	<b>Pre –Requisite (if any):</b>	Prs: PHT511			
6	<b>Co –Requisite (if any):</b>	-----			
7	<b>Program (s) in which the Course is Offered:</b>	Bachelor of Pharmacy			
8	<b>Language of Teaching the Course:</b>	English			
9	<b>Study System:</b>	Semester based System			
10	<b>Mode of Delivery:</b>	Full Time			
11	<b>Location of Teaching the Course:</b>	Faculty of Medicine and Health Sciences			
12	<b>Prepared by:</b>	Dr. Nabil Albaser			
13	<b>Date of Approval:</b>	2022			

**Course Description:**

The course deals with the study of influence of gene on drugs efficacy and toxicity. Moreover, the course also concerns with the principle and applications of gene to treat diseases.

**III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies**

**Alignment CILOs to PILOs**

No.	PILOs	CILOs
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a1.</b> Identify the role of genes in affecting drug disposition in the body. <b>a2.</b> Determine the types of genes used to treat of diseases.

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<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a3.</b> Define pharmacogenomics and recognize its main purposes and techniques. <b>a4.</b> Explicit the medical applications of gene therapy
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a5.</b> Comprehend his/her role as a pharmacist in recognizing and researching of pharmacogenomics & gene therapy
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:		
<b>B1</b>	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	<b>b1.</b> Interpret symbols and abbreviations related to pharmacogenomics & gene therapy.
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines	<b>b2.</b> Classify pharmacogenomic studies and gene therapy techniques. <b>b3.</b> Compare between various types of gene therapy techniques.
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	<b>b4.</b> Assess the advantages and disadvantages of pharmacogenomics and gene therapy. <b>b5.</b> Select appropriate gene therapy techniques to produce drugs.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:		
<b>C5</b>	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines.	<b>c1.</b> Search efficiently for information using documented and electronic sources of information.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Share successfully in team-work. <b>d2.</b> Communicate effectively with his/her colleagues.

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<b>D2</b>	Develop life-long learning; in particular an awareness of the need for continuing education, scholarship and professionalism in the field of pharmaceutical practice.	<b>d3.</b> Demonstrate time management and self-learning during performing practical and professional works and assignments.
<b>D3</b>	Assess the requirements of research and resources of Information related to drug discovery, development of pharmaceutical products and pharmaceutical-care practice.	<b>D4.</b> Show respect to life.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Identify the role of genes in affecting drug disposition in the body.	Active Lecture	Written exam, Attendance,
<b>a2.</b> Determine the types of genes used to treat of diseases.		
<b>a3.</b> Define pharmacogenomics and recognize its main purposes and techniques.		
<b>a4.</b> Explicit the medical applications of gene therapy		
<b>a5.</b> Comprehend his/her role as a pharmacist in recognizing and researching of pharmacogenomics & gene therapy		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret symbols and abbreviations related to pharmacogenomics & gene therapy.	Lecture, Feed-back learning	Written exam, Attendance, Assignments, quizzes
<b>b2.</b> Classify pharmacogenomic studies and gene therapy techniques.		
<b>b3.</b> Compare between types of various types of gene therapy techniques.		
<b>b4.</b> Assess the advantages and disadvantages of pharmacogenomics and gene therapy.		
<b>b5.</b> Select appropriate gene therapy techniques to produce drugs.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>

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c1. Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Share successfully in team-work.	Feed-back learning	Assignments
d2. Communicate effectively with his/her colleagues.		
d3. Demonstrate time management and self-learning during performing practical and professional works and assignments.		
d4. Show respect to life.	Active Lecture	Written exam, Attendance

<b>Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction to Pharmacogenomics</b>	a1, a3, a5, b1, d2	Pharmacogenomics: definitions (pharmacogenetics, pharmacogenomics) Objective of pharmacogenomics History of pharmacogenomics Genetic elements: Human chromosome (definition, structure, types), DNA (definition, structure, function), genes (definition, structure, functions in production of proteins: steps of production: transcription, translation gene expression) Pharmacological proteins (enzymes, hormones, receptors), transporters with examples of each type and the genes responsible for their production)	2	4
2	<b>Influence of Genetic variations on drugs pharmacokinetics and pharmacodynamics</b>	a4, a5, b3, b4,b5	Phenotype: definition, examples Genotypes: definition, type (wild-alleles, variant alleles), with examples Influence of genetic variation on drug metabolism (genetic variation in metabolizing enzymes e.g., CYP) with clinical cases of variations	3	6

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			Influence of genetic variation on drug efficacy (genetic variation in drug receptors and on drug transporters) with clinical cases of variations		
3	<b>Pharmacogenomic studies</b>	a4, a5,b2, b3	Phenotyping studies: objectives, procedures, examples Genotyping studies: objectives, procedures, examples Adjustment of doses based on pharmacogenomic studies with examples	2	4
<b>Mid-term exam</b>				<b>1</b>	<b>2</b>
4	<b>Introduction to gene therapy</b>	a2, a3,b1, b3,b4	Definition and brief history Stem cells, somatic cells: differences, examples Types of gene therapy: germline gene therapy, somatic gene therapy	2	4
5	<b>Gene delivery systems</b>	a3, a5,b1, b2, b3, b5, d2	viral vectors: types and techniques with examples non-viral vehicles: types and techniques with examples	2	4
6	<b>Application of gene therapy to treat diseases</b>	a2,a4, a5, b4, b5,d2	Applications of gene therapy to treat CVS diseases: aims and examples Applications of gene therapy to treat Alzheimer: aims and examples Applications of gene therapy to treat Diabetes: aims and examples Other applications Limitation and ethical issues of gene therapy	2	4
<b>Course Review</b>		a1, a2, a3, a4, a5,b1, b2,b3,b 4, b5, d2	Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				<b>1</b>	<b>2</b>
<b>TOTAL</b>				<b>16</b>	<b>32</b>
<b>Number of Weeks /and Units Per Semester</b>				<b>16 weeks</b>	<b>6 Units</b>

#### Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

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The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to provide a search-based report on one pharmacogenetic study.	a2, d4	4-13	6
2	<b>Group</b> : each group of students will be assigned to provide a search-based report on one recent advance in gene therapy techniques	a3, d1, d3, d4	14	4

### VII.Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, a3, a4, a5, b1, b1, b3, b4, b5
2	Assignments (1 + 2)	4, 14	10	10	b4, c1, d1, d3, d4
3	Quiz 1 + Quiz 2	7, 12	5	5	b3, b5
4	Mid-term exam (written exam)	7	20	20	a1, a3, a4, a5, b1, b2, b3, b4, b5, d2
5	Final exam (written exam)	17	60	60	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, d2
TOTAL			100	100%	100

### Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Murray P. Ducharme, Leon Shargel. **Biopharmaceutics and pharmacokinetics**, 8th Edition, © 2022 | Published: January 21, 2022, 126014299X · 9781260142990, **McGraw Hill Inc.**

#### 2- Essential References.

Elphick, Lucy. Advanced Textbook on Gene Transfer, Gene Therapy and Genetic Pharmacology edited by Daniel Sherman.2014

#### 3- Electronic Materials and Web Sites *etc.*

<https://www.pharmgkb.org>

<https://www.genome.gov>

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<b>Course Policies: (Based on the Uniform Students' By law (2007))</b>	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of

PHARMACOGENOMICS & GENE THERAPY  
Course No. (PHC 515)

- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Nabil Albaser	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

Course Description:
The course deals with the study of influence of gene on drugs efficacy and toxicity. Moreover, the course also concerns with the principle and applications of gene to treat diseases.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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III. Intended learning outcomes of the course (CILOs)
<b>Alignment CILOs</b>
<b>A: Knowledge &amp; understanding:</b> Upon successful completion of the course, students will be able to:
a1. Identify the role of genes in affecting drug disposition in the body.
a2. Determine the types of genes used to treat of diseases.
a3. Define pharmacogenomics and recognize its main purposes and techniques.
a4. Explicit the medical applications of gene therapy
a5. Comprehend his/her role as a pharmacist in recognizing and researching of pharmacogenomics & gene therapy
<b>B: Intellectual skills:</b> Upon successful completion of the course, students will be able to:
b1. Interpret symbols and abbreviations related to pharmacogenomics & gene therapy.
b2. Classify pharmacogenomic studies and gene therapy techniques.
b3. Compare between various types of gene therapy techniques.
b4. Assess the advantages and disadvantages of pharmacogenomics and gene therapy.
b5. Select appropriate gene therapy techniques to produce drugs.
<b>C: Professional &amp; practical skills:</b> Upon successful completion of the course, students will be able to:
c1. <b>Search</b> efficiently for information using documented and electronic sources of information.
<b>D: Transferable skills:</b> Upon successful completion of the course, students will be able to:
d1. Share successfully in team-work.
d2. Communicate effectively with his/her colleagues.
d3. Demonstrate time management and self-learning during performing practical and professional works and assignments.
<b>D4.</b> Show respect to life.

Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Identify the role of genes in affecting drug disposition in the body.	Active Lecture	Written exam, Attendance,
a2. Determine the types of genes used to treat of diseases.		
a3. Define pharmacogenomics and recognize its main purposes and techniques.		
a4. Explicit the medical applications of gene therapy		
a5. Comprehend his/her role as a pharmacist in recognizing and researching of pharmacogenomics & gene therapy		

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<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret symbols and abbreviations related to pharmacogenomics & gene therapy.	Lecture, learning Feed-back	Written exam, Attendance, Assignments, quizzes
<b>b2.</b> Classify pharmacogenomic studies and gene therapy techniques.		
<b>b3.</b> Compare between types of various types of gene therapy techniques.		
<b>b4.</b> Assess the advantages and disadvantages of pharmacogenomics and gene therapy.		
<b>b5.</b> Select appropriate gene therapy techniques to produce drugs.		
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning, Group-project	Assignments
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Share successfully in team-work.	Feed-back learning	Assignments
<b>d2.</b> Communicate effectively with his/her colleagues.		
<b>d3.</b> Demonstrate time management and self-learning during performing practical and professional works and assignments.		
<b>d4.</b> Show respect to life.	Active Lecture	Written exam, Attendance

<b>Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	<b>Introduction to Pharmacogenomics</b>	a1, a3, a5, b1, d2	Pharmacogenomics: definitions (pharmacogenetics, pharmacogenomics) Objective of pharmacogenomics History of pharmacogenomics Genetic elements: Human chromosome (definition,	2	4

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			structure, types), DNA (definition, structure, function), genes (definition, structure, functions in production of proteins: steps of production: transcription, translation gene expression) Pharmacological proteins (enzymes, hormones, receptors), transporters with examples of each type and the genes responsible for their production)		
2	<b>Influence of Genetic variations on drugs pharmacokinetics and pharmacodynamics</b>	a4, a5, b3, b4,b5	Phenotype: definition, examples Genotypes: definition, type (wild-alleles, variant alleles), with examples. Influence of genetic variation on drug metabolism (genetic variation in metabolizing enzymes e.g., CYP) with clinical cases of variations Influence of genetic variation on drug efficacy (genetic variation in drug receptors and on drug transporters) with clinical cases of variations.	3	6
3	<b>Pharmacogenomic studies</b>	a4, a5,b2, b3	Phenotyping studies: objectives, procedures, examples Genotyping studies: objectives, procedures, examples Adjustment of doses based on pharmacogenomic studies with examples.	2	4
<b>Mid-term exam</b>				<b>1</b>	<b>2</b>
4	<b>Introduction to gene therapy</b>	a2, a3,b1, b3,b4	Definition and brief history Stem cells, somatic cells: differences, examples Types of gene therapy: germline gene therapy, somatic gene therapy	2	4
5	<b>Gene delivery systems</b>	a3, a5, b1, b2, b3, b5, d2	viral vectors: types and techniques with examples non-viral vehicles: types and techniques with examples	2	4
6	<b>Application of gene therapy to treat diseases</b>	a2,a4, a5, b4, b5,d2	Applications of gene therapy to treat CVS diseases: aims and examples Applications of gene therapy to treat Alzheimer: aims and examples Applications of gene therapy to treat Diabetes: aims and examples	2	4

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			Other applications Limitation and ethical issues of gene therapy		
<b>Course Review</b>	a1, a2,a3, a4, a5,b1, b2,b3,b4, b5, d2		Review of the course topics by discussion session.	1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	6 Units

### Teaching strategies of the course:

**Active lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing, using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual</b> : every student is assigned to provide a search-based report on one pharmacogenetic study.	a2, d4	4-13	6
2	<b>Group</b> : each group of students will be assigned to provide a search-based report on one recent advance in gene therapy techniques	a3, d1, d3, d4	14	4

### VII.Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Attendance	1 - 15	5	5	a1, a2, a3, a4, a5, b1, b1, b3, b4, b5
2	Assignments (1 + 2)	4, 14	10	10	b4, c1, d1, d3, d4
3	Quiz 1 + Quiz 2	7, 12	5	5	b3, b5

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4	Mid-term exam (written exam)	7	20	20	a1, a3, a4, a5, b1, b2, b3, b4, b5, d2
5	Final exam (written exam)	17	60	60	a1, a2, a3, a4, a5, b1, b2, b3, b4, b5, d2
TOTAL			100	100%	100

### Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

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#### 2- Essential References.

Elphick, Lucy. Advanced Textbook on Gene Transfer, Gene Therapy and Genetic Pharmacology edited by Daniel Sherman. 2014

#### 3- Electronic Materials and Web Sites *etc.*

<https://www.pharmgkb.org>

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### Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Nabil Albaseer	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



المجلس الأعلى للتعليم والبحث العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Program of Pharmacy**

Course Specification of  
**Pharmacy Training II**  
Course No. (PHF516)

**2022**



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I. Course Identification and General Information:		
1	Course Title:	Pharmacy Training II
2	Course Code & Number:	PHF516
3	Credit Hours:	2 Credit Hours equivalent to 320 Contact Hours
4	Credit Hours:	320 hours (8 hours/day -3 days/week -14 weeks): a) Hospital : 120 hours (Clinical <b>Pharmacy</b> ). b) 200 hours (Community Pharmacy)
5	Study Level/ Semester at which this Course is offered:	At the beginning of the 1 <sup>st</sup> Semester Year 5
6	Pre –Requisite (if any):	Field Pharmacy Training II
7	Co –Requisite (if any):	None
8	Program (s) in which the Course is Offered:	Bachelor of Pharmacy
9	Language of Teaching the Course:	English
10	Study System:	Semester
11	Mode of Delivery:	Full Time
12	Location of Training:	Hospitals and Community Pharmacies
13	Prepared by:	Dr. Abdullah Al-Bajali + Dr. Nabil Al-baseer + Dr. Amin Alwosabi + Dr. Anes Thabit
14	Date of Approval:	

II. Course Description:
<p>This is the second part of training courses for pharmacy Bachelor students. In this part the student is assigned to complete 320 hours in 2 pharmacy practice fields': (1) Hospital and (2) community pharmacy. The Hospital training focuses on completion the clinical pharmacy training of pharmacy training 1. The student is trained for clinical pharmaceutical care services at Gynecological &amp; Obstetrician, Orthopedic and Urogenital departments. Departments. The Through active participation in day-to-day services, students will have the opportunity to apply knowledge and skills previously learned in related courses. Training at Community pharmacies is designed to help the student to attain the skills of patient counseling, dispensing medication prescription, management and organization of community pharmacies and reach contact to the drug market including trade names and pharmaceutical companies.</p>

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<b>II. Course Intended Learning Outcomes (CILOs) : Upon successful completion of the course, students will be able to:</b>		
<b>A. Knowledge &amp; Understanding</b>		
a1	Identify label data of medications and documents used in the pharmacy.	
a2	Explain the role of pharmacists in providing pharmaceutical services to patients in community pharmacies.	
a3	Explains the problems related to drugs in terms of: side and adverse effects, drug interactions and other drug risks	
<b>B. Intellectual Skills</b>		
b1	Classify medications in the community pharmacy according to their therapeutic categories and storage recommendations.	
b2	Compare between pharmaceutical equivalents, pharmaceutical alternatives and therapeutic alternatives in community pharmacy.	
b3	Assess risks of medications on specific population of patients e.g. pregnant, breastfeeding women and geriatrics	
<b>C. Professional &amp; Practical Skills</b>		
c1	Check medical prescription for potential errors e.g. drug interactions and dispense prescriptions accurately according to the standards of Good Dispensing practice (GDP)	
c2	perform patient`s counseling to provide patients information of rational drug use.	
c3	Store medications in and out refrigerator according to their specific storage recommendation.	
c4	Employ clinical skills to design therapeutic regimen for in-patients in the hospital.	
c5	Monitor drug therapy in order to assess drug benefit (patient response to drug) and risk (side and adverse effects).	
<b>B. Transferable Skills</b>		
d1	Practice efficient team-work with his colleagues and other healthcare team members	
d2	Use Reliable Internet, computer-based programs and modern technologies such as Medscape application to provide correct information about drugs.	

