



Mansoura University
Faculty of Pharmacy
Clinical Pharmacy Program



Course specification
2023- 2024
Clinical Pharmacy
Program-Pharm D

Elective Courses	
PC E01	Drug Design
PC E02	Advanced Pharmaceutical Analysis
PC E03	Therapeutic Drug Monitoring
PG E04	Complementary therapies
PG E05	Chromatography and separation techniques
PG E06	Biotechnology of medicinal plants
PT E07	Applied industrial pharmacy
PT E08	Good manufacturing practices
PT E09	Cosmetic Preparations
PT E10	Advanced pharmaceutical technology
PT E11	Medical devices
PM E12	Infection control and antimicrobial stewardship
PM E13	Bioinformatics
PO E14	Biological Standardization
PO E15	Geriatric pharmacotherapy
PO E16	Pharmacokinetics of drug metabolism and transport
PP E17	Interprofessional skills
PP E18	Advanced Pharmacoeconomics
PC E06	Green Chemistry



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بكالوريوس الصيدلة الإكلينيكية (فارم د – Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Drug Design	اسم المقرر: تصميم الدواء
Academic Level: Level 5	المستوى الأكاديمي: المستوى الخامس
Scientific department: Medicinal Chemistry	القسم العلمي: الكيمياء الدوائية
Head of Department: Prof. Dr. Mohamed Ahmed Ahmed Moustafa	رئيس القسم: أ.د/ محمد أحمد أحمد مصطفى
Course Coordinator: Prof. Dr. Mohamed Ahmed Ahmed Moustafa	منسق المقرر: أ.د/ محمد أحمد أحمد مصطفى



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Medicinal Chemistry
Program on which the course is given	B. Pharm. (PharmD) (Clinical Pharmacy)
Academic Level	Fifth level
Date of course specification approval	6-9-2023

1- Basic Information: Course data:

Course Title	Drug Design
Course Code	PC E01
Prerequisite	Medicinal chemistry I and/or Medicinal Chemistry II
Teaching Hours: Lecture	1
Practical	1
Total Credit Hours	2

2- Course Aims:

This course enables the students to:

- Identify the fundamental processes involved in the drug discovery and development from the lead identification till the drug approval and introduction to real clinical practice.
- Outline detailed intermediate preclinical testing including *in vitro*, *in vivo* and *in silico* studies and the four clinical phases and limitations within these phases.
- Recognize the general drug design strategies followed to develop new drugs with improved pharmacokinetic and pharmacodynamics properties.
- Point out the enforcement of chiral switch with examples as regulation in FDA drug approval.
- Determine the importance of soft drugs in the drug development process.



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- Implement the different methodologies included in the drug latentiation (prodrug strategy) and the outcomes of these processes in improving drug pharmacokinetic pharmacodynamics properties.
- Predict the importance of drug salt formation in the drug development process.
- Apply certain *in silico* studies using suitable software.

3- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

DOMAIN 1- FUNDAMENTAL KNOWLEDGE

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Recognize in depth and breadth the basic principles of medicinal chemistry course as a part of applied pharmaceutical sciences in pharmacy curriculum

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
2.1.1	2.1.1.1	Implement legal requirements to practice including legislation, by laws and standard of practice.
2.2.3	2.2.3.1	Apply the artificial intelligence in drug design and development.
2.4.3	2.4.3.1	Use principles of medicinal chemistry to contribute to decision-making process to solve drug-related problems.
2.5.1	2.5.1.1	Adapt national and international standards for authorization of new medicinal products.

DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.2.2	4.2.2.1	Apply the artificial intelligence in drug design and development.
4.3.2	4.3.2.1	Participate in continuous professional development activities to update and advance learning needs.



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3- Course Contents

A) Theoretical part:

Week No.	Topics	Credit Hours
1	Sources of drugs	1
2	Phases of drug development	1
3	Orphan drugs -Withdrawn drugs -IPR	1
4	Drug Design Strategies: Skeletal variation	1
5	Drug Design Strategies: Structure Simplification & Association	1
6	Drug Design Strategies: Structure Rigidification & bioisosterism, etc.....	1
7	Role of metabolism in drug discovery	1
8	Chiral switch	1
9	Soft drugs	1
10	Introduction on the Prodrug Approach	1
11	Carrier-linked prodrugs (Part 1)	1
12	Carrier-linked prodrugs (Part 2)	1
13	Bioprecursor prodrugs	1
14	<u>Self-learning</u> : Drug salt formation in drug design	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final written and oral exams	-



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B) Practical part:

Week No.	Practical topics	Practical Credit hours
1	1 st introduction section □ Intro + optimization strategies	1
2	2 nd introduction section □ Optimization strategies (continue) + Drug targeting.	1
3	3 rd introduction section □ CADD	1
4	4 th introduction section □ Docking process	1
5	1 st Ph4 section □ Ph4 intro + Flexible alignment.	1
6	2 nd Ph4 section □ Ph4 generation + save.	1
7	3 rd Ph4 section □ Database generation + Ph4 screening.	1
8	Mid-term exam	-
9	4 th Ph4 section □ Revision	1
10	1 st molecular docking section □ Database creation	1
11	1 st molecular docking section protein preparation.	1
12	2 nd molecular docking section □ Dummy atom creation	1
13	2 nd molecular docking section running docking process	1
14	3 rd molecular docking section □ Docking result interpretation.	1
15	Revision and activity	1
16	Practical exam (comp. + sheet exams)	1



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4- Teaching and Learning Methods:

	Teaching method	Week no.	K elements to be assessed
4.1.	Computer aided learning: a. Lectures using Data Show, Power Point Presentations b. Distance learning <ul style="list-style-type: none"> Online learning through My Mans "Mansoura University "as recorded – video lectures Interactive discussion through My Mans 	1-16	1.1.1.1, 2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1
4.2.	Self-learning	13	4.3.2.1
4.3.	Practical session using computer software (Molecular modeling software) and tutorials	5-16	1.1.1.1, 2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1, 4.2.2.1, 4.3.2.1
4.4.	Class Activity: Group discussion offline and online.	1-12	2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1, 4.2.2.1, 4.3.2.1
4.5.	Problem – based learning and brainstorming	1-12	2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1, 4.2.2.1, 4.3.2.1

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1- Periodical (Mid-term exam / Course work)	1.1.1.1, 2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1, 4.2.2.1, 4.3.2.1
2- Practical exam using OSPE	1.1.1.1, 2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1, 4.2.2.1, 4.3.2.1
3- Written exam	1.1.1.1, 2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1
4- Oral exam	1.1.1.1, 2.1.1.1, 2.2.3.1, 2.4.3.1, 2.5.1.1, 4.2.2.1, 4.3.2.1



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b- Assessment schedule

Assessment 1	Periodical (Mid-term/ Course work)	7-9 th week
Assessment 2	Practical exam (OSPE)	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week

c- Weighing of assessments

1	Periodical (Mid-term/ Course work)	15%
2	Practical exam	25%
3	Written exam	50%
4	Oral exam	10%
Total		100%

6- Facilities required for teaching and learning

Classroom	Data show- Computers, Internet. (Available)
Laboratory facilities	White board – Computer Software (Molecular modeling software). (Available)
Library	Textbooks



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7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	"An Introduction to Medicinal Chemistry", 6 th Revised Edition, (Graham L. Patrick), Oxford University Press, USA, 2017.	Essential Book
3.	"Foye's Principles of Medicinal Chemistry", 8th edition, (David A. Williams, Thomas L. Lemke & William O. Foye, Editors), Lippincott Williams & Wilkins, 2017	Recommended Book
4.	"Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry" 12th Edition, (J. H. Block and J. M. Beale Jr, Editors), Lippincott Williams & Wilkins, Philadelphia, PA, 2011	Recommended Book
6.	http://www.sciencedirect.com/ / http://www.google scholar.com/ / http://www.pubmed.com/ / https://www.ekb.eg	Website



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8-Matrix:

Matrix 1. Course contents and course key elements

A) Theoretical part:

Course contents / K. elements	Domain 1	Domain 2				Domain 4
	1.1.1.1	2.1.1.1	2.2.3.1	2.4.3.1	2.5.1.1	4.3.2.1
Sources of drugs	✓	✓			✓	
Phases of drug development	✓	✓			✓	
Orphan drugs -Withdrawn drugs -IPR	✓	✓			✓	
Drug Design Strategies: Skeletal variation	✓	✓		✓	✓	
Drug Design Strategies: Structure Simplification & Association	✓	✓		✓	✓	
Drug Design Strategies: Structure Rigidification & bioisosterism, etc.....	✓	✓		✓	✓	
Role of metabolism in drug discovery	✓		✓	✓	✓	
Chiral switch	✓		✓	✓	✓	
Soft drugs	✓		✓	✓	✓	
Introduction on the Prodrug Approach	✓		✓	✓	✓	