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<b>(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
a1	Identify label data of medications and documents used in the pharmacy.	Field Training Seminar Direct Patient Contact Problem-based learning	Attendance Attitude Assignments Seminar Assessment Oral Exam Written Exam Log-Book
a2	Explain the role of pharmacists in providing pharmaceutical services to patients in community pharmacies.		
a3	Explains the problems related to drugs in terms of: side and adverse effects, drug interactions and other drug risks		
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Classify medications in the community pharmacy according to their therapeutic categories and storage recommendations.	Field Training Case-studies. Problem-based learning	Attendance Attitude Assignments Written Exam Log-Book
b2	Compare between pharmaceutical equivalents, pharmaceutical alternatives and therapeutic alternatives in community pharmacy.		
b3	Assess risks of medications on specific population of patients e.g. pregnant, breastfeeding women and geriatrics		
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
<b>Course Intended Learning Outcomes</b>		<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Check medical prescription for potential errors e.g. drug interactions and dispense prescriptions accurately according to the	Field Training	Attendance Attitude

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	standards of Good Dispensing practice (GDP)	Direct-patient contact Problem-based learning	Assignments Log-Book Oral Exam Written Exam
c2	perform patient`s counseling to provide patients information of rational drug use.		
c3	Store medications in and out refrigerator according to their specific storage recommendation		
c4	Employ clinical skills to design therapeutic regimen for in-patients in the hospital.		
c5	Monitor drug therapy in order to assess drug benefit (patient response to drug) and risk (side and adverse effects)		

**(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:**

Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
d1	Practice efficient team-work with his colleagues and other healthcare team members	Field Training Problem-based learning	Attitude Assignments Oral Exam
d2	Use Reliable Internet, computer-based programs and modern technologies such as Medscape application to provide correct information about drugs.		

**IV. Course Contents:**

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
<b>1- Hospital: Clinical pharmacy part II (120 Hours)</b>					
1	Clinical pharmacy: Inpatients (Gynecology & Obstetrician Departments)	Morning Rotation Reading and understanding medical file and medication administration records of patients Review therapeutic regimen Drug therapy monitoring	Week 1 Day: 1,2,3 Week 2 Days 1, 2	(40 hours)	a2,a3,b3,c4,c5, d2

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2	Clinical pharmacy: Inpatients (Orthopedics)	Morning Rotation Reading and understanding medical file and medication administration records of patients Review therapeutic regimen Drug therapy monitoring	Week 2 Days: 3 Week 3 Days: 1,2,3 Week 4 Days:1	(40 hours)	a2,a3,b 3,c4,c5, d2
3	Clinical pharmacy (Urogenital department)	Morning Rotation Reading and understanding medical file and medication administration records of patients Review therapeutic regimen Drug therapy monitoring	Week 5 Day: 2,3 Week 6 Days: 1,2,3	(40 hours)	a2,a3,b 3,c4,c5, d2
<b>2- Community Pharmacy ( 200 Hours)</b>					
4	Identification of a drug product, Medication storage, Controlled-drugs	Identification of a drug product Medications classification and Ordering Label information Brand names and manufacturers Medication storage Storage conditions Storage according to type of the dosage form Medications need specific storage (refrigerator, breakable package, etc) Controlled-drugs Types Specific regulations of dispensing	Week 6 Days: 1,2,3 Week 7 Days: 1,2	(40 hours)	a1, a2,a3,b 1,c3,2,c 3,d1,d2
5	Over the counter (OTC) medications	Selecting an OTC based on patient case (skills of patient counseling)	Week 7 Days: 1,2,3 Week 8	(80 hours)	a2, a3, b1, b2, b3,

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		OTC for pain and fever OTC for community GIT disorders OTC for oral health care OTC for dermatological community cases OTC for respiratory community cases Other OTC	Days: 1,2,3 Week 9 Day: 1		c1,c3,d 1,d2
6	Dispensing Prescriptions supervision) of (under	Prescription data: physician data, patient data, medication data Checking drug information Picking and assembly of medications Instruction of patients to use the medications: telling the patient and writing directions to use	Week 9 Day: 2,3 Week 10 Day: 1,2,3	(40 hours)	a2, b2, c1, c2, d1, d2
7	Protocols for Requesting, Receiving, documentation and Sale of medications	Supplier lists (Agents and domestic manufacturer) Medication prices, bonuses, discounts Protocols of medication requesting Checking of medications received Sale: calculation from the purchase price, sale computer-based software Documents and documentation	Week 11 Day: 1,2,3	(24 hours)	a1, a2, b1, b2, c3, d1, d2
	Final written and Oral Exam		Week 12 Day: 1,2	16	a1, a2, a3, b1, b2, b3, c1, c2, c3, d2
Number of Weeks /and Units Per Semester			14	200	

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#### V. Teaching Strategies of the Course:

Field-Training  
Direct-patient contact  
Seminar  
Problem-Based Learning  
Case Studies

#### VI. Assessment Methods of the Course:

Attendance  
Attitude  
Assignments  
Seminar Assessment  
Log-Book  
Oral Exam  
Written Exam

#### VII. Assessment:

No.	Method	Week Due	Mark	Aligned CILOs (symbols)
1	Attendance	All Weeks	10	a1,a2,a3,a4
2	Attitude	All Weeks	10	a3, c1,c2,c3,c4, d1
3	Assignments	All Weeks	20	b1,b2,c1,c2,c3,c4,d2
4	Seminar Assessment	Week 14	10	a1,a2,a3,a4, b1,b2,c2,c3,c4,d2
5	Log-Book	Week 14	10	a1,a2,b1,b2,c2,c3,c4,d2
6	Final Oral Exam	Week 14	20	a1, a2, a3, b1, b2, b3, c1, c2, c3, d2
7	Final Written Exam	Week 14	20	a1, a2, a3, b1, b2, b3, c1, c2, c3, d2
<b>Total</b>			<b>100</b>	

#### VIII. Learning Resources:

##### 1- Required Textbook(s) (maximum two ):

S.L Foster , Clinical Pharmacy., 2019, Academics  
Rutter, Paul. 2017, Community Pharmacy Symptoms, Diagnosis and Treatment. Elsevier Science Health Science.

##### 2- Essential References:

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Abdullah Al-Bajali	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Zeind, Caroline S, and Michael G Carvalho. 2018, Applied Therapeutics : The Clinical Use of Drugs. 11th ed., Philadelphia, Wolters Kluwer

Filipa Alves Da Costa, et al. 2018, The Pharmacist Guide to Implementing Pharmaceutical Care. Cham, Switzerland, Springer.

### 3- Electronic Materials and Web Sites etc.:

1. <http://www.mhra.gov.uk/index.htm>.
2. <http://jpet.aspetjournals.org>.
3. <http://www.jpharmacol.com>.
4. <http://www.sciencedirect.com>.
5. <http://www.ncbi.nlm.nih.gov/pubmed>.

## IX. Course Policies: (Based on the Uniform Students' By law (2007))

<b>1</b>	<p><b>Class Attendance:</b></p> <p>such as serious illness or death in the family with providing an acceptable documentation approved the university and forwarded by the chairman of the department. Otherwise the absence shall be considered unexcused.</p> <p>-In accordance with the university rules, if the percentage of student's absentness exceeds 25 % of the total lectures or practical classes, the student involved shall be disqualified in the final written and practical examination of the course and shall be deemed to have failed in the course.</p>
<b>2</b>	<p><b>Tardiness:</b></p> <p>Roll will be called in the very beginning of each lecture and practical class. Retardation for more than three weeks without a reasonable excursion, the student involved shall not be allowed to attend the class any longer and consequently shall be considered to be absent</p>
<b>3</b>	<p><b>Exam Attendance/Punctuality:</b></p> <p>It is incumbent on student to report at the examination hall for checking in and rolls calling at least 15 minutes before the commencement of examination.</p> <p>-A student is not allowed to submit answer booklet and leave the examination hall only on or after the passage of the have examination duration (equivalent to the first one hour after the commencement of the examination).</p> <p>-A student who comes late shall not be admitted to the examination hall, only within the first one hour of the examination. Attending after this time, the student will be considered to be missed in the examination and shall be deemed to have failed in the course.</p>
<b>4</b>	<p><b>Assignments &amp; Projects:</b></p> <p>a student does not submit the micro-assignments or practical reports, the student shall be allotted zero marks which will affect the final assessment of the course.</p> <p>-The submission date extension will not be granted only by the consent of the faculty member concerned.</p> <p>In the case of late submission, the student must provide a reasonable explanation to the faculty member.</p> <p>Otherwise 1% of the obtained marks will be subtracted for each late day, including weekends and holidays.</p>

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<b>5</b>	<p><b>Cheating:</b></p> <p>-If a student is found cheating in the final and med-term examinations and quizzes(copying from an authorized materials and anther students' work or allowing other students to copy from his/her own work), the student involved shall be disqualified in the examination and shall be deemed to have failed in the course and also suspended from examinations of two more courses.</p> <p>If a student if found engaging in any unauthorized communications (oral,sign,call,etc.), while the examination is in progress or in possessing of any authorized materials or electronic devices before the distribution of examination papers , the student involved shall be disqualified in the examination and shall be deemed to have failed the course.</p>
<b>6</b>	<p><b>Plagiarism :</b></p> <p>Plagiarism is the presentation of any material (text, data or figures) from any other source in preparation of micro-assignments or practical reports without clear and adequate acknowledgement of the source.</p> <p>- Plagiarism is also the use or copy of other students' work (with, or without payment) to prepare all or part of undertaken micro-assignments or practical reports of work submitted for assessment.</p> <p>All types of plagiarism in are unacceptable and are considered of honest practices. If a student is found using plagiarism in devoted micro-assignments or reports , the student involved shall be subjected to the same penalties as in the case of cheating as already mentioned in the sub-section (5) of the course policies.</p>
<b>7</b>	<p><b>Other policies:</b></p> <p>Students must switch off their mobile phones, labtops, electronic devices etc. before entering lecture room or laboratory. If a student is found using these devices while the lecture or practical work is in progress, the student involved shall be expelled out of the class and shall be considered to be absent.</p> <p>Note that students can submit their micro-assignments or practical reports through the e-mail address of the faculty member concerned and should be prudent to keep Photostat or electronic copies of submitted works to guard against an accidental loss.</p>

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Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACOKINETICS**  
Course No. (PHT517)

2022



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Course Identification and General Information:					
1	Course Title:	Pharmacokinetics			
2	Course Code & Number:	PHT517			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	2	--	1
4	Study Level/ Semester at which this Course is offered:	Fifth Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHC426			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Khalid Shamarekh			
13	Date of Approval:	2022			

Course Description:
<p>This course is follow (Biopharmaceutics course) and both provide knowledge in drug pharmacokinetics and bioavailability. However, this course provides the student with the knowledge and skills required to use data, obtained from pharmacokinetic/ biopharmaceutical studies, for mathematical calculations of drug concentrations in body and the rate and extent of drug absorption, distribution, elimination and bioavailability. In addition, this course has a practical part in order to provide students with skills required to carry out pharmacokinetic and biopharmaceutical experiments</p>

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The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
	PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
A2.	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	a1. Explain the procedures employed during pharmacokinetic/biopharmaceutical studies.
A3	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	a2. Describe the role of pharmacist in determination of pharmacokinetic/biopharmaceutical parameters.
A1.	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a3. Explain the basic mathematical principles of pharmacokinetic/biopharmaceutical calculations
A4.	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a4. Identify the order of changing drug amount in the body and the models of drug distribution
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
B1.	Predict the drug properties from molecular structure that affect pharmacokinetic parameters and interaction with targets in the body.	b1. Interpret the numerical and graphical data relevant to drug pharmacokinetic / biopharmaceutical
B5.	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology,	b2. Apply calculations to graphically & mathematical solve pharmacokinetic/biopharmaceutical problems.

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	pharmacoeconomic factors to enhance the healthcare systems.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C1.</b>	Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory
		<b>c2.</b> Operate the instruments successfully in the laboratory
		<b>c3.</b> Carry out pharmacokinetic / biopharmaceutical experiment
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Participate efficiently with his colleagues in a teamwork.
		<b>d2.</b> Demonstrate the skills of time management and self-learning.
		<b>d3.</b> Communicate effectively and behave in discipline with colleagues.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the procedures employed during pharmacokinetic/ biopharmaceutical studies.	<b>Active lecture</b>	<b>Written exam s</b>
<b>a2.</b> Describe the role of pharmacist in determination of pharmacokinetic/biopharmaceutical parameters.		
<b>a3.</b> Explain the basic mathematical principles of pharmacokinetic/ biopharmaceutical calculations		
<b>a4.</b> Identify the order of changing drug amount in the body and the models of drug distribution		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret the numerical and graphical data relevant to drug pharmacokinetic/biopharmaceutical	<b>Active-lecture, problem-based</b>	<b>Written exams , assignments , quizzes</b>

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<b>b2.</b> Apply calculations to graphically & mathematical solve pharmacokinetic/ biopharmaceutical problems.	<b>learning, feed-back learning</b>	
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	<b>Lab. Practice</b>	<b>Lab. accomplishments and attitude</b>
<b>c2.</b> Operate the instruments successfully in the laboratory		
<b>c3.</b> Carry out pharmacokinetic/ biopharmaceutical experiment		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	<b>Lab. Practice</b>	<b>Lab. attitude</b>
<b>D3.Participate</b> efficiently with his colleagues in a teamwork.		
<b>d2.</b> Demonstrate the skills of time management, self-learning and problems solving	<b>Lab. practice, feed-back learning</b>	<b>Assignments</b>

<b>Course Content:</b>					
<b>Theoretical aspects:</b>					
Each topic, when applicable, is supported by Solved and homework problems.					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	Introduction and Mathematical fundamentals	Definition and Objectives of pharmacokinetic and biopharmaceutical studies Common logarithm (log) , natural logarithm (ln), base exponent (e-x) XY data demonstration: tabular form, graphical form (semilog paper, rectangular coordinate paper), Straight line: general equation, determination of slope and rate constant graphically on, semilog paper, rectangular coordinate paper.	2	4	a1, a2, a3, a4, b1, b2

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2	Clinical aspects of Pharmacokinetic and biopharmaceutical studies	Subjects : Volunteers specifications: number, gender, weight, height, body surface area, race Drug Dosing: drug administration, water intake, fed/fasting states. Post-dosing: Sampling: blood, urine, others (advantages, disadvantage), interval of sampling, considerations of sampling. Analysis of sample	1	2	a1, a2, a3, a4, b1, b2
3	Determination of cumulative drug eliminated in urine	Analysis of urine samples: urine data: time of sampling virus Amount excreted at a time ( $D_t$ ), cumulative amount of drug excreted at a time ( $D_u$ ), excretion rate ( $D_t/\Delta t$ ), total cumulative amount of drug excreted $0-\infty$ ( $D_u\infty$ ), Graphical methods	2	4	a1, a2, a3, a4, b1, b2
4	Order of kinetics and Pharmacokinetic Models	The order of kinetic: definition of kinetic order, significance and types (first order, zero order), mathematical and graphical determination. Pharmacokinetic models of distribution Definition of model, significance, types (one-compartment, two compartments, three compartment) and principle of each model, graphical and mathematical determination.	3	6	a1, a2, a3, a4, b1, b2
<b>Mid-Term Exam</b>			1	2	
5	Pharmacokinetics of drugs given by intravenous (bolus) administration	<u>I.V. Bolus From Blood data (<math>C_{pvs}</math> time)</u> Determine model and order of kinetic General equations of $C_p$ and $C_p^0$ for one-compartment model, two compartment model and three compartment model Determine other parameters: elimination rate constant, half-life ( $t_{1/2}$ ), clearance (Cl) distribution rate constant, $AUC^\infty$ , Distribution: volume of distribution (VD)	2	4	a1, a2, a3, a4, b1, b2
6	Pharmacokinetics of drugs given by intravenous infusion	<u>I.V. multiple bolus dosing :</u> One-compartment assuming first order elimination , general equation of $C_p$ , Determine $C_p^0$ , determine distribution and elimination	2	4	a1, a2, a3, a4, b1, b2

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		<p>parameters, determine specific data (<math>C_{max}</math>, <math>C_{min}</math>, <math>C_{max\infty}</math>, <math>C_{min\infty}</math>, <math>CP_{\infty}</math>, <math>C_{ss}</math>)</p> <p><u>I.V. infusion: one-compartment model at constant infusion rate:</u> General equation of <math>C_p</math>, specific data (rate of infusion(<math>R</math>), steady state concentration <math>C_{ss}</math>, maintenance dose <math>D_m</math>, loading dose <math>D_L</math>), determine distribution and elimination parameters.</p> <p><u>I.V. infusion: one-compartment model at changing infusion rate:</u> General equation of <math>C_p</math>, specific data (rate of infusion(<math>R</math>), steady state concentration <math>C_{ss}</math>, maintenance dose <math>D_m</math>, loading dose <math>D_L</math>), determine distribution and elimination parameters.</p> <p><u>I.V. bolus followed by IV. infusion:</u> General equation of <math>C_p</math>, specific data (rate of infusion(<math>R</math>), steady state concentration <math>C_{ss}</math>, maintenance dose <math>D_m</math>, loading dose <math>D_L</math>), determine distribution and elimination parameters.:</p>			
7	Pharmacokinetics of single dose given by extravascular (oral, I.M., rectal, etc.)	<p>Blood data <math>C_p</math> versus time curve General equation of <math>C_p</math> Absorption parameters: <math>K_a</math>, <math>F</math>, <math>C_{max}</math>, <math>T_{max}</math>, <math>D_{ab}</math>, <math>D_{ab\infty}</math>, <math>f_{ab}</math> (fraction absorbed), <math>f_{ua}</math> (fraction unabsorbed), Elimination parameters: <math>k</math>, half-life, <math>Cl</math></p> <p>Urine data One-compartment : first-order elimination, zero order elimination, ARE versus time</p>	2	4	$a_1, a_2, a_3, a_4, b_1, b_2$
8	Pharmacokinetics of multiple dosing of drug given by extravascular (oral, I.M., rectal, etc.)	One-compartment assuming first order elimination: ( $C_{max}$ , $C_{min}$ , $C_{max\infty}$ , $C_{min\infty}$ , $CP_{\infty}$ , $CSS$ , )	1	2	$a_1, a_2, a_3, a_4, b_1, b_2$

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9	Specific Pharmacokinetic calculations	Calculations of : Loading and maintenance doses Doses and dosage interval at change from I.V. infusion to oral administration. Changes in plasma concentration with change in route of administration. Dose in the elderly	1	2	a1, a2, a3, a4, b1, b2
10	Calculation of bioavailability and bioequivalence	Absolute bioavailability Relative bioavailability Determination of Bioequivalence IVIV correlation calculations	1	2	a1, a2, a3, a4, b1, b2
FINAL – EXAM			1	2	
TOTAL			16	32	
Number of Weeks /and Units Per Semester			16 weeks	10 Units	

Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	CILOs
1	In vitro analysis of drugs from (blood sample mixed with drug)	1	2	c1, c2, c3, d1, 2, d3
2	In vitro analysis of drugs from (blood sample mixed with drug)	1	2	c1, c2, c3, d1, 2, d3
3	In vivo pharmacokinetic analysis (absorption, distribution, elimination) aspirin in blood of rats	3	6	c1, c2, c3, d1, 2, d3
4	In vivo pharmacokinetic analysis (absorption, distribution, elimination) paracetamol in blood of rats	3	6	c1, c2, c3, d1, 2, d3
5	Ex vivo analysis of ciprofloxacin using rat gut sac model	2	4	c1, c2, c3, d1, 2, d3
Practical Exam		2	4	c1, c2, c3, d1, 2, d3
Total		12	24	
Number of Weeks		12		

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### Teaching strategies of the course:

**Active lecture - Discussion:** a short lecture/ address followed by discussion

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects:** students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> A number of problems related to the topics will be answered as homework exercises	b2, c3, d2	2-12	10

### Schedule of Assessment Tasks for Students during the Semester

#### Theoretical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b2
		Assignments	7, 12	5	5	b2, c3, d2
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, a4, b1, b2
3	Final exam ( written exam)		16	50	50	a1, a2, a3, a4, b1, b2
TOTAL				70	70 %	70

#### Practical part assessment

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, 2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, d1, 2, d3
Total				30	30 %	

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Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
Applied biopharmaceutics and pharmacokinetics (Lion Shargel), 7th edition, 2016. Malcolm Rowland. Clinical pharmacokinetics: concepts an applications, 1996, Lippincott's Williams & Wilkins	
<b>2- Essential References.</b>	
Wagner. Pharmacokinetics for the pharmaceutical scientist, 1st edition, 1996 Venkaeswarlu. Biopharmaceutics and pharmacokinetics, 2008.	
<b>3- Electronic Materials and Web Sites etc.</b>	
<u>Articles from:</u> www.emedicine.com www.sciencedirect.com www.blackwell.com www.ovid.com www.pubmed.com	

Course Policies: (Based on the Uniform Students' By law (2007))	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of  
**PHARMACOKINETICS**  
Course Code No. (PTH517 )

Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Khalid Shamarekh	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

Course Description:
This course is follow (Biopharmaceutics course) and both provide knowledge in drug pharmacokinetics and bioavailability. However, this course provides the student with the knowledge and skills required to use data, obtained from pharmacokinetic/biopharmaceutical studies, for mathematical calculations of drug concentrations in body and the rate and extent of drug absorption, distribution, elimination and bioavailability. In addition, this course has a practical part in order to provide students with skills required to carry out pharmacokinetic and biopharmaceutical experiments

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The Course Intended Learning Outcomes (CILOs)	
<b>Alignment CILOs</b>	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>	
a1. Explain the procedures employed during pharmacokinetic/biopharmaceutical studies.	
a2. Describe the role of pharmacist in determination of pharmacokinetic/ biopharmaceutical parameters.	
a3. Explain the basic mathematical principles of pharmacokinetic/ biopharmaceutical calculations.	
a4. Identify the order of changing drug amount in the body and the models of drug distribution.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Interpret the numerical and graphical data relevant to drug pharmacokinetic / biopharmaceutical	
b2. Apply calculations to graphically & mathematical solve pharmacokinetic/biopharmaceutical problems.	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Handle efficiently and safely the chemical materials and tools used in the laboratory	
c2. Operate the instruments successfully in the laboratory	
c3. Carry out pharmacokinetic / biopharmaceutical experiment	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Participate efficiently with his colleagues in a teamwork.	
d2. Demonstrate the skills of time management and self-learning.	
d3. Communicate effectively and behave in discipline with colleagues.	

Alignment CILOs to teaching strategies and assessment strategies		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Explain the procedures employed during pharmacokinetic/ biopharmaceutical studies.	<b>Active lecture</b>	<b>Written exam s</b>
a2. Describe the role of pharmacist in determination of pharmacokinetic/biopharmaceutical parameters.		
a3. Explain the basic mathematical principles of pharmacokinetic/ biopharmaceutical calculations		
a4. Identify the order of changing drug amount in the body and the models of drug distribution		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		

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Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Interpret the numerical and graphical data relevant to drug pharmacokinetic/biopharmaceutical	<b>Active-lecture, problem-based learning, feed-back learning</b>	<b>Written exams , assignments , quizzes</b>
<b>b2.</b> Apply calculations to graphically & mathematical solve pharmacokinetic/biopharmaceutical problems.		
<b>(c)Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skillsto Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>c1.</b> Handle efficiently and safely the chemical materials and tools used in the laboratory	<b>Lab. Practice</b>	<b>Lab. accomplishments and attitude</b>
<b>c2.</b> Operate the instruments successfully in the laboratory		
<b>c3.</b> Carry out pharmacokinetic/biopharmaceutical experiment		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>d1.</b> Communicate effectively and behave in discipline with colleagues.	<b>Lab. Practice</b>	<b>Lab. attitude</b>
<b>D3.Participate</b> efficiently with his colleagues in a teamwork.		
<b>d2.</b> Demonstrate the skills of time management, self-learning and problems solving	<b>Lab. practice, feed-back learning</b>	<b>Assignments</b>

<b>Course Content:</b>					
<b>Theoretical aspects:</b>					
Each topic, when applicable, is supported by Solved and homework problems.					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	Introduction and Mathematical fundamentals	Definition and Objectives of pharmacokinetic and biopharmaceutical studies Common logarithm (log) , natural logarithm (ln), base exponent (e-x) XY data demonstration: tabular form, graphical form (semilog paper, rectangular coordinate paper), Straight line: general equation,	2	4	a1, a2, a3, a4, b1, b2

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		determination of slope and rate constant graphically on, semilog paper, rectangular coordinate paper.			
2	Clinical aspects of Pharmacokinetic and biopharmaceutical studies	Subjects : Volunteers specifications: number, gender, weight, height, body surface area, race Drug Dosing: drug administration, water intake, fed/fasting states. Post-dosing: Sampling: blood, urine, others (advantages, disadvantage), interval of sampling, considerations of sampling. Analysis of sample	1	2	a1, a2, a3, a4, b1, b2
3	Determination of cumulative drug eliminated in urine	Analysis of urine samples: urine data: time of sampling virus Amount excreted at a time ( $D_t$ ), cumulative amount of drug excreted at a time ( $D_u$ ), excretion rate ( $D_t/\Delta t$ ), total cumulative amount of drug excreted $0-\infty$ ( $D_{u\infty}$ ), Graphical methods	2	4	a1, a2, a3, a4, b1, b2
4	Order of kinetics and Pharmacokinetic Models	The order of kinetic: definition of kinetic order, significance and types (first order, zero order), mathematical and graphical determination. Pharmacokinetic models of distribution Definition of model, significance, types (one-compartment, two compartments, three compartment) and principle of each model, graphical and mathematical determination.	3	6	a1, a2, a3, a4, b1, b2
<b>Mid-Term Exam</b>			1	2	
5	Pharmacokinetics of drugs given by intravenous (bolus) administration	<u>I.V. Bolus From Blood data (<math>C_{pvs}</math> time)</u> Determine model and order of kinetic General equations of $C_p$ and $C_p^0$ for one-compartment model, two compartment model and three compartment model Determine other parameters: elimination rate constant, half-life ( $t_{1/2}$ ), clearance (Cl) distribution rate constant, $AUC^\infty$ , Distribution: volume of distribution (VD)	2	4	a1, a2, a3, a4, b1, b2

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6	Pharmacokinetics of drugs given by intravenous infusion	<p><u>I.V. multiple bolus dosing :</u> One-compartment assuming first order elimination , general equation of <math>C_p</math>, Determine <math>C_p^0</math> , determine distribution and elimination parameters, determine specific data (<math>C_{max}</math>, <math>C_{min}</math>, <math>C_{max\infty}</math>, <math>C_{min\infty}</math>, <math>CP_{\infty}</math>, <math>C_{ss}</math>)</p> <p><u>I.V. infusion: one-compartment model at constant infusion rate:</u> General equation of <math>C_p</math>, specific data (rate of infusion(<math>R</math>), steady state concentration <math>C_{ss}</math>, maintenance dose <math>D_m</math>, loading dose <math>D_L</math>), determine distribution and elimination parameters.</p> <p><u>I.V. infusion: one-compartment model at changing infusion rate:</u> General equation of <math>C_p</math>, specific data (rate of infusion(<math>R</math>), steady state concentration <math>C_{ss}</math>, maintenance dose <math>D_m</math>, loading dose <math>D_L</math>), determine distribution and elimination parameters.</p> <p><u>I.V. bolus followed by IV. infusion:</u> General equation of <math>C_p</math>, specific data (rate of infusion(<math>R</math>), steady state concentration <math>C_{ss}</math>, maintenance dose <math>D_m</math>, loading dose <math>D_L</math>), determine distribution and elimination parameters.:</p>	2	4	a1, a2, a3, a4, b1, b2
7	Pharmacokinetics of single dose given by extravascular (oral, I.M., rectal, etc.)	<p>Blood data Cp versus time curve General equation of <math>C_p</math> Absorption parameters: <math>K_a</math>, <math>F</math>, <math>C_{max}</math>, <math>T_{max}</math> <math>D_{ab}</math>, <math>D_{ab\infty}</math>, <math>f_{ab}</math> (fraction absorbed) , <math>f_{ua}</math> (fraction unabsorbed), Elimination parameters: <math>k</math>, half-life , <math>Cl</math></p> <p>Urine data One-compartment : first-order elimination, zero order elimination, ARE versus time</p>	2	4	a1, a2, a3, a4, b1, b2

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8	Pharmacokinetics of multiple dosing of drug given by extravascular (oral, I.M., rectal, etc.)	One-compartment assuming first order elimination: ( $C_{max}$ , $C_{min}$ , $C_{max\infty}$ , $C_{min\infty}$ , $CP_{\infty}$ , $CSS$ , )	1	2	$a_1$ , $a_2$ , $a_3$ , $a_4$ , $b_1$ , $b_2$
9	Specific Pharmacokinetic calculations	Calculations of : Loading and maintenance doses Doses and dosage interval at change from I.V. infusion to oral administration. Changes in plasma concentration with change in route of administration. Dose in the elderly	1	2	$a_1$ , $a_2$ , $a_3$ , $a_4$ , $b_1$ , $b_2$
10	Calculation of bioavailability and bioequivalence	Absolute bioavailability Relative bioavailability Determination of Bioequivalence IVIV correlation calculations	1	2	$a_1$ , $a_2$ , $a_3$ , $a_4$ , $b_1$ , $b_2$
FINAL – EXAM			1	2	
TOTAL			16	32	
Number of Weeks /and Units Per Semester			16 weeks	10 Units	

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Practical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	Contact hours	CILOs
1	In vitro analysis of drugs from (blood sample mixed with drug)	1	2	c1, c2, c3, d1, 2, d3
2	In vitro analysis of drugs from (blood sample mixed with drug)	1	2	c1, c2, c3, d1, 2, d3
3	In vivo pharmacokinetic analysis (absorption, distribution, elimination) aspirin in blood of rats	3	6	c1, c2, c3, d1, 2, d3
4	In vivo pharmacokinetic analysis (absorption, distribution, elimination) paracetamol in blood of rats	3	6	c1, c2, c3, d1, 2, d3
5	Ex vivo analysis of ciprofloxacin using rat gut sac model	2	4	c1, c2, c3, d1, 2, d3
Practical Exam		2	4	c1, c2, c3, d1, 2, d3
<b>Total</b>		<b>12</b>	<b>24</b>	
Number of Weeks		12		

Teaching strategies of the course:	
<b>Active lecture - Discussion:</b>	a short lecture/ address followed by discussion
<b>Feed-back learning:</b>	students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homeworks, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation
<b>Group projects:</b>	students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

Assignments:				
No	Assignments	Aligned CILOs	Week Due	Mark
1	<b>Individual:</b> A number of problems related to the topics will be answered as homework exercises	b2, c3, d2	2-12	10

Schedule of Assessment Tasks for Students during the Semester	
Theoretical part assessment	

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No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	5	5	b2
		Assignments	7, 12	5	5	b2, c3, d2
2	Mid-semester exam (written exam)		7	10	10	a1, a2, a3, a4, b1, b2
3	Final exam ( written exam)		16	50	50	a1, a2, a3, a4, b1, b2
TOTAL				70	70 %	70

Practical part assessment						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes(CILOs)
1	Lab. Term works	Attitude	1-12	5	5	c1, c2, c3, d1, 2, d3
		Accomplishments		5	5	
2	Final exam (practical)		12	20	20	c1, c2, c3, d1, 2, d3
Total				30	30 %	

Learning Resources:	
<b>1- Required Textbook(s) ( maximum two ).</b>	
Applied biopharmaceutics and pharmacokinetics (Lion Shargel), 7th edition, 2016. Malcolm Rowland. Clinical pharmacokinetics: concepts an applications, 1996, Lippincott's Williams & Wilkins	
<b>2- Essential References.</b>	
Wagner. Pharmacokinetics for the pharmaceutical scientist, 1st edition, 1996 Venkaeswarlu. Biopharmaceutics and pharmacokinetics, 2008.	
<b>3- Electronic Materials and Web Sites etc.</b>	
Articles from: www.emedicine.com www.sciencedirect.com www.blackwell.com www.ovid.com www.pubmed.com	

Course Policies: (Based on the Uniform Students' By law (2007)	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

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3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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المجلس الأعلى للتعليم والبحث العلمي  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**NUCLEAR PHARMACY**  
Course No. (PHT518)

2022



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Course Identification and General Information:					
1	Course Title:	Nuclear Pharmacy			
2	Course Code & Number:	PHT518			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	Fifth Level / 1 <sup>st</sup> Semester			
5	Pre –Requisite (if any):	PHC515			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of –Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Khalid Shamarekh			
13	Date of Approval:	2022			

Course Description:
This course concerns with the study of radiopharmaceuticals. In the first part, it introduces knowledge of general radiations, types of radiations, elements that emit radiation, and study of production and labeling methods, risks management. The second part focus on radiopharmaceuticals used for diagnosis and treatment of human diseases.