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Carrier-linked prodrugs (Part 1)	✓		✓	✓	✓	
Carrier-linked prodrugs (Part 2)	✓		✓	✓	✓	
Bioprecursor prodrugs	✓		✓	✓	✓	
Self-learning: Drug salt formation in drug design						✓

B) Practical part:

Course contents/ K. elements	Domain 1	Domain 2				Domain 4	
	1.1.1.1	2.1.1.1	2.2.3.1	2.4.3.1	2.5.1.1	4.2.2.1.	4.3.2.1
1 st introduction section <input type="checkbox"/> Intro + optimization strategies	✓	✓		✓	✓		
2 nd introduction section <input type="checkbox"/> Optimization strategies (continue) + Drug targeting.	✓	✓		✓	✓		
3 rd introduction section <input type="checkbox"/> CADD	✓	✓		✓	✓		
4 th introduction section <input type="checkbox"/> Docking process	✓	✓		✓	✓		
1 st Ph4 section <input type="checkbox"/> Ph4 intro + Flexible alignment.		✓	✓	✓		✓	✓
2 nd Ph4 section <input type="checkbox"/> Ph4 generation + save.		✓	✓	✓		✓	✓
3 rd Ph4 section <input type="checkbox"/> Database generation + Ph4		✓	✓	✓		✓	✓



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screening.							
4 th Ph4 section <input type="checkbox"/> Revision		✓	✓	✓		✓	✓
1 st molecular docking section <input type="checkbox"/> Database creation		✓	✓	✓		✓	✓
1 st molecular docking section protein preparation.		✓	✓	✓		✓	✓
2 nd molecular docking section <input type="checkbox"/> Dummy atom creation		✓	✓	✓		✓	✓
2 nd molecular docking section running docking process		✓	✓	✓		✓	✓
3 rd molecular docking section <input type="checkbox"/> Docking result interpretation.		✓	✓	✓		✓	✓



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Matrix 2. Between course contents, methods of learning, and assessment

A) Theoretical part:

Course Contents	Teaching and Learning methods				Assessment methods		
	Lecture	Hybrid learning	Comp. aided learning	Self-learning	Corse Work	Written	Oral
Sources of drugs	✓	✓	✓		✓	✓	✓
Phases of drug development	✓	✓	✓		✓	✓	✓
Orphan drugs -Withdrawn drugs -IPR	✓	✓	✓		✓	✓	✓
Drug Design Strategies: Skeletal variation	✓	✓	✓		✓	✓	✓
Drug Design Strategies: Structure Simplification & Association	✓	✓	✓		✓	✓	✓
Drug Design Strategies: Structure Rigidification & bioisosterism, etc.....	✓	✓	✓		✓	✓	✓
Role of metabolism in drug discovery	✓	✓	✓		✓	✓	✓
Chiral switch	✓	✓	✓		✓	✓	✓
Soft drugs	✓	✓	✓		✓	✓	✓
Introduction on the Prodrug Approach	✓	✓	✓			✓	✓
Carrier-linked prodrugs (Part 1)	✓	✓	✓			✓	✓



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Carrier-linked prodrugs (Part 2)	✓	✓	✓			✓	✓
Bioprecursor prodrugs	✓	✓	✓			✓	✓
Self-learning: Drug salt formation in drug design			✓	✓			✓

B) Practical part:

Course Contents	Teaching and Learning methods				Assessment methods
	Hybrid learning	Comp. aided learning	Lab sessions	Self-learning	Practical/Tutorial/Activity
1 st introduction section □ Intro + optimization strategies	✓	✓	✓		✓
2 nd introduction section □ Optimization strategies (continue) + Drug targeting.	✓	✓	✓		✓
3 rd introduction section □ CADD	✓	✓	✓		✓
4 th introduction section □ Docking process	✓	✓	✓		✓
1 st Ph4 section □ Ph4 intro + Flexible alignment.	✓	✓	✓	✓	✓
2 nd Ph4 section □ Ph4 generation + save.	✓	✓	✓	✓	✓
3 rd Ph4 section □ Database generation + Ph4 screening.	✓	✓	✓	✓	✓
4 th Ph4 section □ Revision	✓	✓	✓	✓	✓
1 st molecular docking section □ Database creation.	✓	✓	✓	✓	✓





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1 st molecular docking section protein preparation.					
2 nd molecular docking section <input type="checkbox"/> Dummy atom creation	✓	✓	✓	✓	✓
2 nd molecular docking section running docking process	✓	✓	✓	✓	✓
3 rd molecular docking section <input type="checkbox"/> Docking result interpretation.	✓	✓	✓	✓	✓

Course Coordinator	Prof. Dr. Mohamed Ahmed Ahmed Mostafa 
Head of Department	Prof. Dr. Mohamed Ahmed Ahmed Mostafa 

Date: 6/9/2022



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الإكلينيكية (بكالوريوس الصيدلة)
Clinical Pharmacy Program
Course Specification
Academic year: 2023/2024

Course name: Advanced Pharmaceutical Analysis-Spectroscopy	اسم المقرر: تحاليل صيدلانية متقدمة – تحليل طيفي
Academic Level: Level 5	المستوى الأكاديمي: الخامس
Scientific department: Pharmaceutical analytical chemistry	القسم العلمي: الكيمياء التحليلية الصيدلانية
Head of Department: Prof. Dr. Jenny Jeehan Mohamed Ahmed Nasr	رئيس القسم: أ.د/ جيني جيهان محمد أحمد نصر
Course Coordinator: Prof. Dr. Yasser El-Shabrawy	منسق المقرر: أ.د/ ياسر الشبراوي



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutical analytical chemistry
Department supervising the course	Pharmaceutical analytical chemistry
Program on which the course is given	B. Pharm (Clinical Pharmacy-Pharm D)
Academic Level	Level 5, First semester (2023-2024)
Date of course specification approval	10/9/2023

4- Basic Information: Course data:

Course Title	Advanced Pharmaceutical Analysis- Spectroscopy
Course Code	PC E02
Prerequisite	Registration
Teaching Hours: Lecture	1
Practical/Tutorial	1
Total Credit Hours	2

5- Professional Information:

1. Course Aims:

1. Orienting the students to recall the basic principles of the advanced pharmaceutical analysis methods such as derivative spectrophotometry, synchronous spectrofluorimetric, and chemiluminescence.
2. Knowing applications of these methods to assess pharmaceutical compounds in pharmaceutical and biological matrices.
3. Recognizing the requirements for pharmaceutical industry, such as quality control and quality assurance of pharmaceutical products.



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2. Course Key Elements

Upon completing the course, the student will be able to dominate the following key elements

DOMAIN 1: FUNDAMENTAL KNOWLEDGE

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Identify the advanced spectroscopic methods involved in pharmaceutical analysis such as derivative spectrophotometry, synchronous spectrofluorimetric, and chemiluminescence
1.1.3	1.1.3.1	Recognize the principles of spectrometry to identify and analyze pharmaceutical compounds in raw materials, pharmaceutical preparations, and biological fluids.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
2.2.1	2.2.1.1	Design analytical methods for the identification and quantification of pharmaceutical compounds in different pharmaceutical formulations.
2.2.3	2.2.3.1	Demonstrate how to use the available spectrometric instruments and software for the assay of single and multicomponent dosage forms.
2.2.4	2.2.4.1	Explain calculations and statistical analysis in assessment and validation of the developed methods.
2.3.1	2.3.1.1	Select appropriate methods for handling and disposal of chemicals used in pharmaceutical analysis to avoid direct contact with hazardous chemicals.
2.3.2	2.3.2.1	Select best practices and adhere to high safety standards for management of pharmaceutical raw materials and pharmaceutical products.
2.5.3	2.5.3.1	Perform research studies and data analysis.



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DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Communicate effectively in team working.
4.1.2	4.1.2.1	Retrieve and analyze information to solve problems and work individually or effectively in a team.
4.2.2	4.2.2.1	Utilize artificial technology to present relevant information.
4.3.1	4.3.1.1	Use effective strategies to manage and improve self-practice of pharmacy.
4.3.2	4.3.2.1	Apply principles of self-learning to improve professional skills.