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The Course Intended Learning Outcomes (CILOs) and their alignment to Program Intended Learning Outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
	PILOs	CILOs
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A2.</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a1.</b> Explain the physicochemical properties of radionuclides, radioisotopes, radioisomers and radiopharmaceuticals.
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<b>a2.</b> Describe the analytical methods used for measurement of radioactivity, radiodiagnosis of human diseases and quality evaluation of radiopharmaceuticals.
<b>A1.</b>	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	<b>a3.</b> Identify actions of radiations and radiopharmaceuticals in human.
<b>A4.</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Describe the role of pharmacist in safe and effective radiopharmaceutical administration.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2.</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<b>b1.</b> Classify radiations, radionuclides and radiopharmaceuticals.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Khalid Shamarekh	Dr. Ahmed Al-Ghani	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>B5.</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b2.</b> Apply calculations to measure radioactivity and radiopharmaceutical doses.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C2.</b>	<b>C1.</b> Apply knowledge, practical and industrial skills of handling, designing, pre-formulation, manufacturing development, packaging, storage and quality assurance of synthetic/natural pharmaceutical preparations including drug delivery system according to GLP, GSP, GDP and cGMP guidelines.	<b>c1.</b> Search efficiently for information using documented and electronic sources of information. <b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1.</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills.	<b>d1.</b> Demonstrate time management and self-learning skills.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the physicochemical properties of radionuclides, radioisotopes, radioisomers and radiopharmaceuticals.	<b>Active Lecture</b>	<b>Written exams</b>
<b>a2.</b> Describe the analytical methods used for measurement of radioactivity, radiodiagnosis of human diseases and quality evaluation of radiopharmaceuticals.		
<b>a3.</b> Identify actions of radiations and radiopharmaceuticals in human.		
<b>a4.</b> Describe the role of pharmacist in safe and effective radiopharmaceutical administration.		

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<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify radiations, radionuclides and radiopharmaceuticals.	<b>Active Lecture</b>	<b>Written exams</b>
<b>b2.</b> Apply calculations to measure radioactivity and radiopharmaceutical doses.	<b>Active Lecture , feed-back learning</b>	<b>Written exams , Quizzes</b>
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	<b>Feed-back learning</b>	<b>Assignments</b>
<b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate time management and self-learning skills.	<b>Feed-back learning</b>	<b>Assignments</b>

<b>Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>Contact hours</b>	<b>CILOs</b>
1	<b>Introduction To Nuclear pharmacy</b>	Definitions: nuclear medicine, nuclear pharmacy, radiopharmaceuticals). Regulations of nuclear pharmacy Significance of nuclear pharmacy Interior design and location of a nuclear pharmacy The basics of atom radioactivity: atom nuclear structure, types of particles. Radioactivity: lower, high energy, theories Radionuclides, radioisotopes, radioisomers, normal atoms vs. Radionuclides Types of radiations: ionizing, non-ionizing. Differences and types	2	4	a1, a2, a3, a4, b1, b2

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		Ionizing radiations: Particle radiations ( $\alpha$ , $\beta$ ), wave radiations (gamma radiations, X-rays) properties. Risks of radiations: types of risks, factors affecting risks			
2	<b>Radioactivity</b>	Radioactivity: types of radioactive substances (natural, artificial) Properties of commonly used radionuclides Units of measurement of radioactivity Half-lives : physical, biological, effective Kinetics of radioactivity Calculation of radiation exposure Calculation of radiation absorbed by man Calculation of dose of radiopharmaceutical: dose as Ci or Bq, as $\mu\text{g}$ as rad/mci	3	6	a1, a2, a3, a4, b1, b
3	<b>Introduction to Radiopharmaceuticals</b>	Definition and components of radiopharmaceutical Production and labeling Classification Properties of ideal radiopharmaceutical Routes of administration Administration procedures: dose calibrator	2	4	a1, a2, a3, a4, b1, b2
<b>Mid-Term Exam</b>			1	2	

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4	<b>Diagnostic radiopharmaceuticals</b>	<p><b>In vitro diagnostic methods</b> Radioimmunoassay Schilling test Blood volume determination</p> <p><b>In vivo (Imaging diagnostic radiopharmaceuticals):</b> <b>Gamma camera techniques:</b> scintillation, SPECT techniques , types , doses and adverse effects for Heart imaging Brain imaging Kidney imaging Thyroid and parathyroid imaging Lung imaging Bone and joint imaging Liver imaging Infection and inflammation imaging</p> <p><b>Positron emission tomography (PET)</b> Advantages Disadvantages Radionuclides and Radiopharmaceuticals used for imaging</p>	4	8	a1, a2, a3, a4, b1, b2
5	<b>Therapeutic Radiopharmaceuticals</b>	<p>General properties of radiotherapeutics Types , doses and adverse effects for Radiopharmaceuticals used for therapy of : Hyperthyroidism Thyroid cancer Bone metastasis Neuroendocrine digestive system tumor Prostate cancer Liver cancer Non-Hodking lymphoma Polycythemia and leukemia</p>	2	4	a1, a2, a3, a4, b1, b2
6	<b>Quality control of radiopharmaceuticals</b>	<p>Physicochemical tests Radioactive purity Radiochemical purity Chemical purity Radioassay Biological tests: sterility, a pyrogenicity</p>	1	2	a1, a2, a3, a4, b1, b2
<b>FINAL – EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	6 Units	

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### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feedback learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to provide a search-based report on one radiopharmaceutical product.	c1, c2, d1	4-13

### Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	c1, c2, d1
2	Mid-semester exam ( written exam)		7	20	20	a1, a2, a3, a4, b1, b2
3	Final exam of ( written exam)		16	60	60	a1, a2, a3, a4, b1, b2
TOTAL				100	100 %	

### Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

Gopal B. Saha. Fundamentals of nuclear pharmacy, 7<sup>th</sup> edition, 2018, Springer.

#### 2- Essential References.

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Ansel's Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA

### 3- Electronic Materials and Web Sites etc.

Article from:

[www.emedicine.com](http://www.emedicine.com)

[www.sciencedirect.com](http://www.sciencedirect.com)

[www.blackwell.com](http://www.blackwell.com)

[www.ovid.com](http://www.ovid.com)

[www.pubmed.com](http://www.pubmed.com)

<https://www.slideshare.net/TashfaZaheer/nuclear-pharmacy-part-1-125360708>

<https://slideplayer.com/slide/12189088/>

### Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.







Second Part of Course Specification  
Faculty of Medicine and Health Sciences  
**Department of Pharmacy**  
**Program of Pharmacy Bachelor**

Course Plan (Syllabus) of :  
**NUCLEAR PHARMACY**  
Course Code No. (PHT518)

Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Khalid Shamarekh	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

Course Description:
This course concerns with the study of radiopharmaceuticals. In the first part, it introduces knowledge of general radiations, types of radiations, elements that emit radiation, and study of production and labeling methods, risks management. The second part focus on radiopharmaceuticals used for diagnosis and treatment of human diseases.

The Course Intended Learning Outcomes (CILOs)
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>

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<b>a1.</b> Explain the physicochemical properties of radionuclides, radioisotopes, radioisomers and radiopharmaceuticals.
<b>a2.</b> Describe the analytical methods used for measurement of radioactivity, radiodiagnosis of human diseases and quality evaluation of radiopharmaceuticals.
<b>a3.</b> Identify actions of radiations and radiopharmaceuticals in human.
<b>a4.</b> Describe the role of pharmacist in safe and effective radiopharmaceutical administration.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>
<b>b1.</b> Classify radiations, radionuclides and radiopharmaceuticals.
<b>b2.</b> Apply calculations to measure radioactivity and radiopharmaceutical doses.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.
<b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>
<b>d1.</b> Demonstrate time management and self-learning skills.

Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Explain the physicochemical properties of radionuclides, radioisotopes, radioisomers and radiopharmaceuticals.	<b>Active Lecture</b>	<b>Written exams</b>
<b>a2.</b> Describe the analytical methods used for measurement of radioactivity, radiodiagnosis of human diseases and quality evaluation of radiopharmaceuticals.		
<b>a3.</b> Identify actions of radiations and radiopharmaceuticals in human.		
<b>a4.</b> Describe the role of pharmacist in safe and effective radiopharmaceutical administration.		
(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>b1.</b> Classify radiations, radionuclides and radiopharmaceuticals.	<b>Active Lecture</b>	<b>Written exams</b>

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b2. Apply calculations to measure radioactivity and radiopharmaceutical doses.	Active Lecture , feed-back learning	Written exams , Quizzes
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Search efficiently for information using documented and electronic sources of information.	Feed-back learning	Assignments
c2. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate time management and self-learning skills.	Feed-back learning	Assignments

<b>Course Content:</b>					
Order	Units/ Topics List	Sub Topics List	No. of Weeks	Contact hours	CILOs
1	<b>Introduction To Nuclear pharmacy</b>	Definitions: nuclear medicine, nuclear pharmacy, radiopharmaceuticals). Regulations of nuclear pharmacy Significance of nuclear pharmacy Interior design and location of a nuclear pharmacy The basics of atom radioactivity: atom nuclear structure, types of particles. Radioactivity: lower, high energy, theories Radionuclides, radioisotopes, radioisomers, normal atoms vs. Radionuclides Types of radiations: ionizing, non-ionizing. Differences and types Ionizing radiations: Particle radiations ( $\alpha$ , $\beta$ ), wave radiations (gamma radiations, X-rays) properties. Risks of radiations: types of risks, factors affecting risks	2	4	a1, a2, a3, a4, b1, b2
2	<b>Radioactivity</b>	Radioactivity: types of radioactive substances (natural, artificial)	3	6	a1, a2,

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		Properties of commonly used radionuclides Units of measurement of radioactivity Half-lives : physical, biological, effective Kinetics of radioactivity Calculation of radiation exposure Calculation of radiation absorbed by man Calculation of dose of radiopharmaceutical: dose as Ci or Bq, as $\mu\text{g}$ as rad/mci			a3, a4, b1, b
3	<b>Introduction to Radiopharmaceuticals</b>	Definition and components of radiopharmaceutical Production and labeling Classification Properties of ideal radiopharmaceutical Routes of administration Administration procedures: dose calibrator	2	4	a1, a2, a3, a4, b1, b2
<b>Mid-Term Exam</b>			1	2	
4	<b>Diagnostic radiopharmaceuticals</b>	<b>In vitro diagnostic methods</b> Radioimmunoassay Schilling test Blood volume determination <b>In vivo (Imaging diagnostic radiopharmaceuticals):</b> <b>Gamma camera techniques:</b> scintillation, SPECT techniques , types , doses and adverse effects for Heart imaging Brain imaging Kidney imaging Thyroid and parathyroid imaging Lung imaging Bone and joint imaging Liver imaging Infection and inflammation imaging <b>Positron emission tomography (PET)</b> Advantages Disadvantages Radionuclides and Radiopharmaceuticals used for imaging	4	8	a1, a2, a3, a4, b1, b2

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5	<b>Therapeutic Radiopharmaceuticals</b>	General properties of radiotherapeutics Types , doses and adverse effects for Radiopharmaceuticals used for therapy of : Hyperthyroidism Thyroid cancer Bone metastasis Neuroendocrine digestive system tumor Prostate cancer Liver cancer Non-Hodking lymphoma Polycythemia and leukemia	2	4	a1, a2, a3, a4, b1, b2
6	<b>Quality control of radiopharmaceuticals</b>	Physicochemical tests Radioactive purity Radiochemical purity Chemical purity Radioassay Biological tests: sterility, a pyrogenicity	1	2	a1, a2, a3, a4, b1, b2
<b>FINAL – EXAM</b>			1	2	
<b>TOTAL</b>			16	32	
<b>Number of Weeks /and Units Per Semester</b>			16 weeks	6 Units	

#### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom. The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

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**Group projects**: students work on a project in groups of 2 to 3 students. Important for learning by doing ,using the results in practical manner &for promoting team work skills

#### Assignments:

No	Assignments	Aligned CILOs	Week Due	
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1	<b>Individual:</b> every student is assigned to provide a search-based report on one radiopharmaceutical product.	c1, c2, d1	4-13	
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### Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	b2
		Assignments	7, 12	10	10	c1, c2, d1
2	Mid-semester exam ( written exam)		7	20	20	a1, a2, a3, a4, b1, b2
3	Final exam of ( written exam)		16	60	60	a1, a2, a3, a4, b1, b2
<b>TOTAL</b>				<b>100</b>	<b>100 %</b>	

### Learning Resources:

#### 1- Required Textbook(s) ( maximum two ).

Gopal B. Saha. Fundamentals of nuclear pharmacy, 7<sup>th</sup> edition, 2018, Springer.

#### 2- Essential References.

Ansel`s Pharmaceutical dosage forms and drug delivery system, 2018, Lippincott Williams and Wilkins, USA

#### 3- Electronic Materials and Web Sites etc.

Article from:

[www.emedicine.com](http://www.emedicine.com)

[www.sciencedirect.com](http://www.sciencedirect.com)

[www.blackwell.com](http://www.blackwell.com)

[www.ovid.com](http://www.ovid.com)

[www.pubmed.com](http://www.pubmed.com)

<https://www.slideshare.net/TashfaZaheer/nuclear-pharmacy-part-1-125360708>

<https://slideplayer.com/slide/12189088/>

### Course Policies: (Based on the Uniform Students' By law (2007)

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

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3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) should apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

**PHARMACEUTICAL BIOTECHNOLOGY**

Course No. (64)

Course Code No. (PHT511)

2022



This template of course specifications was prepared by CAQA, Yemen, 2017.  
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Prepared by:

Dr. Ahmed Al-Ghani

Reviewed by:

Dr. ----

Head of the Department:

Quality Assurance head

Dean:





Course Specification

**PHARMACEUTICAL BIOTECHNOLOGY**

Course Identification and General Information:							
1	Course Title:	PHARMACEUTICAL BIOTECHNOLOGY					
2	Course Code & Number:	PHT511					
3	Credit hours: 2	C.H			TOTAL		
		Theoretical					
		L.	Tut.	S.		P	Tr.
		2	-	-	-	-	2
4	Study level/ semester at which this course is offered:	5 <sup>th</sup> Level – 1 <sup>st</sup> Semester					
5	Pre –requisite (if any):	PHT421					
6	Co –requisite (if any):	--					
7	Program (s) in which the course is offered:	Pharmacy Bachelor					
8	Study System:	Semester based System					
9	Mode of delivery:	Full Time					
10	Language of teaching the course:	English					
11	Location of teaching the course:	At The University Facility					
12	Prepared By:	Dr. Ahmed Al-Ghani					
13	Date of Approval:	2022					

L: lecturing; Tut: Tutorial, S: seminar; P: practical; Tr.: training

**Course Description:**

This course deals with the study of applications of biotechnological methods such as recombinant DNA, polymerase chain reaction (PCR) and peptide technologies in pharmacy in particular the use of these techniques in analysis of genes and also the recent production of certain medicines such as monoclonal antibodies and others and their therapeutic uses. Also, this course concerns with the study of genetic therapy for complicated diseases (treatment by replacement of the defected genes with normal genes).