3. Course Contents

Week No.	Topics	Lecture credit Hours
1	Application of UV-Vis spectroscopy: qualitative and quantitative analysis. Fundamentals of UV-Vis spectroscopy, its application in qualitative and quantitative analysis, Beer's law, and problems on Beer's law	1
2	Determination of pKa by spectrophotometric titration	1
3	Quantitative application of UV-Vis spectroscopy: mathematical derivatization. Fundamentals of derivative spectroscopy and its applications.	1
4	Quantitative application of UV-Vis spectroscopy: chemical derivatization: Chemical derivatization of compounds of low molar absorptivity, examples and applications.	1
5	Reaction stoichiometric determination by Job's method, molar ratio method, and limiting logarithmic method	1
6	Conventional and synchronous spectrofluorimetry: fundamentals. Fluorescence and phosphorescence phenomena, Factors affecting fluorescence and phosphorescence, fluorescence quantum efficiency.	1
7	Conventional and synchronous spectrofluorimetry: Advantages/limitations of spectrofluorimetry Applications of spectrofluorimetry for determination of inorganic species	1
8	Quantitative applications of spectrofluorimetry. Analysis of organic and pharmaceutical compounds (direct and indirect methods)	1



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9	Quantitative applications of spectrofluorimetry. synchronous spectrofluorimetry and derivative synchronous spectrofluorimetry for multicomponent analysis.	1
10	Biomedical application of spectrofluorimetry: Disease diagnosis and protein-drug interaction.	1
11	Fundamentals of chemiluminescence. Definition, Principle, types, advantages, and examples.	1
12	Analytical applications of chemiluminescence: analysis of gases, organic species, and inorganic species.	1
13	Recent Clinical Applications of Chemiluminescence: Immunoassays, Nucleic acid assays, Western blot assays, Reporter gene-based assays. (+self-learning)	1
14	Analytical Applications of Chemiluminescence for Cancer Detection and Therapy Compensatory and alternative lecture	1
15	Revision and quiz	1
16	Final written and oral exam	--
Week No.	Practical Topics	Tutorial credit hours
1.	Beer's law (introduction and problems solving).	1
2.	- Determination of pKa by spectrophotometry (algebraic method). Students group seminars	1
3.	- Determination of pKa by spectrophotometry (graphical method). Students group seminars	1
4.	- Derivative spectrophotometry for determination of a binary drug mixture Students group seminars	1
5.	- Determination of reaction stoichiometry by Job's method. Students group seminars	1
6.	- Determination of reaction stoichiometry by molar ratio method. Students group seminars	1
7.	- Determination of reaction stoichiometry by limiting logarithmic method. Students group seminars	1
8.	- Mid-term exam	-



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9.	- Correction of inner filter effect during fluorescence measurement (Mathematical method) Students group seminars	1
10.	- Application of Stern-Volmer Analysis for determination of fluorescence quenching mechanism (static quenching example) Students group seminars	1
11.	- Application of Stern-Volmer Analysis for determination of fluorescence quenching mechanism (dynamic quenching example) Students group seminars	1
12	- Study of drug protein interaction by fluorescence spectroscopy.	1
13	- Chemiluminescence role in disease diagnosis. - Poster exhibition and evaluation	1
14	Tutorial exam	1

4. Teaching and Learning Methods:

Teaching and learning Methods	Weeks No.	K. elements to be addressed
4.1 Computer aided learning: a. Lectures using Data show, power Point presentations b. Distance learning <ul style="list-style-type: none"> Online learning through my mans "Mansoura university" as recorded video lectures Interactive discussion through My Mans. Recorded videos 	1-14	1.1.1.1, 1.1.3.1, 2.2.1.1, 2.2.3.1, 2.2.4.1
4.2 Tutorials	1-13	2.2.1.1, 2.2.3.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1,4.3.2.1
4.3 Self-learning	2-13	1.1.1.1, 1.1.3.1, 2.5.3.1, 2.2.3.1, 2.2.4.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1,4.3.2.1
4.4 Class Activity/ Group Discussion / Brainstorming / problem solving	2-6,10-11	2.5.3.1, 2.2.3.1, 2.2.3.1., 2.2.1.1., 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1, 4.3.2.1,



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5. Student Assessment:

d- Assessment Methods:

Assessment Methods	K. elements to be assessed
1-Written exam	1.1.1.1, 1.1.3.1, 2.2.1.1, 2.2.3.1, 2.2.4.1, 2.3.1.1, 2.3.2.1, 2.5.3.1
2-Practical examination and tutorial	2.2.1.1, 2.2.3.1, 2.2.4.1, 2.3.1.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1, 4.3.2.1
3-Oral	1.1.1.1, 1.1.3.1, 4.1.2.1, 4.2.2.1, 4.3.1.1, 4.3.2.1
4- Periodical exam / Course work	1.1.1.1, 1.1.3.1, 2.2.1.1, 4.2.2.1

e- Assessment schedule

Assessment 1	Periodical exam / Course work	7-9 th week
Assessment 2	Practical examination and tutorial	14 th week
Assessment 3	Written exam	Start from 15 th week
Assessment 4	Oral exam	Start from 15 th week

c. Weighing of assessments

1	Periodical exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%



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6. Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Tutorial facilities	Tutorial room equipped with PC, microphone, sound system, data show, and white board.



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7. Matrix 1 of knowledge and skills of the course

Course contents / K. elements	Domain 1		Domain 2						Domain 4				
	1.1.1.1	1.1.3.1	2.2.1.1	2.2.3.1	2.2.4.1	2.3.1.1	2.3.2.1	2.5.3.1	4.1.1.1	4.1.2.1	4.2.1.1	4.3.1.1	4.3.2.1
Application of UV-Vis spectroscopy: qualitative and quantitative analysis. Fundamentals of UV-Vis spectroscopy, its application in qualitative analysis, Beer's law, and problems on Beer's law	✓	✓	✓	✓									
Determination of pKa by spectrophotometric titration	✓	✓	✓	✓									
Quantitative application of UV-Vis spectroscopy: mathematical derivatization. Fundamentals of derivative spectroscopy and its applications.	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓



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8. List of References

No	Reference	Type
1.	Electronic book prepared by staff members.	Course notes
2.	Recorded videos prepared by staff members.	Videos on platform
3.	Fundamentals of Analytical Chemistry, Douglas A.; Skoog; Donald M.; West, F.James Holler; Stanely, R.Crouch, Belmont, CA, USA 9th ed. (2014).	Essential Book
4.	Practical Fluorescence, Second Edition, George G. Guilbault, CRC Press (2020).	Essential Book
5.	A Comprehensive Guide to Chemiluminescence, Luís Pinto da Silva, Nova Science Publishers (2019).	Essential Book
6.	Derivative Spectroscopy, Joseph Dubrovkin, Cambridge Scholars Publishing (2020).	Essential Book
7.	https://www.ekb.eg http://www.sciencedirect.com http://www.google scholar.com http://www.pubmed.com	Websites



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9. Matrix 2. between course contents, methods of learning and assessment

A) Theoretical Part:										
Course Contents	Teaching and Learning Methods						Assessment Methods			
	Lecture	Online interactive	Record video	Group discussion	Tutorial sessions	Problem solving	Self-learning	Tutorial /Course work	Written	Oral
Application of UV-Vis spectroscopy: qualitative and quantitative analysis. Fundamentals of UV-Vis spectroscopy, its application in qualitative analysis, Beer's law, and problems on Beer's law	√		√	√	√	√		√	√	√
Determination of pKa by spectrophotometric titration	√			√	√	√		√	√	√
Quantitative application of UV-Vis spectroscopy: mathematical derivatization. Fundamentals of derivative spectroscopy and its applications.	√			√	√		√	√	√	√



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<p>Quantitative application of UV-Vis spectroscopy: chemical derivatization: Chemical derivatization of compounds of low molar absorptivity, examples and applications.</p>	√			√			√		√	√
<p>Reaction stoichiometric determination by Job's method, molar ratio method, and limiting logarithmic method</p>	√			√		√		√	√	√
<p>Conventional and synchronous spectrofluorimetry: fundamentals. Fluorescence and phosphorescence phenomena, Factors affecting fluorescence, fluorescence quantum efficiency, and advantages and disadvantages of spectrofluorimetry.</p>	√		√	√			√		√	√
<p>Conventional and synchronous spectrofluorimetry applications. Fluorescence and phosphorescence phenomena, Factors affecting fluorescence and phosphorescence.</p>	√	√	√	√			√		√	√



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Advantages/ disadvantages of spectrofluorimetry Quantitative applications of spectrofluorimetry. Analysis of inorganic and organic compounds	√			√			√		√	√
Quantitative applications of spectrofluorimetry. synchronous spectrofluorimetry and derivative synchronous spectrofluorimetry for multicomponent analysis.	√			√			√	√	√	√
Biomedical application of spectrofluorimetry: Disease diagnosis and protein-drug interaction.	√			√			√	√	√	√
Fundamentals of chemiluminescence. Definition, Principle, types, advantages, and examples.	√			√		√	√		√	√
Analytical applications of chemiluminescence: analysis of gases, organic species, and inorganic species.	√			√			√		√	√



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Recent Clinical Applications of Chemiluminescence: Immunoassays, Nucleic acid assays, Western blot assays, Reporter gene-based assays.	√			√			√		√	√
Analytical Applications of Chemiluminescence for Cancer Detection and Therapy	√	√	√	√	√	√	√		√	√



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A) Practical Part:									
Course Contents	Teaching and Learning Methods						Assessment Methods		
	Interactive discussion	Record video	Group discussion	Tutorial sessions	Problem solving	Self-learning	Tutorial /Course work	Written	Oral
Beer's law (introduction and problems solving).		√	√	√			√	√	√
- Determination of pKa by spectrophotometry (algebraic method). <u>Students group seminars</u>			√	√	√	√	√	√	√
- Determination of pKa by spectrophotometry (graphical method). <u>Students group seminars</u>			√	√	√	√	√	√	√
- Derivative spectrophotometry for determination of a binary drug mixture <u>Students group seminars</u>			√	√	√	√	√	√	√
- Determination of reaction stoichiometry by Job's method. <u>Students group seminars</u>			√	√	√	√	√	√	√



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- Determination of reaction stoichiometry by molar ratio method. - Students group seminars			√	√	√	√	√	√	√
- Determination of reaction stoichiometry by limiting logarithmic method. - Students group seminars	√		√	√	√	√	√	√	√
- Correction of inner filter effect during fluorescence measurement (Mathematical method) - Students group seminars		√	√	√	√	√	√		
- Application of Stern-Volmer Analysis for determination of fluorescence quenching mechanism (static quenching example) Students group seminars			√	√	√	√	√		
- Application of Stern-Volmer Analysis for determination of fluorescence quenching mechanism (dynamic quenching example) - Students group seminars	√		√	√	√	√	√		



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- Study of drug protein interaction by fluorescence spectroscopy.									
- Chemiluminescence role in disease diagnosis. Poster exhibition and evaluation	√		√	√		√	√	√	√
Chemiluminescence role in disease diagnosis.	√		√	√		√	√	√	√
- Poster exhibition and evaluation	√		√	√		√	√	√	√

Course Coordinator	Prof. Dr. Yasser El Shabrawy
Head of Department	Prof. Dr. Jenny Jeehan Mohamed Ahmed Nasr
Date of Approval	10/9/2023



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بكالوريوس الصيدلة (فارم دي – Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Therapeutic Drug Monitoring	اسم المقرر: رصد الادوية
Academic Level: Level 5	المستوى الأكاديمي: الخامس
Scientific department: Pharmaceutical analytical chemistry	القسم العلمي: كيمياء تحليلية صيدلية
Head of Department: Prof. Dr. Jenny Jeehan Mohamed Ahmed Nasr	رئيس القسم: أ.د/ جيني جيهان محمد أحمد نصر
Course Coordinator: To be nominated	منسق المقرر: -----



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutical analytical chemistry
Department supervising the course	Pharmaceutical analytical chemistry
Program on which the course is given	Bachelor in clinical Pharmacy-Pharm D
Academic Level	Fifth level, First semester, 2023-2024
Date of course specification approval	10/9/2023

A. Basic Information: Course data:

Course Title	Therapeutic Drug Monitoring
Course Code	PAE 10
Prerequisite	Registration
Teaching credit Hours: Lecture	1
Practical:	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

1. Orienting students to recall the basic principles of therapeutic drug monitoring (TDM), such as serum-along concentration, drug-protein binding, pharmacokinetics, pharmacodynamics, bioavailability, therapeutic index, biopharmaceutics, and bioequivalence.
2. Studying different analytical methods for TDM of some typical drug classes such as antibiotics, anticonvulsants, immunosuppressant, cardiac medications, tranquilisers and bronchodilators



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2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Recall basic understanding of different biological process related to drug monitoring like pharmacokinetics, pharmacodynamics, bioavailability, bioequivalence, toxicology, therapeutic index, volume of distribution, metabolism, excretion and their consequent clinical effects.
1.1.2	1.1.2.1	Define different terms and illustrate symbols and abbreviations that are frequently used in therapeutic drug monitoring and how they can be appropriately used.
1.1.4	1.1.4.1	Identify drug classes that need to be therapeutically monitored in order to optimize their efficacy in relation to their safety and clinical response.
1.1.5	1.1.5.1	Define the principles and practice and critical understanding of fundamental sciences to solve problems related to human health.
1.1.6	1.1.6.1	Classify analytical methods that can be applied for analysis and monitoring of biological drug levels to give a correct decision about drug dosage regimen.
1.1.7	1.1.7.1	Analyze new information, including evidence-based information, that may be applicable to pharmaceutical industry and patient care.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.3	2.2.3.1	Utilize different instruments to analyze drugs levels in biological fluids applying the correct procedure and software.
2.2.4	2.2.4.1	Implement calculations, biostatistical analysis, and assessment procedures required for drug analysis and their applications in therapeutic drug monitoring.
2.3.1	2.3.1.1	Select and apply appropriate methods that are best used for therapeutic monitoring of certain drugs.
2.3.2	2.3.2.1	Choose best practices and adhere to high safety standards for therapeutic drug monitoring.
2.4.3	2.4.3.1	Recommend and adjust drug dosage regimens of therapeutically monitored



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		drugs.
2.4.4	2.4.4.1	Evaluate toxicity profiles of chemicals and other xenobiotics and investigate poisons in biological samples.

Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.1.1	3.1.1.1	Modify a dosage regimen for a patient based on the clinical changes or bioanalytical results brought about by an administered drug.
3.2.1	3.2.1.1	Integrate principles of pharmacokinetics, pharmacodynamics, mechanism of action and drug interactions to aid in optimizing therapeutic drug response and avoiding any side or toxic effects.
3.2.7	3.2.7.1	Identify the occurrence of a medication incident, adverse drug event and respond effectively to alleviate harm and prevent reoccurrence.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Demonstrate decision-making and time management abilities in sharing information with professional and other team members.
4.1.2	4.1.2.1	Retrieve and analyze information to solve problems and work individually or collaboratively in a team.
4.2.2	4.2.2.1	Use artificial technology including special instruments and connected software whenever possible to present relevant information and decisions.
4.3.1	4.3.1.1	Use effective strategies to manage and improve self-practice of analytical techniques used in therapeutic drug monitoring.
4.3.2	4.3.2.1	Practice self-learning needed to improve professional skills.



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3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Introduction: role of clinical pharmacy and pharmacist in TDM.	1
2	Important concepts: pharmacokinetics, distributional phase of the drug.	1
3	Steady state and peak, trough sampling times pharmacodynamics.	1
4	Bioavailability, protein binding and biopharmaceutics.	1
5	Bioequivalence, drug metabolism and elimination.	1
6	Bioanalysis and estimation of drugs in biological fluids	1
7	Factors affecting therapeutic drug monitoring.	1
8	Application of different analytical methods for TDM of drugs as anticonvulsant.	1
9	Application of different analytical methods for TDM of drugs as immunosuppressants.	1
10	Application of different analytical methods for TDM of antibiotics	1
11	TDM of cardiac medications in pregnant women.	1
12	TDM of bronchodilators and antiretroviral in pregnant women.	1
13	TDM of drugs used in treatment of tuberculosis (self-learning) .	1
14	TDM of covid medication medications in young and pregnant women.	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final theoretical and oral exam	-----



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Week No.	Practical topics	Tutorial credit hours
1.	Pharmacokinetics, distributional phase of the drug.	1
2.	Steady state and peak, trough sampling times pharmacodynamics.	1
3.	Bioavailability and protein binding	1
4.	Biopharmaceutics	1
5.	Bioequivalence, drug metabolism and elimination.	1
6.	Bioanalysis and estimation of cardiovascular drugs in biological fluids	1
7.	Bioanalysis and estimation of antivirals in biological fluids	1
8	Mid term exam	-
9.	Bioanalysis and estimation of antibiotics in biological fluids	1
10.	Bioanalysis and estimation of antifungals in biological fluids part1	1
11.	Bioanalysis and estimation of antifungals in biological fluids part2	1
12	Bioanalysis and estimation of antibiotics in biological fluids	1
13	Bioanalysis and estimation of anticancer drugs in biological fluids part 1	1
14	Bioanalysis and estimation of anticancer drugs in biological fluids part 2	1
15	Revision and activity	1
16	Practical Exam (OSPE)	1