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Dr. Nabil Albaseer	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge &amp; understanding: upon completion of the course, students will be able to:</b>		
<b>A3</b>	Illustrate broad knowledge about physicochemical properties of drug structure and other fundamental sciences to explain mechanism of action, effectiveness, use, safety, side effects and interactions of therapeutic agents as well as the complementary therapies including phytotherapy.	<p><b>a1.</b> Explain the physicochemical properties of biotechnology drug products.</p> <p><b>d2.</b> Identify the actions, therapeutic uses and adverse effects of biotechnology-drug products.</p>
<b>A2</b>	Explain the essential knowledge about design, isolation, extraction, preparation, formulation, manufacturing, quality control and quality assurance of natural and synthetic medicines and biopharmaceuticals in compliance with standard operating procedures (SOPs) and GMP guidelines.	<b>a3.</b> Explain the approaches and analytical techniques applied in biotechnology relevant to gene analysis and production of biotechnology-drug products.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a4.</b> Describe the role of pharmacist in developing and employing biotechnology techniques in pharmacy practice.
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B2</b>	Integrate knowledge from fundamental sciences necessary for handling, identification, extraction, designing, preparing, manufacturing, quality control and quality assurance of synthetic/natural pharmaceutical and biopharmaceutical materials/products according to GLP and GMP guidelines.	<p><b>b1.</b> Classify biotechnology drugs.</p> <p><b>b2.</b> Design a suitable method to extract, isolate and purify DNA and genes from human samples</p>
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<p><b>c1.</b> Search efficiently for information using documented and electronic sources of information.</p> <p><b>c2.</b> Present and report his/her works correctly using appropriate</p>

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Dr. Ahmed Al-Ghani	Dr. Nabil Albaser	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



		writing rules and technologies media.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Demonstrate the ability of time management and self-learning.

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Explain the physicochemical properties of biotechnology drug products.	Active Lecture	Written exams
<b>a3.</b> Identify the actions, therapeutic uses and adverse effects of biotechnology-drug products.		
<b>a4.</b> Describe the role of pharmacist in developing and employing biotechnology techniques in pharmacy practice.		
<b>a2.</b> Explain the approaches and analytical techniques applied in biotechnology relevant to gene analysis and production of biotechnology-drug products.	Active Lecture, feed-back learning	Written exams, quizzes
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Classify biotechnology drugs.	Active Lecture	Written exams
<b>b2.</b> Design a suitable method to extract, isolate and purify DNA and genes from human samples	Active Lecture, feed-back learning	Written exams, assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning	Assignments

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c2. Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate the ability of time management and self-learning.	Feed-back learning	Assignments

Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to Biotechnology	a1, a2, a4	definition & purposes & brief history. Relation of biotechnology to advancement in intracellular chemistry, molecular biology, rDNA technology, pharmacogenomics and immunopharmacology. living organisms used in biotechnology	2	4
2	Techniques of Biotechnology	a4, b1	Classification of biotechnology techniques Principles, equipment, pharmaceutical applications, comparison, advantages and disadvantages of: recombinant DNA (rDNA). Monoclonal antibodies Polymerase chain Reaction (PCR) Nucleotide blockade/antisense Peptide technology	4	8
3	Analysis of genes	a3, a4, b2	DNA isolation and purification Genetic analysis	1	2
<b>MID-TERM EXAM</b>				1	2
4	Biotechnology produced-Drugs	a1, a2, a4, b1	Classification of biotechnology drugs advantage and disadvantages of biotechnology drug products as compared to classical medications Proteins as the first biotechnology products of biotechnology Physicochemical properties, Indication, mechanism of action, dose, route of	6	

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			administration, precautions, biotechnology by which is obtained for the following products : Anticoagulant drug: Lepirudin (Refludan) ® Antisense drugs : Fomivirsen sodium (Vitravene), efavirenz (Sustiva)® Clotting factors: Systemic antihemophilic factors (Kogenate) ® colony-stimulating factors: granulocyte colony–stimulating factor (Filgrastim)® Erythropoietins : Epoetin alfa (Epogen, Procrit) ® Fusion inhibitors: Enfuvirtide (Fuzeon) ® Growth factor: becaplermin (Regranex) ® Human growth hormone: ystemic growth hormone (Humatrope, protropin) ® Interferons: interferon beta-1b (betaseron), interferon beta-1a (Avonex) ® Interleukins: Aldesleukin (Proleukin) ® tissue plasminogen activators: recombinant Alteplase (Activase) ® Vaccines: hepatitis B vaccine recombinant (Engerix-b) ®, haemophiles B conjugate vaccine (Hibtiter) ®		12
Course Review	a1, a2,a3, a4, b1, b2	Review of the course topics by discussion session.		1	2
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	4 Units

### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

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The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation.

Assignments:				
No	Assignments	Aligned CILOs	Week Due	
1	<b>Individual</b> : every student is assigned to provide a search-based report on one biotechnology method or one drug produced by biotechnology.	b2, c1, c2, d1	7	

VII. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	a2
		Assignments	7, 12	10	10	b2, c1, c2, d1
2	Mid-semester exam (written exam)		7	20	20	a1, a2, a3, a4, b1, b2
3	Final exam of (written exam)		16	60	60	a1, a2, a3, a4, b1, b2
TOTAL				100	100 %	

Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
Ansel's pharmaceutical dosage forms and drug delivery system, 2011, Lippincott Williams and Wilkins, USA: Chapter: Biotechnology	
<b>2- Essential References.</b>	
Nagori. Foundations in pharmaceutical biotechnology R.S. pharmaceutical biotechnology	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://slideplayer.com/slide/10556636/">https://slideplayer.com/slide/10556636/</a>	
<a href="https://www.slideshare.net/maha0695kiran/pharmaceutical-biotechnology-197478286">https://www.slideshare.net/maha0695kiran/pharmaceutical-biotechnology-197478286</a>	

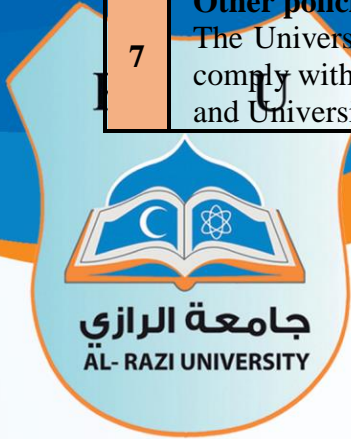
Course Policies: (Based on the Uniform Students' By law (2007)	
1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b>

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	A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**PHARMACEUTICAL BIOTECHNOLOGY**  
Course No. (64)  
Course No. (PHT511)

<b>- Information about Faculty Member Responsible for the Course:</b>						
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>				
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>
<b>E-mail</b>						

<b>Course Description:</b>
This course deals with the study of applications of biotechnological methods such as recombinant DNA, polymerase chain reaction (PCR) and peptide technologies in pharmacy in particular the use of these techniques in analysis of genes and also the recent production of certain medicines such as monoclonal antibodies and others and their therapeutic uses. Also, this course concerns with the study of genetic therapy for complicated diseases (treatment by replacement of the defected genes with normal genes).

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<b>III. Intended learning outcomes of the course (CILOs):</b>	
<b>Alignment CILOs to PILOs</b>	
<b>A: Knowledge &amp; understanding: upon completion of the course, students will be able to:</b>	
a1. Explain the physicochemical properties of biotechnology drug products.	
a2. Identify the actions, therapeutic uses and adverse effects of biotechnology-drug products.	
a3. Explain the approaches and analytical techniques applied in biotechnology relevant to gene analysis and production of biotechnology-drug products.	
a4. Describe the role of pharmacist in developing and employing biotechnology techniques in pharmacy practice.	
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>	
b1. Classify biotechnology drugs.	
b2. Design a suitable method to extract, isolate and purify DNA and genes from human samples	
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>	
c1. Search efficiently for information using documented and electronic sources of information.	
c2. Present and report his/her works correctly using appropriate writing rules and technologies media.	
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>	
d1. Demonstrate the ability of time management and self-learning.	

<b>Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
a1. Explain the physicochemical properties of biotechnology drug products.	Active Lecture	Written exams
a3. Identify the actions, therapeutic uses and adverse effects of biotechnology-drug products.		
a4. Describe the role of pharmacist in developing and employing biotechnology techniques in pharmacy practice.		
a2. Explain the approaches and analytical techniques applied in biotechnology relevant to gene analysis and production of biotechnology-drug products.	Active Lecture, feed-back learning	Written exams, quizzes
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>b1.</b> Classify biotechnology drugs.	Active Lecture	Written exams
<b>b2.</b> Design a suitable method to extract, isolate and purify DNA and genes from human samples	Active Lecture, feed-back learning	Written exams, assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>c1.</b> Search efficiently for information using documented and electronic sources of information.	feed-back learning	Assignments
<b>c2.</b> Present and report his/her works correctly using appropriate writing rules and technologies media.		
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
<b>d1.</b> Demonstrate the ability of time management and self-learning.	Feed-back learning	Assignments

Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
1	Introduction to Biotechnology	a1, a2, a4	definition & purposes & brief history. Relation of biotechnology to advancement in intracellular chemistry, molecular biology, rDNA technology, pharmacogenomics and immunopharmacology. living organisms used in biotechnology	2	4
2	Techniques of Biotechnology	a4, b1	Classification of biotechnology techniques Principles, equipment, pharmaceutical applications, comparison, advantages and disadvantages of: recombinant DNA (rDNA). Monoclonal antibodies Polymerase chain Reaction (PCR) Nucleotide blockade/antisense	4	8

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			Peptide technology		
3	Analysis of genes	a3, a4, b2	DNA isolation and purification Genetic analysis	1	2
MID-TERM EXAM				1	2
4	Biotechnology produced-Drugs	a1, a2, a4, b1	<p>Classification of biotechnology drugs advantage and disadvantages of biotechnology drug products as compared to classical medications</p> <p>Proteins as the first biotechnology products of biotechnology</p> <p>Physicochemical properties, Indication, mechanism of action, dose, route of administration, precautions, biotechnology by which is obtained for the following products :</p> <p>Anticoagulant drug: Lepirudin (Refludan) ®</p> <p>Antisense drugs : Fomivirsen sodium (Vitravene), efavirenz (Sustiva)®</p> <p>Clotting factors: Systemic antihemophilic factors (Kogenate) ®</p> <p>colony-stimulating factors: granulocyte colony–stimulating factor (Filgrastim)®</p> <p>Erythropoietins : Epoetin alfa (Epogen, Procrit) ®</p> <p>Fusion inhibitors: Enfuvirtide (Fuzeon) ®</p> <p>Growth factor: becaplermin (Regranex) ®</p> <p>Human growth hormone: ystemic growth hormone (Humatrope, protropin) ®</p> <p>Interferons: interferon beta-1b (betaseron), interferon beta-1a (Avonex) ®</p> <p>Interleukins: Aldesleukin (Proleukin) ®</p> <p>tissue plasminogen activators: recombinant Alteplase (Activase) ®</p> <p>Vaccines: hepatitis B vaccine recombinant (Engerix-b) ®,</p>	6	12

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			haemophiles B conjugate vaccine (Hibtiter) ®		
Course Review	a1, a2,a3, a4, b1, b2		Review of the course topics by discussion session.	1	2
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	4 Units

#### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student`s brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feed-back learning**: students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation.

#### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual</b> : every student is assigned to provide a search-based report on one biotechnology method or one drug produced by biotechnology.	b2, c1, c2, d1	7

#### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion to Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	10	10	a2
		Assignments	7, 12	10	10	b2, c1, c2, d1
2	Mid-semester exam (written exam)	7	20	20	a1, a2, a3, a4, b1, b2	
3	Final exam of (written exam)	16	60	60	a1, a2, a3, a4, b1, b2	
TOTAL			100	100 %		

#### Learning Resources:

1- Required Textbook(s) (maximum two ).

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Ansel's pharmaceutical dosage forms and drug delivery system, 2011, Lippincott Williams and Wilkins, USA: Chapter: Biotechnology
<b>2- Essential References.</b>
Nagori. Foundations in pharmaceutical biotechnology R.S. pharmaceutical biotechnology
<b>3- Electronic Materials and Web Sites etc.</b>
<a href="https://slideplayer.com/slide/10556636/">https://slideplayer.com/slide/10556636/</a>
<a href="https://www.slideshare.net/maha0695kiran/pharmaceutical-biotechnology-197478286">https://www.slideshare.net/maha0695kiran/pharmaceutical-biotechnology-197478286</a>

<b>Course Policies: (Based on the Uniform Students' By law (2007))</b>	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
<b>5</b>	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>6</b>	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
<b>7</b>	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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السنة الخامسة  
الفصل الثاني

FIFTH level (2 <sup>nd</sup> semester)							
	Course Name	اسم المقرر	Code	Credit hours			Prerequisite (Pre)/ Corequisite (Co)
				Th	Pr.	Cr.hr	
	Pharmaceutical Marketing	تسويق دوائي	PHC524	2	-	2	Co: PHP521
	Professional Ethics and Regulations	أخلاقيات و تشريعات مهنية	MSC523	2	-	2	Co:MSC522
	Graduation Research project	مشروع بحث التخرج	MSC525	-	4	2	Pr: MSC512, 513
	Pharmacoeconomics & Epidemiology	اقتصاد صيدلاني وعلم الوبائيات	PHP521	2	-	2	Co: PHP524
	Public health	صحة عامة	MSC522	2	-	2	Co: MSC523
Total				8	4	10	

Th: Theoretical ( Lecture, seminar, tutorial, etc.), Pr: practical at lab.; ; Pr: Prerequisite ;  
Co: Corequisite



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

Course Specification of  
**PHARMACEUTICAL MARKETING**  
Course No. (PHP524)

2022



This template of course specifications was prepared by CAQA,  
Yemen, 2017.

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I. Course Identification and General Information:					
1	Course Title:	Pharmaceutical Marketing			
2	Course Code & Number:	PHP524			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	5 <sup>th</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	Prs: Pr:PHP521			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhawlani			
13	Date of Approval:	2022			

Course Description:
This course is designed to provide the students with knowledge, ability and skills required to effectively promote pharmaceutical and cosmetic products. The course also concerns with skills of self-promotion including preparation of CV and practicing effective Job interview. The course also concerns with skills of self-supporting of pharmacist in the work market.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies</b>		
<b>Alignment CILOs to PILOs</b>		
	<b>PILOs</b>	<b>CILOs</b>
<b>Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A5</b>	Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmaco-economic, pharmacoinformatic etc) to optimize the therapeutic outcomes.	<b>a1.</b> Define the basis of marketing and its strategies and applications in pharmacy.
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a2.</b> Describe the role of pharmacist in promoting pharmaceutical and cosmetic products
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B3</b>	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	<b>b1.</b> Plan a modern marketing strategy to promote pharmaceutical and cosmetic products.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C4</b>	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	<b>c1.</b> Apply marketing rules to apply to jobs and to promote pharmaceutical and cosmetic products.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Interact and communicate effectively with healthcare professional during marketing of pharmaceutical and cosmetic products.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawlani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Alignment CILOs to teaching strategies and assessment strategies		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Define the basis of marketing and its strategies and applications in pharmacy.	Active Lecture	Written exams
a2. Describe the role of pharmacist in promoting pharmaceutical and cosmetic products		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Plan a modern marketing strategy to promote pharmaceutical and cosmetic products.	Active Lecture	Written exams
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
c1. Apply marketing rules to apply to jobs and to promote pharmaceutical and cosmetic products.	Feed -back learning (seminar)	Assignment assessment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
d1. Interact and communicate effectively with healthcare professional during marketing of pharmaceutical and cosmetic products.	Feed -back learning (seminar)	Assignment assessment

Course Content:					
Order	Units/ Topics List	CIL Os	Sub Topics List	No. of Weeks	contact hours
1	Introduction to marketing	a1, a2	Definitions, (markets, marketing, promotion, promotional materials, products, competitors, customers, marketing targets, plan and planning Significance and objectives of marketing	1	2

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2	Requirements of a successful marketing	a1,a2, b1,d1	Personnel, mental, skills communication and relationship building Strategy of marketing: planning, execution, evaluation Designing a marketing plan	2	4
3	Understanding the customers	b1,d1	Types of customers Dealing with customers customers need and satisfaction	1	2
4	Pharmaceutical marketing	a1, a2, b1	Significance Who is the med. Rep. ? ethical issues Pharmaceutical products: differences from other products, essential information to be full known on pharmaceutical products (pharmaceutical, pharmacological, commercial) properties Pharmaceutical Promotional materials: brochures, gifts, charts, etc.	3	6
Mid-term exam				1	2
5	Role play	a2, b1	Training on visiting to customers (physicians) : pre-visit preparation ad skills of effective visit (meeting, opening, offering, closing), post-visit evaluation	1	2
6	Self-marketing (C.V)	a1	How to prepare C.V	1	2
	Self-marketing (Job applications and interview)	a1,a2	Requirements of successful job application and interview	1	2
7	Feedback learning (1)	c1, d1	Role play	2	4
	Feedback learning (2)	c1, d1	CV preparation	1	4
	Feedback learning (3)	c1, d1	Job interview	1	4
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	7 Units

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

**Feedback learning**: The student(s) is assigned to present one-related topic with discussion such topic with other students

### Assignments (Feedback learning)

No	Topic	Aligned CILOs	Week Due
<b>Individual:</b> every student is assigned to participate in one of the following Feedback learning tasks			
1	Role play marketing	c1, d1	12, 13
2	Job interview	c1, d1	14
3	CV preparation	c1, d1	15

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13	5	5	c1
		Assignments	12, 13, 14, 15	15	15	c1, d1
2	Mid-term exam (written exam)		7	20	20	a1, a2, b1
3	Final exam of theoretical part (written exam)		16	60	60	a1, a2, b1, d1
TOTAL				100	100 %	

### Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Ross Mulner. Pharmaceutical marketing, Journal of Consumer Marketing, 2005

#### 2- Essential References.

Handbook of pharmaceutical marketing

#### 3- Electronic Materials and Web Sites etc.

<https://www.slideshare.net/AshishAgrawal135/pharmaceutical-marketing-by-vikram-mathariya>

<https://www.slideshare.net/alijehangir/pharmaceuticals-marketing-strategies>

### IX. Course Policies: (Based on the Uniform Students' By law (2007))

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Mohammed Alkhawani	Dr. Amin Alwosabi	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of Pharmacy**

Course Plan (Syllabus) of  
**Pharmaceutical Marketing**  
Course Code No. (PHP524)

- Information about Faculty Member Responsible for the Course:							
Name of Faculty Member	Dr. Mohammed Alkhawlani	Office Hours					
Location & Telephone No.		SAT	SUN	MON	TUE	WED	THU
E-mail							

Course Description:
This course is designed to provide the students with knowledge, ability and skills required to effectively promote pharmaceutical and cosmetic products. The course also concerns with skills of self-promotion including preparation of CV and practicing effective Job interview. The course also concerns with skills of self-supporting of pharmacist in the work market.

III. Intended learning outcomes of the course (CILOs)
<b>Knowledge and understanding: upon completion of the course, students will be able to:</b>

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A5	Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmaco-economic, pharmacoinformatic etc) to optimize the therapeutic outcomes.	a1. Define the basis of marketing and its strategies and applications in pharmacy.
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a2. Describe the role of pharmacist in promoting pharmaceutical and cosmetic products
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b1. Plan a modern marketing strategy to promote pharmaceutical and cosmetic products.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
C4	Utilize the management skills in procurement activities, inventory, distribution, pharmaceutical marketing, registration and documentation of interventions in patient's drug therapy and pharmaceutical products.	c1. Apply marketing rules to apply to jobs and to promote pharmaceutical and cosmetic products.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Interact and communicate effectively with healthcare professional during marketing of pharmaceutical and cosmetic products.

Alignment CILOs to teaching strategies and assessment strategies		
(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge & understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Define the basis of marketing and its strategies and applications in pharmacy.	Active Lecture	Written exams
a2. Describe the role of pharmacist in promoting pharmaceutical and cosmetic products		

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<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Plan a modern marketing strategy to promote pharmaceutical and cosmetic products.	Active Lecture	Written exams
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Apply marketing rules to apply to jobs and to promote pharmaceutical and cosmetic products.	Feed -back learning (seminar)	Assignment assessment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Interact and communicate effectively with healthcare professional during marketing of pharmaceutical and cosmetic products.	Feed -back learning (seminar)	Assignment assessment

<b>Course Content:</b>					
<b>Order</b>	<b>Units/ Topics List</b>	<b>CILOs</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>contact hours</b>
1	Introduction to marketing	a1, a2	Definitions, (markets, marketing, promotion, promotional materials, products, competitors, customers, marketing targets, plan and planning Significance and objectives of marketing	1	2
2	Requirements of a successful marketing	a1,a2, b1,d1	Personnel, mental, skills communication and relationship building Strategy of marketing: planning, execution, evaluation Designing a marketing plan	2	4
3	Understanding the customers	b1,d1	Types of customers Dealing with customers customers need and satisfaction	1	2

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4	Pharmaceutical marketing	a1, a2, b1	Significance Who is the med. Rep. ? ethical issues Pharmaceutical products: differences from other products, essential information to be full known on pharmaceutical products (pharmaceutical, pharmacological, commercial) properties Pharmaceutical Promotional materials: brochures, gifts, charts, etc.	3	6
Mid-term exam				1	2
5	Role play	a2, b1	Training on visiting to customers (physicians) : pre-visit preparation and skills of effective visit (meeting, opening, offering, closing), post-visit evaluation	1	2
6	Self-marketing (C.V)	a1	How to prepare C.V	1	2
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	Feedback learning (2)	c1, d1	CV preparation	1	4
	Feedback learning (3)	c1, d1	Job interview	1	4
FINAL – EXAM				1	2
TOTAL				16	32
Number of Weeks /and Units Per Semester				16 weeks	7 Units

### Teaching strategies of the course:

**Active Lecture** It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-200) or in sessions, which consist of more than one group gathered in one classroom.

The efficiency of lecturing can be enhanced by using techniques such as **Brain-storming**: It depends on stimulation of the student's brain through a group of questions &/or **Concepts map**: which depends on sequencing of thoughts in the form of maps with horizontal or vertical relations & by using **learning aids** such as Data show projector

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**Feedback learning:** The student(s) is assigned to present one-related topic with discussion such topic with other students

Assignments (Feedback learning)			
No	Topic	Aligned CILOs	Week Due
<b>Individual:</b> every student is assigned to participate in one of the following Feedback learning tasks			
1	Role play marketing	c1, d1	12, 13
2	Job interview	c1, d1	14
3	CV preparation	c1, d1	15

VII. Schedule of Assessment Tasks for Students During the Semester						
No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13	5	5	c1
		Assignments	12, 13, 14, 15	15	15	c1, d1
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3	Final exam of theoretical part (written exam)		16	60	60	a1, a2, b1, d1
TOTAL				100	100 %	

Learning Resources:	
<b>1- Required Textbook(s) (maximum two ).</b>	
Ross Mulner. Pharmaceutical marketing, Journal of Consumer Marketing, 2005	
<b>2- Essential References.</b>	
Handbook of pharmaceutical marketing	
<b>3- Electronic Materials and Web Sites etc.</b>	
<a href="https://www.slideshare.net/AshishAgrawal135/pharmaceutical-marketing-by-vikram-mathariya">https://www.slideshare.net/AshishAgrawal135/pharmaceutical-marketing-by-vikram-mathariya</a>	
<a href="https://www.slideshare.net/alijehangir/pharmaceuticals-marketing-strategies">https://www.slideshare.net/alijehangir/pharmaceuticals-marketing-strategies</a>	

IX. Course Policies: (Based on the Uniform Students' By law (2007)	
<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b>

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	No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Science

**All department**

**Faculty Requirements**

Course Specification of

**Professional Ethics and regulations**

Course Code No. (MSC523)

**2022**



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Yemen, 2017.

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I. Course Identification and General Information:					
1	Course Title:	Professional Ethics and regulations			
2	Course Code & Number:	MSC523			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	2 <sup>nd</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	-----			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Medicine and health Science			
8	Language of Teaching the Course:	English			
9	Study System:	Credit Hour System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medicine and health Science			
12	Prepared by:	Prof. Abdulsalam Dallak.			
13	Date of Approval:				

II. Course Description:
<p>The course deals with the basic issues facing health workers today. The course is also designed to present health workers with the basic facts of law in a concise and nontechnical manner. It focuses on the value formation, theories of ethics, ethical concepts and application to health workers practice. Controlling bodies, standards, legal issues, and strategies for problem solving are used as a guide to examine implications for legal and ethical making in patient care situation selected from actual work settings.</p>

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Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Course Intended Learning Outcomes (CILOs) :		Referenced PILOs
<b>Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:		
a1	Identify concept of ethics, medical ethics, bioethics, moral, morality and moral dilemma, codes, principles and theories of ethics, legislation and laws affecting the professional.	A1
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:		
b1	Discuss professional values, the seven human rights and types of ethical problems.	B1
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:		
c1	Not applicable	
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:		
d1	Describe professional rules and responsibilities toward patient and health team.	D1
d2	Deal effectively with patients, their families and the health care team.	D2
d3	Practice within ethical and legal framework professional.	D4

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Identify concept of ethics, medical ethics, bioethics,	Lecture -Discussion Short answer questions

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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	moral, morality and moral dilemma, codes, principles and theories of ethics, legislation and laws affecting the professional.		Objective type
<b>(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
b1	Discuss professional values, the seven human rights and types of ethical problems.	Lecture-Discussion	Short answer questions Objective type
<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Not applicable		
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>			
	<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Describe professional rules and responsibilities toward patient and health team.	Lecture-Discussion	Short answer questions Objective type
d2	Deal effectively with patients, their families and the health care team.	Lecture-Discussion	Short answer questions Objective type
d3	Practice within ethical and legal framework professional.	Lecture-Discussion	Short answer questions Objective type

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Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Sub Topics List	No. of Weeks	Contact hours	Learning Outcomes
1	Introduction to Ethics	History of profession Characteristics of health profession Scope of practice Definitions of Ethics, Medical ethics, Bioethics, Moral, Morality and Moral dilemma Professional rules and responsibilities conduct Laws of practicing	1	2	a1, d1
2	Code of Ethics for medical professions and regulation	Old (Oath of Hippocrates) , and in Yemen Global Code of Ethics for medical professions	1	2	d1
3	Professional Values	Altruism Human dignity Autonomy Integrity Social justice Value, Beliefs an Attitude	1	2	b1
4	Theories and principles of ethics	Theories: Utilitarian. Deontologic. Ethical principles in health care: Autonomy. Beneficence. Confidentiality. Fidelity. Justice. Non maleficence. Paternalism. Veracity.	2	4	a1
5	Negligence and malpractice	Definitions Elements of malpractice or negligence Unprofessional, incompetent, unethical or illegal health care practice.	1	2	d3
6	Midterm exam		1	2	a1,b1, d1,d3
7	Types of ethical problems	Confidentiality. Trust issues. Refusing care			

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		End of life issues. Advance directives Pain control Informed consent	1	2	d1
8	Legal issues in ethics	Legal aspects of maternity and perinatal care Ethical and legal considerations prior to conception Artificial Insemination In Vitro fertilization and embryo transfer Surrogate Mothers Amniocentesis (Screening and the perfect baby)	2	4	d3
9	Ethical and legal considerations	Ethical issues in neonatal intensive care Ethical and legal considerations for termination of pregnancy for fetal abnormalities Confidentiality and truth telling Organ transplantation Strikes Euthanasia Allocation of resources Professional ethics in research	3	6	d3
10	Medico legal aspects of medical records	Medico legal case and type Records and document related to MLC Ownership of medical records Confidentiality Privilege communication Release of medical information Unauthorized disclosure retention of medical records other various aspects.	1	2	d3
11	Interpersonal relationship	Relationship with patients and their families Relationship with health care institutions Relationship with colleagues and peers Relationship with medical and other professional.	1	2	d3
12		Final exam	1	2	a1,b1,d1 ,d2,d3
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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B- Practical/clinical Aspect:				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
	Not applicable	-	-	-
Number of Weeks /and Units Per Semester				

V. Teaching Strategies of the Course:
Lecture Discussion Demonstration

VI. Assessment Methods of the Course:
<ul style="list-style-type: none"> <li>- Short answer questions</li> <li>- Objective type</li> <li>- Quizzes</li> </ul> <p>Midterm Exam Final Written Exam Homework</p>

Schedule of Assessment Tasks for Students During the Semester Theoretical part					
No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1,b1,d1,d2,d3
2	Student assignments	5th and 12th week	5	5%	d3
3	Mid-term exam	7th or 8th week	20	20%	a1,b1,d1,d3
4	Final-exam	16th-17th week	70	70 %	a1,b1,d1,d2,d3
<b>Total Theory Weight</b>			<b>100</b>	<b>100%</b>	

Learning Resources:
<b>1- Required Textbook(s)</b>
Bonnie F Fremgen.(2007). Medical Law and Ethics George V Lobo (2008). Current Problems in Medical Ethics. 2nd edition, Blackned.
<b>2- Essential References.</b>
Thompson. I(2006). Nursing ethics. Third edition. Churchill Livingstone. New work. 2. Jonathan Herring (2005). Medical Law and Ethics
<b>3- Electronic Materials and Web Sites etc.</b>
Http: // www.google. Com

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**X. Course Policies: (Based on the Uniform Students' By law**

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
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7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.



الجمهورية اليمنية

وزارة التعليم العالي والبحث العلمي

جامعة الرازي

كلية الطب والعلوم الصحية

قسم الصيدلة



Second Part of Course Specification  
Faculty of Medicine and Health Science

All department

Faculty Requirements  
Course Specification of  
**Professional Ethics and regulations**  
Course No. (MSC523)

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member:	Prof. Abdulsalam Dallak.					
Location & Telephone No.:	-----					
E-mail:	--@---					
	S	S	M	T	W	T
	A	U	O	U	E	H
	T	N	N	E	D	U
Office Hours						

2022

II. Course Description:
The course deals with the basic issues facing health workers today. The course is also designed to present health workers with the basic facts of law in a concise and nontechnical manner. It focuses on the value formation, theories of ethics, ethical concepts and application to health workers practice. Controlling bodies, standards, legal issues, and strategies for problem solving are used as a guide to examine implications for legal and ethical making in patient care situation selected from actual work settings.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Course Intended Learning Outcomes (CILOs) :	
<b>Knowledge and Understanding:</b> Upon successful completion of the course, students will be able to:	
a1	Identify concept of ethics, medical ethics, bioethics, moral, morality and moral dilemma, codes, principles and theories of ethics, legislation and laws affecting the professional.
<b>B. Intellectual Skills:</b> Upon successful completion of the course, students will be able to:	
b1	Discuss professional values, the seven human rights and types of ethical problems.
<b>C. Professional and Practical Skills:</b> Upon successful completion of the course, students will be able to:	
c1	Not applicable
<b>D. Transferable Skills:</b> Upon successful completion of the course, students will be able to:	
d1	Describe professional rules and responsibilities toward patient and health team.
d2	Deal effectively with patients, their families and the health care team.
d3	Practice within ethical and legal framework professional.