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4- Teaching and Learning Methods:

Teaching and learning Methods		Weeks No.	K. elements to be addressed
4.1	Computer-aided learning: a. Lectures using Data show, PowerPoint presentations. b. Distance learning <ul style="list-style-type: none"> Online learning through my mans "Mansoura university" as recorded video lectures Interactive discussion through My Mans. 	1-16	1.1.1.1, 1.1.2.1, 1.1.4.1,1.1.5.1, 1.1.6.1, 1.1.7.1, 2.2.3.1, 2.2.4.1, 2.3.1.1, 2.3.2.1, 2.4.3.1, 3.1.1.1, 3.2.1.1
4.2	Tutorials	1-16	2.2.3.1, 2.2.4.1, 2.3.1.1, 2.3.2.1, 2.4.3.1, 2.4.4.1, 3.2.7.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1
4.3	Self-learning	13	4.1.2.1,4.2.2.1, 4.3.2.1
4.4	Class Activity Discussion / Brainstorming / problem solving	10-13	4.1.2.1,4.2.2.1,4.3.1.1 4.3.2.1

5- Student Assessment:

f- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.1.1, 1.1.2.1, 1.1.4.1,1.1.5.1, 1.1.6.1, 1.1.7.1, 2.2.3.1, 2.2.4.1, 2.3.1.1, 2.3.2.1, 2.4.3.1, 3.1.1.1, 3.2.1.1
2- Tutorials exam applying OSPE/	2.2.3.1, 2.2.4.1, 2.3.1.1, 2.3.2.1, 2.4.3.1, 2.4.4.1, 3.2.7.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1
3-Oral exam, OSCE	1.1.1.1, 1.1.2.1, 1.1.4.1, 1.1.6.1, 2.2.4.1, 2.4.3.1, 2.3.1.1, 2.3.2.1
4- Periodical exam / Course work	1.1.1.1, 1.1.2.1, 1.1.4.1, 1.1.6.1, 2.2.4.1, 2.4.3.1, 2.3.1.1, 2.3.2.1

b. Assessment schedule

Assessment 1	Periodical exam / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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c. Weighing of assessments

1	Periodical exam / Course work	15%
2	Tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	Data show- Computers, Internet. - white board

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Clarke W, Dasgupta A, editors. Clinical challenges in therapeutic drug monitoring: special populations, physiological conditions and pharmacogenomics. Elsevier; 2016 May 17.	Book
4.	Dasgupta A, editor. Therapeutic drug monitoring: newer drugs and biomarkers. Academic Press; 2012 Jun 7.	Book
5.	http://www.sciencedirect.com/ http://www.google scholar.com/ http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content versus course k. elements:

Course contents / K. elements	Domain 1						Domain 2					
	1.1.1.1	1.1.2.1	1.1.4.1	1.1.5.1	1.1.6.1	1.1.7.1	2.2.3.1	2.2.4.1	2.3.1.1	2.3.2.1	2.4.3.1	2.4.4.1
Introduction: role of clinical pharmacy and pharmacist in TDM.	✓	✓	✓	✓		✓			✓	✓		✓
Important concepts: pharmacokinetics, distributional phase of the drug.	✓	✓	✓			✓			✓	✓		✓
Steady state and peak, trough sampling times pharmacodynamics.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Bioavailability, protein binding and biopharmaceutics.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Bioequivalence, drug metabolism and elimination.	✓	✓			✓		✓		✓	✓		
Bioanalysis and estimation of drugs in biological fluids	✓	✓	✓			✓			✓	✓		✓
Factors affecting therapeutic drug monitoring.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Application of different analytical methods for TDM of drugs as anticonvulsant.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Application of different analytical methods for TDM of drugs as immunosuppressants.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Application of different analytical methods for TDM of antibiotics	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓



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TDM of cardiac medications in pregnant women.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
TDM of bronchodilators and antiretroviral in pregnant women.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
TDM of drugs used in treatment of tuberculosis.	✓	✓			✓		✓		✓	✓		
TDM of covid medication medications in young and pregnant women.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓

Practical topics

Pharmacokinetics, distributional phase of the drug.									✓	✓	✓	✓
Steady state and peak, trough sampling times pharmacodynamics.									✓	✓	✓	✓
Bioavailability and protein binding									✓	✓	✓	✓
Biopharmaceutics									✓	✓	✓	✓
Bioequivalence, drug metabolism and elimination.									✓	✓	✓	✓
Bioanalysis and estimation of cardiovascular drugs in biological fluids									✓	✓	✓	✓
Bioanalysis and estimation of antivirals in biological fluids									✓	✓	✓	✓
Bioanalysis and estimation of antibiotics in biological fluids									✓	✓	✓	✓



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Factors affecting therapeutic drug monitoring.	✓	✓	✓	✓	✓	✓	✓	
Application of different analytical methods for TDM of drugs as anticonvulsant.	✓	✓	✓	✓	✓	✓	✓	
Application of different analytical methods for TDM of drugs as immunosuppressants.	✓	✓	✓	✓	✓	✓	✓	
Application of different analytical methods for TDM of antibiotics.	✓	✓	✓	✓	✓	✓	✓	
TDM of cardiac medications in pregnant women.	✓	✓	✓	✓	✓	✓	✓	
TDM of bronchodilators and antiretroviral in pregnant women.	✓	✓	✓	✓	✓	✓	✓	
TDM of drugs used in treatment of tuberculosis.	✓	✓	✓	✓	✓	✓	✓	
TDM of covid medication medications in young and pregnant women	✓	✓	✓	✓	✓	✓	✓	✓

Practical topics									
1	Pharmacokinetics, distributional phase of the drug.								
2	Steady state and peak, trough sampling times pharmacodynamics.	✓	✓						
3	Bioavailability and protein binding	✓	✓						
4	Biopharmaceutics	✓	✓						
5	Bioequivalence, drug metabolism and elimination.	✓	✓		✓	✓	✓	✓	
6	Bioanalysis and estimation of cardiovascular drugs in biological fluids	✓	✓		✓	✓	✓	✓	
7	Bioanalysis and estimation of antivirals in biological fluids	✓	✓		✓	✓	✓	✓	
8	Bioanalysis and estimation of antibiotics in biological fluids	✓	✓		✓	✓	✓	✓	
9	Bioanalysis and estimation of antifungals in biological fluids part1				✓	✓	✓	✓	



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	Bioanalysis and estimation of antifungals in biological fluids part2				✓	✓	✓	✓	
10	Bioanalysis and estimation of antibiotics in biological fluids				✓	✓	✓	✓	
11	Bioanalysis and estimation of anticancer drugs in biological fluids part1	✓	✓		✓	✓	✓	✓	
	Bioanalysis and estimation of anticancer drugs in biological fluids part2	✓	✓		✓	✓	✓	✓	



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Matrix 2. between course contents, methods of learning and assessment

Course Contents	Teaching and Learning Methods							Assessment Methods			
	Lecture	Online interactive discussion	Record video	Group discussion	Lab sessions	Problem solving	Self-learning	Periodical exam	Practical/Tutorial	Written	Oral
Introduction: role of clinical pharmacy and pharmacist in TDM	√	√	√	√				√		√	√
Important concepts: pharmacokinetics, distributional phase of the drug, steady state and peak, trough sampling times pharmacodynamics.	√	√	√	√				√		√	√
Bioavailability, protein binding and biopharmaceutics.	√	√	√	√				√		√	√
Bioequivalence, drug metabolism and elimination.	√	√	√	√				√		√	√
Bioanalysis and estimation of drugs in biological fluids	√	√	√	√						√	√
Factors affecting therapeutic drug monitoring.	√		√	√						√	√
Application of different analytical methods for TDM of drugs as anticonvulsant.	√		√	√						√	√
Application of different analytical methods for TDM of drugs as immunosuppressants.	√		√	√						√	√
Application of different analytical methods for TDM of antibiotics	√	√	√	√		√				√	√
TDM of cardiac medications in pregnant women.	√		√	√		√				√	√
TDM of bronchodilators and antiretroviral in pregnant women.	√		√	√		√				√	√