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
a1	Identify concept of ethics, medical ethics, bioethics, moral, morality and moral dilemma, codes, principles and theories of ethics, legislation and laws affecting the professional.	Lecture -Discussion  Short answer questions Objective type
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:		
Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1	Discuss professional values, the seven human rights and types of ethical problems.	Lecture-Discussion  Short answer questions Objective type

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Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





<b>(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
c1	Not applicable	
<b>(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching Strategies</b>	<b>Assessment Strategies</b>
d1	Describe professional rules and responsibilities toward patient and health team.	Lecture- Discussion  Short answer questions Objective type
d2	Deal effectively with patients, their families and the health care team.	Lecture- Discussion  Short answer questions Objective type
d3	Practice within ethical and legal framework professional.	Lecture- Discussion  Short answer questions Objective type

<b>Course Content:</b>					
<b>A – Theoretical Aspect:</b>					
<b>Order</b>	<b>Units/Topics List</b>	<b>Sub Topics List</b>	<b>No. of Weeks</b>	<b>Contact hours</b>	<b>Learning Outcomes</b>
1	Introduction to Ethics	History of profession Characteristics of health profession Scope of practice Definitions of Ethics, Medical ethics, Bioethics, Moral, Morality and Moral dilemma Professional rules and responsibilities conduct Laws of practicing	1	2	a1, d1
2	Code of Ethics for medical professions and regulation	Old (Oath of Hippocrates) , and in Yemen Global Code of Ethics for medical professions	1	2	d1

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3	Professional Values	Altruism Human dignity Autonomy Integrity Social justice Value, Beliefs an Attitude	1	2	b1
4	Theories and principles of ethics	Theories: Utilitarian. Deontologic. Ethical principles in health care: Autonomy. Beneficence. Confidentiality. Fidelity. Justice. Non maleficence. Paternalism. Veracity.	2	4	a1
5	Negligence and malpractice	Definitions Elements of malpractice or negligence Unprofessional, incompetent, unethical or illegal health care practice.	1	2	d3
6	Midterm exam		1	2	a1,b1, d1,d3
7	Types of ethical problems	Confidentiality. Trust issues. Refusing care End of life issues. Advance directives Pain control Informed consent	1	2	d1
8	Legal issues in ethics	Legal aspects of maternity and perinatal care Ethical and legal considerations prior to conception Artificial Insemination In Vitro fertilization and embryo transfer Surrogate Mothers Amniocentesis (Screening and the perfect baby)	2	4	d3
9	Ethical and legal considerations	Ethical issues in neonatal intensive care Ethical and legal considerations for termination of pregnancy for fetal abnormalities	3	6	d3

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Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



		Confidentiality and truth telling Organ transplantation Strikes Euthanasia Allocation of resources Professional ethics in research			
10	Medico legal aspects of medical records	Medico legal case and type Records and document related to MLC Ownership of medical records Confidentiality Privilege communication Release of medical information Unauthorized disclosure retention of medical records other various aspects.	1	2	D3
11	Interpersonal relationship	Relationship with patients and their families Relationship with health care institutions Relationship with colleagues and peers Relationship with medical and other professional.	1	2	D3
12	Final exam		1	2	a1,b1,d1,d2,d3
<b>Number of Weeks /and Units Per Semester</b>			<b>16</b>	<b>32</b>	
<b>B– Practical/clinical Aspect:</b>					
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes	
	Not applicable	-	-	-	
<b>Number of Weeks /and Units Per Semester</b>					

#### V. Teaching Strategies of the Course:

Lecture Discussion  
Demonstration

#### VI. Assessment Methods of the Course:

– Short answer questions

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



- Objective type
- Quizzes
- Midterm Exam
- Final Written Exam
- Homework

### Schedule of Assessment Tasks for Students During the Semester Theoretical part

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1,b1,d1,d2,d3
2	Student assignments	5th and 12th week	5	5%	d3
3	Mid-term exam	7th or 8th week	20	20%	a1,b1,d1,d3
4	Final-exam	16th-17th week	70	70 %	a1,b1,d1,d2,d3
<b>Total Theory Weight</b>			<b>100</b>	<b>100%</b>	

### Learning Resources:

#### 1- Required Textbook(s)

Bonnie F Fremgen.(2007). Medical Law and Ethics  
George V Lobo (2008). Current Problems in Medical Ethics. 2nd edition, Blackned.

#### 2- Essential References.

Thompson. I(2006). Nursing ethics. Third edition. Churchill Livingstone. New work.  
2. Jonathan Herring (2005). Medical Law and Ethics

#### 3- Electronic Materials and Web Sites etc.

Http: // www.google. Com

### X. Course Policies: (Based on the Uniform Students' By law

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
<b>3</b>	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
<b>4</b>	<b>Assignments &amp; Projects:</b>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



	Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Abdulsalam Dallak	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



الجمهورية اليمنية  
وزارة التعليم العالي والبحث العلمي  
**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

Faculty of Medicine and Health Sciences

**Department of Pharmacy**

**Bachelor of Pharmacy**

**Course Specification of**

**PHARMACOECONOMICS & PHARMACOEPIDEMOLOGY**

Course Code No. (PHP521)

2022



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Course Specification

**PHARMACOECONOMICS & PHARMACOEPIDEMOLOGY**

Course Identification and General Information:						
1	Course Title:	Pharmacoeconomics & Pharmacoepidemiology				
2	Course Code & Number:	PHP521				
3	Credit hours: 2	C.H				TOTAL
		Theoretical			P	
		L.	Tut.	S.		
		2	-	-	-	-
4	Study level/ semester at which this course is offered:	5 <sup>th</sup> Level – 2 <sup>nd</sup> Semester				
5	Pre –requisite (if any):	---				
6	Co –requisite (if any):	PHP524 (Pharmaceutical Marketing)				
7	Program (s) in which the course is offered:	Pharmacy Bachelor				
8	Study System:	Semester based System				
9	Mode of delivery:	Full Time				
10	Language of teaching the course:	ENGLISH				
11	Location of teaching the course:	At The University Facility				
12	Prepared By:	Dr. Ahmed Al-Ghani				
13	Date of Approval:	2022				

**Course Description:**

This course provides the students in the first part with basic knowledge and skills necessary to carry out pharmacoeconomics analysis in order to select a drug product or therapy among other ones by comparing their cost and outcomes. The course deals with the knowledge of students with best method for analysis that may be used for select the suitable method of therapy or suitable economic method for purchase. The second part of the course deals with methodologies and concepts of (Pharmacoepidemiology) which is study of the uses and effects of drugs in well-defined populations. The course also provides a link of pharmacoepidemiology to Pharmacovigilance which is assessment, detection and monitoring of adverse effects of drugs in the market.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
Alignment CILOs to PILOs		
PILOs	CILOs	
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>		
<b>A5</b>	Recognize the advanced concepts of professional ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmaco-economic, pharmacoinformatic etc) to optimize the therapeutic outcomes	<b>a1.</b> Describe the analysis methods of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance <b>a2.</b> Define the basis of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance
<b>A4</b>	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	<b>a3.</b> Describe the role of pharmacists to evaluate drug products and therapies using pharmaco-economically and pharmacoepidemiologic methods
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>		
<b>B5</b>	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, Pharmacoepidemiology, pharmaco-economic factors to enhance the healthcare systems.	<b>b1.</b> Interpret outcome data of pharmaco-economic and pharmacoepidemiology analysis. <b>b2.</b> Apply pharmaco-economic and pharmacoepidemiologic calculations to evaluate drug products or therapies.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>		
<b>C5</b>	Advise/ educate patients on the safe, cost-effective and rational use of herbal / synthetic medicines and devices including the use, storage, contraindications, drug-drug/drug-food interactions and side effects of non-prescription and prescription medicines..	<b>c1.</b> Apply rules of Pharmacoeconomics and pharmacoepidemiology in pharmacy practice.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>		
<b>D1</b>	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	<b>d1.</b> Demonstrate skills of time management, problem-solving and decision making. <b>d2.</b> Take responsibility of adaptation to changes need in pharmacy practice.

### Alignment CILOs to teaching strategies and assessment strategies

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>a1.</b> Describe the analysis methods of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance	Active Lecture-discussion	Written exams
<b>a2.</b> Define the basis of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance		
<b>a3.</b> Describe the role of pharmacists to evaluate drug products and therapies using pharmacoeconomically and pharmacoepidemiologic methods		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>b1.</b> Interpret outcome data of pharmaco-economic and pharmacoepidemiology analysis.	Active Lecture-discussion, feed-back learning	Written exams, quizzes
<b>b2.</b> Apply pharmaco-economic and pharmacoepidemiologic calculations to evaluate drug products or therapies.	Feed-back learning	Assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>c1.</b> Apply rules of Pharmacoeconomics and pharmacoepidemiology in pharmacy practice.	Feed-back learning	Assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
<b>d1.</b> Demonstrate skills of time management, problem-solving and decision making.	Feed-back learning	Assignment
<b>d2.</b> Take responsibility of adaptation to changes need in pharmacy practice.		

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Part I: Pharmacoeconomics</b>					
1	<b>Introduction to pharmacoeconomic</b>	a2,b1	Definition and scope Evolution of Pharmacoeconomics The need to pharmacoeconomic evaluation Types of Outcomes. Types of costs, Monetary units Types of perspectives	1	2
2	<b>Pharmacoeconomics analysis</b>	a1,a3,b1, b2	Types of pharmacoeconomic analysis studies and how to select the proper study? Steps to carry out a pharmacoeconomic study Methodology, outcomes, cost, analysis of cost-outcome ratios and examples of case studies (Solved and exercises) of the following Pharmacoeconomic methods: COI (cost of illness) CEA (cost-effectiveness analysis) CBA (cost-benefit analysis) CUA (cost-utility analysis)	5	10
<b>Mid-term exam</b>				1	2
<b>Part II: Pharmacoepidemiology</b>					
3	<b>Introduction to pharmacoepidemiology</b>	a2, b2	Definition and scope Origin and evaluation The need to pharmacoepidemiology Aims and applications	1	2
4	<b>Measurement of outcomes</b>	a1, a3, b1, b2	Methodology and case studies examples (solved and exercises) Outcome measure and drug use measures Prevalence, incidence, incidence rate Number of prescriptions and units of drugs dispensed Daily dose Medication adherence measurement	2	4
5	<b>Concept of risks</b>	a1,a3,b1,b2	Measurement of risk Attributable risks Relative risks Time-risk relationship	1	2

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			Odds ratios		
6	<b>Pharmacoepidemiologic methods</b>	a1,a3,b1,b2	<b>Methodology and examples of</b> Drug utilization review Case reports Case series Case control studies Case-cohort studies Meta-analysis Spontaneous reporting Prescription events monitoring	2	4
7	<b>Pharmacovigilance relationship to pharmacoepidemiology</b>	a1, a2	Definition and scope of Pharmacovigilance Pharmacovigilance methods and systems Relation to pharmacoepidemiology	2	4
FINAL – EXAM				1	2
TOTAL				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	7 Units

### Teaching strategies of the course:

**Active lecture - Discussion:** a short lecture/ address followed by discussion

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> Each student is assigned to solve pharmaco-economic and pharmacoepidemiology problems as homework	b2, c1, d1, d2	4-13

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method		Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)
1	Term Works	Quizzes	4-13, 14	10	10	b1
		Assignments	7, 12	10	10	b2, c1, d1, d2
2	Mid-term exam (written exam)		7	20	20	a1, a2, a3, b1

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





3	Final exam (written exam)	16	60	60	a1, a2, a3, b1, b2
TOTAL			100	100 %	

### Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Pharmacoeconomic From Theory to Practice Renee J. G. Arnold, 2<sup>nd</sup> edition, Copyright© 2022. CRC Press.

Brian L. Strom. Textbook of pharmacoepidemiology, Copyright © 2022 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.

#### 2- Essential References.

Diprio Pharmacotherapy pathophysiologic approaches

#### 3- Electronic Materials and Web Sites etc.

<https://www.slideshare.net/ShivarajD4/pharmacoepidemiology-and-pharmacoeconomics>

<https://www.slideshare.net/Divyasingh370/pharmacoeconomics-pharmacoepidemiology>

### Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.





Second Part of Course Specification  
Faculty of Medicine and Health Science  
**Department of Pharmacy**  
**Bachelor of pharmacy**

Course Plan (Syllabus)

## PHARMACOECONOMIC

Course Code No. (PHP521)

- Information about Faculty Member Responsible for the Course:						
<b>Name of Faculty Member</b>	Dr. Ahmed Al-Ghani	<b>Office Hours</b>				
<b>Location &amp; Telephone No.</b>		<b>SAT</b>	<b>SUN</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>
<b>E-mail</b>						

<b>Course Description:</b>
<p>This course provides the students in the first part with basic knowledge and skills necessary to carry out pharmacoeconomics analysis in order to select a drug product or therapy among other ones by comparing their cost and outcomes. The course deals with the knowledge of students with best method for analysis that may be used for select the suitable method of therapy or suitable economic method for purchase. The second part of the course deals with methodologies and concepts of (Pharmacoepidemiology) which is study of the uses and effects of drugs in well-defined populations. The course also provides a link of pharmacoepidemiology to Pharmacovigilance which is assessment, detection and monitoring of adverse effects of drugs in the market.</p>

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





Intended learning outcomes of the course (CILOs)
<b>Alignment CILOs</b>
<b>A: Knowledge and understanding: upon completion of the course, students will be able to:</b>
a1. Describe the analysis methods of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance
a2. Define the basis of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance
a3. Describe the role of pharmacists to evaluate drug products and therapies using pharmacoeconomically and pharmacoepidemiologic methods
<b>B: Intellectual skills: upon completion of the course, students will be able to:</b>
b1. Interpret outcome data of pharmaco-economic and pharmacoepidemiology analysis.
b2. Apply pharmaco-economic and pharmacoepidemiologic calculations to evaluate drug products or therapies.
<b>C: Professional and practical skills: upon completion of the course, students will be able to:</b>
c1. Apply rules of Pharmacoeconomics and pharmacoepidemiology in pharmacy practice.
<b>D: Transferable skills: upon completion of the course, students will be able to:</b>
d1. Demonstrate skills of time management, problem-solving and decision making.
d2. Take responsibility of adaptation to changes need in pharmacy practice.

Alignment CILOs to teaching strategies and assessment strategies		
<b>(a) Alignment Course Intended Learning Outcomes (CILOs) of knowledge &amp; understanding to Teaching Strategies and Assessment Strategies</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
a1. Describe the analysis methods of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance	Active Lecture-discussion	Written exams
a2. Define the basis of Pharmacoeconomics, pharmacoepidemiology and Pharmacovigilance		
a3. Describe the role of pharmacists to evaluate drug products and therapies using pharmacoeconomically and pharmacoepidemiologic methods		
<b>(b) Alignment Course Intended Learning Outcomes (CILOs) of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes (CILOs)	Teaching strategies	Assessment Strategies
b1. Interpret outcome data of pharmaco-economic and pharmacoepidemiology analysis.	Active Lecture-discussion, feed-back learning	Written exams, quizzes

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



b2. Apply pharmacoeconomic and pharmacoepidemiologic calculations to evaluate drug products or therapies.	Feed-back learning	Assignment
<b>(c) Alignment Course Intended Learning Outcomes (CILOs) of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
c1. Apply rules of Pharmacoeconomics and pharmacoepidemiology in pharmacy practice.	Feed-back learning	Assignment
<b>(d) Alignment Course Intended Learning Outcomes (CILOs) of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes (CILOs)</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Demonstrate skills of time management, problem-solving and decision making.	Feed-back learning	Assignment
d2. Take responsibility of adaptation to changes need in pharmacy practice.		

Course Content:					
Order	Units/ Topics List	CILOs	Sub Topics List	No. of Weeks	contact hours
<b>Part I: Pharmacoeconomics</b>					
1	<b>Introduction to pharmacoeconomic</b>	a2,b1	Definition and scope Evolution of Pharmacoeconomics The need to pharmacoeconomic evaluation Types of Outcomes. Types of costs, Monetary units Types of perspectives	1	2
2	<b>Pharmacoeconomics analysis</b>	a1,a3,b1, b2	Types of pharmacoeconomic analysis studies and how to select the proper study? Steps to carry out a pharmacoeconomic study Methodology, outcomes, cost, analysis of cost-outcome ratios and examples of case studies (Solved and exercises) of the following Pharmacoeconomic methods: COI (cost of illness) CEA (cost-effectiveness analysis) CBA (cost-benefit analysis) CUA (cost-utility analysis)	5	10

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



Mid-term exam				1	2
<b>Part II: Pharmacoepidemiology</b>					
3	<b>Introduction to pharmacoepidemiology</b>	a2, b2	Definition and scope Origin and evaluation The need to pharmacoepidemiology Aims and applications	1	2
4	<b>Measurement of outcomes</b>	a1, a3, b1, b2	Methodology and case studies examples (solved and exercises) Outcome measure and drug use measures Prevalence, incidence, incidence rate Number of prescriptions and units of drugs dispensed Daily dose Medication adherence measurement	2	4
5	<b>Concept of risks</b>	a1,a3,b1,b2	Measurement of risk Attributable risks Relative risks Time-risk relationship Odds ratios	1	2
6	<b>Pharmacoepidemiologic methods</b>	a1,a3,b1,b2	<b>Methodology and examples of</b> Drug utilization review Case reports Case series Case control studies Case-cohort studies Meta-analysis Spontaneous reporting Prescription events monitoring	2	4
7	<b>Pharmacovigilance relationship to pharmacoepidemiology</b>	a1, a2	Definition and scope of Pharmacovigilance Pharmacovigilance methods and systems Relation to pharmacoepidemiology	2	4
<b>FINAL – EXAM</b>				1	2
<b>TOTAL</b>				16	32
<b>Number of Weeks /and Units Per Semester</b>				16 weeks	7 Units

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



### Teaching strategies of the course:

**Active lecture - Discussion:** a short lecture/ address followed by discussion

**Feed-back learning:** students are individually asked to do perform quick tests (quiz) or to do certain assignments such lab. experiments, problems solving, homework, topics summarizing or internet search. The teacher will provide them feed-back correction & evaluation

### Assignments:

No	Assignments	Aligned CILOs	Week Due
1	<b>Individual:</b> Each student is assigned to solve pharmacoeconomic and pharmacoepidemiology problems as homework	b2, c1, d1, d2	4-13

### VII. Schedule of Assessment Tasks for Students During the Semester

No.	Assessment Method	Week Due	Mark	Proportion of Total course Assessment	Aligned Course Learning Outcomes (CILOs)	
1	Term Works	Quizzes	4-13, 14	10	10	b1
		Assignments	7, 12	10	10	b2, c1, d1, d2
2	Mid-term exam (written exam)	7	20	20	a1, a2, a3, b1	
3	Final exam (written exam)	16	60	60	a1, a2, a3, b1, b2	
TOTAL			100	100 %		

### Learning Resources:

#### 1- Required Textbook(s) (maximum two ).

Pharmacoeconomic From Theory to Practice Renee J. G. Arnold, 2<sup>nd</sup> edition, Copyright© 2022. CRC Press.

Brian L. Strom. Textbook of pharmacoepidemiology, Copyright © 2022 John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester.

#### 2- Essential References.

Diprio Pharmacotherapy pathophysiologic approaches

#### 3- Electronic Materials and Web Sites etc.

<https://www.slideshare.net/ShivarajD4/pharmacoepidemiology-and-pharmacoeconomics>  
<https://www.slideshare.net/Divyasingh370/pharmacoeconomics-pharmacoepidemiology>

### Course Policies: (Based on the Uniform Students' By law (2007))

1	<b>Class Attendance:</b>
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



	Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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**جامعة الرازي**  
كلية الطب والعلوم الصحية  
قسم الصيدلة

## **Faculty of Medical Sciences**

Department of Pharmacy

Bachelor of Pharmacy

Course Specification of:

**Public Health**

Course Code No. (MSC522)

**2022**



This template of course specifications was prepared by CAQA, Yemen,  
2017.







## I. Course Identification and General Information:

1	Course Title:	Public Health			
2	Course Code & Number:	MSC522			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	5 <sup>th</sup> Level / 2 <sup>nd</sup> Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medical Sciences			
12	Prepared by:	Prof. Nabil Al- Rabeei			
13	Date of Approval:	2022			

## II. Course Description:

The course deals with the study of basic issues relate to health of the community.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



III. Intended learning outcomes of the course (CILOs) and their alignment to Program Intended learning outcomes (PILOs), teaching strategies and assessment strategies		
16. Alignment PILOs to CILOs		
PILOS		CILOS
<b>A. Knowledge and Understanding:</b>		
A1	Recognize the fundamental knowledge and principles of biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences.	a1. Define health, epidemiology, epidemic diseases and recognize the factors affecting personal and community health
		a2. Discuss the principles of prevention of epidemic diseases in a community.
A4	Define the pharmacist roles in providing pharmaceutical care including non-prescription medications, natural health products, and devices to promote the public healthcare and wellness.	a3. Comprehend his/her role as a pharmacist to implement and participate in primary health care and epidemic-diseases control programs and in assisting health care team to provide public health and community services.
<b>B. Intellectual Skills:</b>		
B3	Design / prioritize potential strategies for dispensing and monitoring the prescriptions, minimizing medication errors and solving encountered pharmaceutical problems.	b1. Compare between procedures of health care of epidemic diseases.
<b>C. Professional and Practical Skills:</b>		
C3	Utilize the pharmacokinetics, pharmacodynamics of medicines, pharmacogenetic profile and disease pathophysiology to dispense medication and ensure optimal pharmaceutical care for the patient in compliance with GPP and ethical manner.	c1. Search efficiently for information using documented and electronic sources of information.
<b>D. Transferable Skills:</b>		

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



D1	Demonstrate leadership, time management, critical thinking, problem solving, communication, independent, creativity, innovation, entrepreneurial, delegation and organizational skills	d1. Show respect to life and commit to community and patients serving.
		d2. Communicate effectively with his/her colleagues, members of health care team, patients and community
		d3. Demonstrate time management and self-learning during performing practical and professional works and assignments.

### 17. Alignment CILOs to teaching strategies and assessment strategies

#### (a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1. Define health, epidemiology, epidemic diseases and recognize the factors affecting personal and community health	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
a2. Discuss the principles of prevention of epidemic diseases in a community.		
a3. Comprehend his/her role as a pharmacist to implement and participate in primary health care and epidemic-diseases control programs and in assisting health care team to provide public health and community services.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz

#### (b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Compare between procedures of health care of epidemics diseases.	Lecture Instructor – student Interactive Exercises Solving Problem Methods	Problem-Solving Exercises. Assignment Quiz

#### (c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
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Prepared by: Prof. Nabil Al-Rabeei	Reviewed by: Prof. Nabil Al-Rabeei	Head of the Department: Dr. Ahmed Al-Ghani	Dean Prof. Nabil Al-Rabeei	Quality Assurance head Dr. Turki Alqabbani
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c1. Search efficiently for information using documented and electronic sources of information.	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Show respect to life and commit to community and patients serving.	Self-Learning Seminar Exercises	Presentation Assignment Quiz
d2. Communicate effectively with his/her colleagues, members of health care team, patients and community		
d3. Demonstrate time management and self-learning during performing practical and professional works and assignments.		

## IV. Course Content:

### A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Introduction</b>	a 1, a2, a3, b1	-Definitions : health , public health -Concept of health ,public health -Factors affecting personal and public health : (personal hygiene, hereditary ,environment ,life style ,socioeconomic condition)	3	6
2	<b>Primary health care</b>	a1, a3	-Objectives -Methods -Programs	3	6
3	<b>Mid-Term-Exam</b>			1	2
4	<b>Prevention of Epidemic diseases</b>	a1, a2, a3, b1, d1, d2, d3	<ul style="list-style-type: none"> <li>definition of Epidemiology, Epidemic diseases</li> <li>Objectives of epidemiology studies and preventive programs</li> <li>role of pharmacist in assisting health care team in preventive programs</li> </ul>	4	8

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



			<ul style="list-style-type: none"> <li>• Examples of studies and preventive programs of epidemic diseases :\ <ul style="list-style-type: none"> <li>○ Malaria</li> <li>○ TB</li> <li>▪ Bilharziasis</li> </ul> </li> </ul>		
5	<b>Prevention of Epidemic diseases</b>	a1, a2, a3, b1, d1, d2, d3	<p>Examples of studies and preventive programs of epidemic diseases :</p> <ul style="list-style-type: none"> <li>○ Rabies</li> <li>○ Leprosy</li> <li>○ Hepatitis</li> <li>▪ AIDS and other sexual transmitted disease</li> </ul>	3	6
6	<b>Course Review</b>	a 1, a2, a3, b1, c1, d1, d2	Review of the course topics by discussion session.	1	2
7	<b>Final Exam</b>	a 1, a2, a3, b1, d2		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

## V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

## VI. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

## VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



1	<b>Assignment 1:</b> Each student presents selected in Rabie	a 1, a2, a3, b1, c1, d1, d2	6 <sup>th</sup>	5
2	<b>Assignment 2:</b> Each students group present selected cases discussion on selected hepatitis	a 1, a2, a3, b1, c1, d1, d2	12 <sup>th</sup>	5
<b>Total</b>				<b>10</b>

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6 <sup>th</sup> , 12 <sup>th</sup>	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
3	Midterm Exam	Week 7	20	20%	a 1, a2, a3, b1, d3
4	Quiz 2	12 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
5	Final Exam (Theory)	Week 16	60	60%	a1, a2, a3, b1, d3
<b>Total</b>			<b>100</b>	<b>100%</b>	

### IX. Learning Resources:

<b>1- Required Textbook(s) ( maximum two ).</b>	
	1.American Red Cross First Aid/CPR/AED PARTICIPANT'S MANUA, 2011. 2.David Pencheon. Oxford handbook of public health Practice 3. القواعد العامة للاسعافات الاولية / د/ محمد ابراهيم شلبي
<b>2- Essential References.</b>	
	N. Murugesh Health Education and community pharmacy.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1 - <a href="http://www.accesspharmacy.com">www.accesspharmacy.com</a>

### X. Course Policies: (Based on the Uniform Students' By law (2007)

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





2	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



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قسم الصيدلة

## Faculty of Medical Sciences

Department of Pharmacy

Program of Pharmacy

Course Plan (Syllabus) of:

**Public Health**

Course Code No. ( MSC522)

2022

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Prof. Nabil Al- Rabeei	Office Hours					
Location & Telephone No.:							
E-mail:		SAT	SUN	MON	TUE	WED	THU

1	Course Title:	Introduction to Pharmacy	
2	Course Code & Number:	PHP115	
3	Credit Hours:	Theory Hours	Lab. Hours



		Credit Hours	Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	1st Level / 1st Semester			
5	Pre –Requisite (if any):	Prs: Pr:PHP418			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Pharmacy			
8	Language of Teaching the Course:	English			
9	Study System:	Semester based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	At University Facilities			
12	Prepared by:	Dr. Mohammed Alkhawlani			
13	Date of Approval:	2022			

## II. Course Description:

The course deals with the study of basic issues relate to health of the community.

## III. Intended learning outcomes of the course (CILOs)

### 18. Alignment CILOs

#### A. Knowledge and Understanding:

a1. Define health, epidemiology, epidemic diseases and recognize the factors affecting personal and community health

a2. Discuss the principles of prevention of epidemic diseases in a community.

a3. Comprehend his/her role as a pharmacist to implement and participate in primary health care and epidemic-diseases control programs and in assisting health care team to provide public health and community services.

#### B. Intellectual Skills:

b1. Compare between procedures of health care of epidemic diseases.

#### C. Professional and Practical Skills:

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



c1. Search efficiently for information using documented and electronic sources of information.
<b>D. Transferable Skills:</b>
d1. Show respect to life and commit to community and patients serving.
d2. Communicate effectively with his/her colleagues, members of health care team, patients and community
d3. Demonstrate time management and self-learning during performing practical and professional works and assignments.

<b>19. Alignment CILOs to teaching strategies and assessment strategies</b>		
<b>(a) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
<b>a1.</b> Define health, epidemiology, epidemic diseases and recognize the factors affecting personal and community health	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
<b>a2.</b> Discuss the principles of prevention of epidemic diseases in a community.		
<b>a3.</b> Comprehend his/her role as a pharmacist to implement and participate in primary health care and epidemic-diseases control programs and in assisting health care team to provide public health and community services.	Lecture Instructor – student Interactive Office hour	Exam Assignment Quiz
<b>(b) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Compare between procedures of health care of epidemics diseases.	Lecture Instructor – student Interactive Exercises Solving Problem Methods	Problem-Solving Exercises. Assignment Quiz
<b>(c) Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:</b>		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



c1. Search efficiently for information using documented and electronic sources of information.	Lecture Instructor – student Interactive Self-Learning	Exam Assignment Quiz
<b>(d) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:</b>		
<b>Course Intended Learning Outcomes</b>	<b>Teaching strategies</b>	<b>Assessment Strategies</b>
d1. Show respect to life and commit to community and patients serving.	Self-Learning Seminar Exercises	Presentation Assignment Quiz
d2. Communicate effectively with his/her colleagues, members of health care team, patients and community		
d3. Demonstrate time management and self-learning during performing practical and professional works and assignments.		

## V. Course Content:

### A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact Hours
1	<b>Introduction</b>	a 1, a2, a3, b1	-Definitions : health , public health -Concept of health ,public health -Factors affecting personal and public health : (personal hygiene, hereditary ,environment ,life style ,socioeconomic condition)	3	6
2	<b>Primary health care</b>	a1, a3	-Objectives -Methods -Programs	3	6
3	<b>Mid-Term-Exam</b>			1	2
4	<b>Prevention of Epidemic diseases</b>	a1, a2, a3, b1, d1, d2, d3	<ul style="list-style-type: none"> <li>definition of Epidemiology, Epidemic diseases</li> <li>Objectives of epidemiology studies and preventive programs</li> <li>role of pharmacist in assisting health care team in preventive programs</li> </ul>	4	8

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani



			<ul style="list-style-type: none"> <li>• Examples of studies and preventive programs of epidemic diseases :\ <ul style="list-style-type: none"> <li>○ Malaria</li> <li>○ TB</li> <li>▪ Bilharziasis</li> </ul> </li> </ul>		
5	<b>Prevention of Epidemic diseases</b>	a1, a2, a3, b1, d1, d2, d3	<p>Examples of studies and preventive programs of epidemic diseases :</p> <ul style="list-style-type: none"> <li>○ Rabies</li> <li>○ Leprosy</li> <li>○ Hepatitis</li> <li>▪ AIDS and other sexual transmitted disease</li> </ul>	3	6
6	<b>Course Review</b>	a 1, a2, a3, b1, c1, d1, d2	Review of the course topics by discussion session.	1	2
7	<b>Final Exam</b>	a 1, a2, a3, b1, d2		1	2
<b>Number of Weeks /and Units Per Semester</b>				<b>16</b>	<b>32</b>

## V. Teaching Strategies of the Course:

Lecture  
Instructor – student Interactive  
Exercises  
Presentation  
Office hours  
Seminar  
Assignment  
Self-Learning

## VI. Assessment Methods of the Course:

Assignments  
Quiz  
Exam

## VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
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Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
Prof. Nabil Al-Rabeei	Prof. Nabil Al-Rabeei	Dr. Ahmed Al-Ghani	Prof. Nabil Al-Rabeei	Dr. Turki Alqabbani





1	<b>Assignment 1:</b> Each student presents selected in Rabie	a 1, a2, a3, b1, c1, d1, d2	6 <sup>th</sup>	5
2	<b>Assignment 2:</b> Each students group present selected cases discussion on selected hepatitis	a 1, a2, a3, b1, c1, d1, d2	12 <sup>th</sup>	5
Total				10

### VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	6 <sup>th</sup> , 12 <sup>th</sup>	10	10%	a 1, a2, b1, c1, d1
2	Quiz 1	6 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
3	Midterm Exam	Week 7	20	20%	a 1, a2, a3, b1, d3
4	Quiz 2	12 <sup>th</sup>	5	5%	a 1, a2, b1, c1, d1
5	Final Exam (Theory)	Week 16	60	60%	a1, a2, a3, b1, d3
Total			100	100%	

### IX. Learning Resources:

<b>1- Required Textbook(s) ( maximum two ).</b>	
	1.American Red Cross First Aid/CPR/AED PARTICIPANT'S MANUA, 2011. 2.David Pencheon. Oxford handbook of public health Practice 3. القواعد العامة للاسعافات الاولية / د/ محمد ابراهيم شلبي
<b>2- Essential References.</b>	
	N. Murugesh Health Education and community pharmacy.
<b>3- Electronic Materials and Web Sites etc.</b>	
	1 - <a href="http://www.accesspharmacy.com">www.accesspharmacy.com</a>

### X. Course Policies: (Based on the Uniform Students' By law (2007)

<b>1</b>	<b>Class Attendance:</b> Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
<b>2</b>	<b>Tardiness:</b> A student will be considered late if he/she is not in class after 10 minutes of the start time of class.

Prepared by:	Reviewed by:	Head of the Department:	Dean	Quality Assurance head
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3	<b>Exam Attendance/Punctuality:</b> No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	<b>Assignments &amp; Projects:</b> Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	<b>Cheating:</b> Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	<b>Forgery and Impersonation:</b> Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	<b>Other policies:</b> The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

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