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TDM of drugs used in treatment of tuberculosis.	√		√	√		√			√	√
TDM of covid medication medications in young and pregnant women .	√	√	√	√		√	√		√	√

B) Practical Part:

Course Contents	Teaching and Learning Methods							Assessment Methods			
	Lecture	Online interactive discussion	Record video	Group discussion	Lab sessions	Problem solving	Self-learning	Periodical exam	Practical/Tutorial	Written	Oral
Pharmacokinetics, distributional phase of the drug.			√	√	√				√		
Steady state and peak, trough sampling times pharmacodynamics.			√	√	√				√		
Bioavailability and protein binding			√	√	√				√		
Biopharmaceutics			√	√	√				√		
Bioequivalence, drug metabolism and elimination.			√	√	√				√		
Bioanalysis and estimation of cardiovascular drugs in biological fluids			√	√	√				√		
Bioanalysis and estimation of antivirals in biological fluids			√	√	√				√		
Bioanalysis and estimation of antibiotics in biological fluids			√	√	√				√		
Bioanalysis and estimation of antifungals in biological fluids part1			√	√	√				√		
Bioanalysis and estimation of antifungals in biological fluids part2			√	√	√				√		



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Bioanalysis and estimation of antibiotics in biological fluids			√	√	√				√		
Bioanalysis and estimation of anticancer drugs in biological fluids part1			√	√	√				√		
Bioanalysis and estimation of anticancer drugs in biological fluids part2			√	√	√				√		

Course Coordinator	To be nominated.
Head of Department	Prof. Dr. Jenny Jeehan Mohamed Ahmed Nasr

Date:10 / 9 / 2023



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بكالوريوس الصيدلة الإكلينيكية (فارم دي – Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Complementary therapy	اسم المقرر : العلاج التكميلي
Academic Level: Four/ Five	المستوى الأكاديمي: الرابع/الخامس
Scientific department: Pharmacognosy	القسم العلمي : العقاقير
Head of Department: Prof. Dr. Mahmoud Fahmy el-Sebai	رئيس القسم: ا.د/ محمود فهمي السباعي
Course Coordinator: Prof. Dr. To be nominated	منسق المقرر :



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (PharmD)
Academic Level	Level Four/ Five, 2023-2024
Date of course specification approval	6/9/2023

A. Basic Information: Course data:

Course Title	Complementary therapy
Course Code	PG E04
Prerequisite	Registration
Teaching credit Hours: Lecture	1
:Practical (Tutorial)	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Gain valuable knowledge about the Complementary medicine with an overview of different domains of mind- body interventions, alternative medical systems.
- Gain understanding of the nutraceuticals as types of biologically based therapies. Including dietary supplements, vitamins and minerals, functional foods and medical foods.
- Master the definition, effective application and safety guidelines of aromatherapy.



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2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Recognize comprehensive understanding of pharmacological, biological, social, behavioral, administrative, and clinical sciences.
1.1.3	1.1.3.1	Combine the principles of basic science to handle, identify, extract, design, prepare, analyze and ensure synthetic / natural pharmaceutical raw materials and finished products.
1.1.4	1.1.4.1	Explain the mode of action and therapeutic effects of drugs and evaluate their appropriateness, effectiveness, and safety in individuals and populations using evidence from basic science.
1.1.5	1.1.5.1	Utilize the principles and practice and crucial understanding of basic sciences to resolve problems concerning with human health and health systems.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.1	2.2.1.1	Manipulate the proper methods for dietary supplements, vitamins and minerals, functional foods, medical foods purification, identification, standardization, effective application and safety guidelines.
2.3.1	2.3.1.1	Employ the applicable practices for aromatherapy and herbal therapies purification, identification, standardization, effective application and safety guidelines.

Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.2.3	3.2.3.1	Learn applicable methods for identification and standardization of aromatherapy and herbal therapies.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Communicate actively as a member of a team.



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4.2.1	4.2.1.1	Provide obviously information in written, electronic, and oral forms.
4.3.2	4.3.2.1	Apply principles of continuous professional development, such as analyzing one's own learning requirements and devising a strategy to meet them.

3- Course Contents:

Week No.	Topics	Lecture credit Hours	Tutorial credit hours
1	Introduction of CAM (Complementary and Alternative Medicine), Psychobiology of Mindful, Somatic practice, music therapy.	1	
2	Massage & other Bodywork therapies and energy medicine.	1	
3	Tai Chi & Qigong	1	
4	Nutritional Medicine	1	
5	Ayurvedic Medicine	1	
6	Hypnotherapy	1	
7	Chiropractic & Functional Neurology	1	
8	Acupuncture & Traditional Chinese Medicine	1	
9	Homeopathic Medicine	1	
10	Herbals in Health & Healing	1	
11	Herbal Medicine: Safety, Efficacy & Effectiveness	1	
12	Aromatherapy/Essential Oils	1	
13	Essential Oils (Self-learning)	1	
14	Revision / Quiz	1	
15	Final written and oral exam		



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Week No.	Tutorial Topics	Lecture credit Hours	Tutorial credit hours
1	Psychobiology of Mindful, Somatic practice, music therapy		1
2	Massage & other Bodywork therapies and energy medicine		1
3	Tai Chi & Qigong		1
4	Nutritional Medicine		1
5	Ayurvedic Medicine		1
6	Hypnotherapy		1
7	Chiropractic & Functional Neurology		1
8	Midterm exam		-
9	Acupuncture & Traditional Chinese Medicine		1
10	Homeopathic Medicine		1
11	Herbals in Health & Healing, Herbal Medicine: Safety, Efficacy & Effectiveness		1
12	Aromatherapy		1
13	Essential Oils		1
14	Tutorial exam		1

4- Teaching and Learning Methods:

	Teaching and Learning Methods	Week No	K elements to be assessed
5.1	Computer aided learning: a. Lectures using Data show, power Point presentations b. Distance learning <ul style="list-style-type: none"> Online learning through my mans "Mansoura university "as 	1-14	1.1.1.1,1.1.4.1,1.1.3.1,1.1.5.1, 2.2.1.1, 2.2.2.1, 2.3.1.1, 4.2.1.1, 4.3.2.1



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	recorded – video lectures <ul style="list-style-type: none"> Inter active discussion through My Mans 		
5.2	Self-learning	13	4.2.11, 4.3.2.1
5.3	tutorials session	1-14	2.2.1.1, 2.2.1.1, 2.3.1.1, 3.2.3.1, 4.1.2.1, 4.3.2.1
5.4	Class Activity: Group discussion offline and online.	8	4.1.2.1
5.5	Research assignments	10	4.2.11, 4.3.2.1

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.1.1, 1.1.4.1, 1.1.3.1, 1.1.5.1, 2.2.1.1, 2.2.2.1, 2.3.1.1, 4.2.1.1, 4.3.2.1
2-Tutorial	2.2.1.1, 2.2.1.1, 2.3.1.1, 3.2.3.1, 4.1.2.1, 4.3.2.1
3-Oral	1.1.1.1, 1.1.3.1, 1.1.4.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.3.1, 1.1.4.1, 2.2.1.1, 4.2.1.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	6-9 th week
Assessment 2	tutorial	14 th week
Assessment 3	Written exam	15 th week
Assessment 4	Oral exam	15 th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%



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6- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	white board



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7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	COMPLEMENTARY AND ALTERNATIVE THERAPIES edited by Donald W. Novey MD, Mosby, Inc. 2000	Book
4.	CLINICAL RESEARCH IN COMPLEMENTARY THERAPIES, edited by George Lewith, Wayne Jonas, and Harald Walach. New York: Churchill Livingstone, 2002	Book
5.	INTEGRATIVE MEDICINE: PRINCIPLES FOR PRACTICE edited by Benjamin Kligler, Roberta A. Lee, McGraw-Hill Companies, Inc., New York, NY. 2004 (936 pages).	Book
6.	http://www.sciencedirect.com/ http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content:

Matrix 1. Course contents and course key elements

Course contents	Course Key Elements									
	Domain: 1				Domain: 2		Domain 3	Domain: 4		
	1.1.1.1	1.1.3.1	2.3.13	1.1.5.1	2.2.1.1	2.3.1.1	2.3.2.1	4.1.2.1	4.2.1.1	4.3.2.1
A) Theoretical part										
Introduction of CAM (Complementary and Alternative Medicine), Psychobiology of Mindful, Somatic practice, music therapy.	✓	✓	✓	✓	✓		✓			
Massage & other Bodywork therapies and energy medicine.	✓	✓	✓	✓	✓		✓			
Tai Chi & Qigong	✓	✓	✓	✓	✓		✓			
Nutritional Medicine	✓				✓		✓			
Ayurvedic Medicine	✓				✓		✓			
Hypnotherapy	✓				✓		✓			
Chiropractic & Functional Neurology	✓					✓				
Acupuncture & Traditional Chinese Medicine	✓	✓	✓	✓	✓		✓			
Homeopathic Medicine	✓	✓	✓	✓	✓		✓			
Herbals in Health & Healing	✓	✓	✓	✓	✓		✓			
Herbal Medicine: Safety, Efficacy & Effectiveness			✓			✓				
Aromatherapy/ Essential Oils		✓	✓			✓				
Essential Oils (Self-learning)			✓			✓				
Psychobiology of Mindful, Somatic practice, music therapy. Massage & other			✓		✓	✓	✓	✓	✓	✓



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Herbals in Health & Healing	√								√	√
Herbal Medicine: Safety, Efficacy & Effectiveness	√								√	√
Aromatherapy/Essential Oils	√								√	√
Essential Oils (Self-learning)	√					√			√	√
Psychobiology of Mindful, Somatic practice, music therapy. Massage & other Bodywork therapies and energy medicine. Tai Chi & Qigong, Nutritional Medicine, Ayurvedic Medicine Hypnotherapy, Chiropractic & Functional Neurology Acupuncture & Traditional Chinese Medicine Homeopathic Medici, Herbals in Health & Healing, Herbal Medicine: Safety, Efficacy & Effectiveness Aromatherapy/Essential Oils			√					√		

Course Coordinator	Prof. Dr.
Head of Department	Prof. Dr. Mahmoud Fahmy El-Sebai

Date: 6/ 9/ 2023



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الإكلينيكية (فارم دي) بكالوريوس الصيدلة
Pharm D-Clinical Pharmacy
Course Specification
Academic year: 2023/2024

Course name: Applied industrial pharmacy	اسم المقرر : صيدلية صناعية تطبيقية
Academic Level: Elective Course	المستوى الأكاديمي : مقرر اختياري
Scientific department: Pharmaceutics	القسم العلمي : الصيدلانيات
Head of Department: Prof. Dr. Irhan Ibrahim Abu Hashim	رئيس القسم : أ.د/ ارهان ابراهيم أبو هاشم
Course Coordinator: To be nominated	منسق المقرر : أ.د/.....



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Course specification
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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (PharmD)
Academic Level	Elective Course, 2023-2024
Date of course specification approval	September 2023

A. Basic Information: Course data:

Course Title	Applied industrial pharmacy
Course Code	PTE07
Prerequisite	----
Teaching Hours: Lecture	1 عدد الساعات الزمنية
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Develop basic understanding in pharmaceutical manufacturing.
- Understand the basic principles of unit operations in manufacturing of dosage forms and techniques of manufacturing and equipment.
- Design a quality product and its manufacturing process by applying quality by design principles.



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2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Identify the basics of dosage from manufacture and design.
1.1.3.	1.1.3.1	Describe a quality product and its manufacturing process to consistently deliver the intended performance of the product.
1.1.7.	1.1.7.1	Recognize the patient needs by applying Quality-by-Design- principles.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.2	2.2.2.1.	Apply good manufacturing practices (GMP) involving quality assurance (QA) and quality control QC
2.2.4.	2.2.4.1.	Illustrate different unit operations in pharmaceutical industry as per the need of industry and prospects in pharmacy practice.
2.3.3	2.3.3.1	Implement procedures to ensure the proper disposal of recalled product.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1.	4.1.1.1.	Demonstrate critical thinking, time management skills and decision-making activities
4.1.2	4.1.2.1	Retrieve and evaluate information, solve problems, and work effectively in a team.
4.2.1	4.2.1.1	Communicate effectively in a scientific language by verbal and written means in the field of health care.



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3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Particle size reduction (Principle)	2
2	Particle size reduction (Equipment)	2
3	Particle size separation (Principle)	2
4	Particle size separation (Equipment)	2
5	Particle size analysis (Principle)	2
6	Particle size analysis (Equipment)	2
7	Particle size enlargement (Principle)	2
8	Particle size enlargement (Equipment)	2
9	Manufacturing of pharmaceutical drug products (conventional and nanotechnology based)	2
10	Container/closure systems (Principle)	2
11	Factors affecting packaging and container/closure systems	2
12	Quality by design principles (Principle)	2
13	Factors affecting quality by design and Self-learning topic discussion	2
14	Factors affecting quality by design- continue and Self-learning topic discussion	2
15	Compensatory and alternative	2
16	Revision and quiz	2
17	Final written and oral exam	-



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Week No.	Practical topics	Practical credit hours
1.	Introduction	1
2.	particle size and unit operation	1
3.	Sieving and unit operation	1
4.	Microscopy	1
5.	Introduction of powder flow properties + powder flow rate.	1
6.	Angle of repose.	1
7	Carr's index	1
8	Mid-term exam	-
9	Hausner ratio.	1
10	Problems Solving (sieving).	1
11	Problems Solving (microscope).	1
12	Problems Solving (powder flow properties)	1
13	Quality control of suppository.	1
14	Quality control of suppository- continue	1
15	Revision and activity	1
16	Sheet and Practical exam applying OSPE	1



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4- Teaching and Learning Methods:

Teaching and learning Methods		Weeks No.	K. elements to be addressed
4.1	Hybrid learning <ul style="list-style-type: none"> Online learning through my mans "Mansoura university" as recorded video lectures Interactive discussion through My Mans. 	1-16	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.4.1., 2.3.3.1, 4.1.2.1., 4.2.1.1
4.2	Advanced lecture Brain storming	1-14	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.2.1, 2.2.4.1., 2.3.3.1, 4.1.2.1., 4.2.1.1
4.3	Self-learning	13, 14	1.1.1.1, 2.2.4.1., 4.1.2.1., 4.2.1.1
4.2	Practical works and tutorials	1-16	1.1.1.1, 1.1.3.1, 2.2.4.1., 4.1.1.1, 4.1.2.1., 4.2.1.1

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.2.1, 2.2.4.1., 2.3.3.1
2-Practical exam applying OSPE	1.1.1.1, 1.1.3.1., 2.2.4.1., 4.1.1.1, 4.1.2.1., 4.2.1.1.
3-Oral exam	1.1.1.1, 1.1.3.1., 1.1.7.1, 2.2.2.1, 2.2.4.1., 2.3.3.1, 4.1.1.1., 4.2.1.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.3.1, 2.2.4.1, 4.1.1.1, 4.1.2.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	White board

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	The theory and practice of industrial pharmacy 2nd Ed., lea & Febiger, Philadelphia, (2012).	Book
4.	Handbook of Pharmaceutical Manufacturing Formulations 2nd Ed., Sarfaraz K. Niazi (2019)	Book
5.	QUALITY, Pharmaceutical Engineering Series, Kate McCormick, Butterworth-Heinemann, London, (2020).	Book
6.	http://www.sciencedirect.com/ http://www.google scholar.com/ http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content versus course k. elements:

A. Theoretical part:

Course contents / K. elements	Domain 1			Domain 2			Domain 4		
	1.1. 1.1	1.1. 3.1	1.1. 7.1	2.2. 2.1	2.2. 4.1	2.3. 3.1	4.1. 1.1	4.1. 2.1	4.2. 1.1
Particle size reduction (Principle)	✓				✓		✓		
Particle size reduction (Equipment)		✓			✓		✓		
Particle size separation (Principle)	✓				✓		✓	✓	
Particle size separation (Equipment)		✓			✓		✓		
Particle size analysis (Principle)	✓				✓		✓	✓	
Particle size analysis (Equipment)		✓			✓		✓		
Particle size enlargement (Principle)	✓				✓		✓		
Particle size enlargement (Equipment)		✓			✓		✓		
Manufacturing of pharmaceutical drug products (conventional and nanotechnology based)	✓	✓		✓		✓	✓	✓	
Container/closure systems (Principle)		✓		✓		✓	✓		
Factors affecting packaging and container/closure systems		✓		✓		✓	✓		
Quality by design principles (Principle)			✓	✓			✓	✓	
Factors affecting quality by design and Self-learning topic discussion	✓		✓	✓			✓	✓	✓
Factors affecting quality by design-continue and Self-learning topic discussion	✓		✓	✓			✓	✓	✓



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B. Practical part:

Course contents / K. elements	Domain 1			Domain 2			Domain 4		
	1.1.1.1	1.1.3.1.	1.1.7.1.	2.2.2.1	2.2.4.1	2.3.3.1	4.1.1.1	4.1.2.1.	4.2.1.1.
Introduction							✓	✓	
particle size and unit operation							✓	✓	
Sieving and unit operation							✓		
Microscopy							✓		
Introduction of powder flow properties + powder flow rate.							✓	✓	
Angle of repose.								✓	✓
Carr's index								✓	✓
Hausner ratio.							✓	✓	✓
Problems Solving (sieving).								✓	✓
Problems Solving (microscope).								✓	✓
Problems Solving (powder flow properties)							✓	✓	✓
Quality control of suppository.				✓					
Quality control of suppository				✓					



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Matrix 2. Between course contents, methods of learning and assessment

A. Theoretical part

Theoretical course contents	Teaching and Learning Methods					Assessment methods			
	Advanced Lecture	Hybrid learning	Lab sessions	Problem Solving	Self-learning	Course Work	Practical	Written	Oral
Particle size reduction (Principle)	√	√				√		√	√
Particle size reduction (Equipment)	√	√				√		√	√
Particle size separation (Principle)	√	√				√		√	√
Particle size separation (Equipment)	√	√				√		√	√
Particle size analysis (Principle)	√	√						√	√
Particle size analysis (Equipment)	√	√						√	√
Particle size enlargement (Principle)	√	√						√	√
Particle size enlargement (Equipment)	√	√						√	√
Manufacturing of pharmaceutical drug products (conventional and nanotechnology based)	√	√				√		√	√
Container/closure systems (Principle)	√	√				√		√	√
Factors affecting packaging and container/closure systems	√	√						√	√
Quality by design principles (Principle)	√	√						√	√
Factors affecting quality by design and Self-learning topic discussion	√	√			√			√	√
Factors affecting quality by design- continue and Self-learning topic discussion	√	√			√			√	√



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B. Practical part

Practical course contents	Teaching and Learning Methods					Assessment methods			
	Lecture	Practical works and tutorials	Lab sessions	Problem Solving	Self-learning	Course Work	Practical	Written	Oral
Introduction		√	√				√		
particle size and unit operation		√	√				√		
Sieving and unit operation		√	√				√		
Microscopy		√	√				√		
Introduction of powder flow properties + powder flow rate.		√	√				√		
Angle of repose.		√	√				√		
Carr's index		√	√				√		
Hausner ratio.		√	√	√			√		
Problems Solving (sieving).		√	√	√			√		
Problems Solving (microscope).		√	√	√			√		
Problems Solving (powder flow properties)		√	√	√			√		
Quality control of suppository.		√	√				√		
Quality control of suppository		√	√				√		

Course Coordinator	To be nominated
Head of Department	Prof. Dr. Irhan Ibrahim Abu Hashim

Date: 20/9 / 2023



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Course specification
2023- 2024

بكالوريوس الصيدلة الاكلينيكية (فارم دي – Clinical Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Good Manufacturing Practice	اسم المقرر: ممارسة التصنيع الجيد
Academic Level: level 4	المستوى الأكاديمي : الرابع
Scientific department: Pharmaceutics	القسم العلمي : الصيدلانيات
Head of Department: Prof. Dr. Irhan Ibrahim Abu Hashim	رئيس القسم : ا.د/ أرهان ابراهيم ابو هاشم
Course Coordinator: Ass. Prof. Amira Mohsen Motawea	منسق المقرر : أ.م.د. أميرة محسن مطاوع



Mansoura University
Faculty of Pharmacy
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Course specification
2023- 2024

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	B. Pharm. (Pharm D)
Academic Level	Level 4, Ninth semester, 2023-2024
Date of course specification approval	September 2023

1. Basic Information: Course data:

Course Title	Good manufacturing practice
Course Code	PTE 08
Prerequisite	--
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Know basic hygiene principles and GMPs to control operational and environmental conditions within the facility to ensure the production of safe food products.
- Understand the different details of quality principles, quality parameters and Good Manufacturing Practice.
- Understand the different key elements of good manufacturing practice.



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2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Identify the general principles and objectives of quality assurance and good manufacturing practice.
1.1.3	1.1.3.1	Recognize the key parts of good manufacturing practice.
1.1.7	1.1.7.1	Illustrate the industrial and clinical benefits of good manufacturing practice.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.2	2.2.2.1	Specify the good manufacturing practice regulations for each element of pharmaceutical products (tablets, capsules, injections, liquid- semisolid dosage forms and suppositories).
2.2.4	2.2.4.1	Investigate the requirements of different good manufacturing practices including sampling, packaging, holding and distribution, reports and records, labeling and inspection.
	2.2.4.2	Conclude the handling of returned and Salvaged drug products.



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Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Retrieve and evaluate information, solve problems, and work effectively in a team.
4.3.2	4.3.2.1	Practice independent learning to promote continuous professional development.

3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Introduction about Good Manufacturing Practice: definitions, objectives, applicability and general provisions as well as quality control.	1
2	Personnel as a key part of GMP: general requirements, responsibilities of key personnel, consultant and authorized personnel as well as personnel training	1
3	Buildings as a key part of GMP: general requirements, clean room, sanitation and maintenance, lighting, sewage and other waste, and containment	1
4	Equipment as a key part of GMP: requirements of the different types of equipment Materials as a key part of GMP: general requirements, starting materials and packaging materials.	1
5	Packaging and Labeling Control: definitions, requirements of labels and containers, as well as packaging operation	1
6	Production and process controls: aims, important documents and their requirements as well as specifications of labels.	1
7	Holding and distribution: implementation of good practice in holding and distribution, Goods In, and Goods Out.	1



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8	Reports and Records: general requirements, reasons for writing procedures in records, examples of records, batch production records, and quality Records.	1
9	Specifications of labels and testing procedures.	1
10	Returned and Salvaged Drug Products: rejected, recovered and returned materials	1
11	Self-inspection: definition, requirements, team, frequency, items for self-inspection.	1
12	Sampling: definitions of different types of samples.	1
13	Repackaging (self-learning).	1
14	Quality audits (self-learning).	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final written and oral exam	-



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Week No.	Practical topics	Practical credit hours
1.	Important definitions about GMP	1
2.	Introduction: What is I.P.Q.C ?	1
3.	I.P.Q.C tests for liquid and semisolid dosage forms.	1
4.	I.P.Q.C tests for tablets: <ul style="list-style-type: none">▪ Weight uniformity test, drug content and moisture content.	1
5.	I.P.Q.C tests for tablets: <ul style="list-style-type: none">▪ Hardness test, disintegration and dissolution tests.	1
6.	Dissolution study for different dosage forms.	1
7.	I.P.Q.C tests for injectables.	1
8.	Mid-term exam	-
9.	Quality control of suppositories: <ul style="list-style-type: none">▪ Physical aspects, mechanical strength, melting point test and liquefaction time test.	1
10.	Quality control of suppositories: <ul style="list-style-type: none">▪ Penetration test, content uniformity and dissolution test.	1
11	Troubleshooting problems during tablet manufacture: <ul style="list-style-type: none">▪ Defects related to process and defects related to excipients.	1
12	Troubleshooting problems during tablet manufacture: <ul style="list-style-type: none">▪ Defects related to machine and defects due to other factors.	1
13	Troubleshooting problems during capsule manufacture	1
14	Troubleshooting problems during suppository manufacture	1
15	Revision and activity	1
16	Sheet / and Practical exam	1



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4- Teaching and Learning Methods:

Teaching and learning Methods		Weeks	K. elements to be addressed
4.1	Computer aided learning: a. Lectures using Data show, power Point presentations b. Distance learning Online learning through my mans "Mansoura university" as recorded video lectures Interactive discussion through My Mans	1-16	1.1.1.1, 1.1.3.1, 1.1.7.1 2.2.2.1 2.2.4.1, 2.2.4.2
4.2	Self-learning	13, 14	4.3.2.1
4.3	Practical session using tutorials	1-16	4.3.2.1/4.1.2.1
4.4	Class Activity - Presentations	1-4&14	4.1.2.1
4.5	Problem solving	3-9	4.1.2.1

5- Student Assessment:-

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.2.1, 2.2.4.1, 2.2.4.2
2-Practical exam	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.2.1, 2.2.4.1, 4.1.2.1, 4.3.2.1
3-Oral	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.2.1, 2.2.4.1, 2.2.4.2, 4.1.2.1,
4- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.3.1, 1.1.7.1, 2.2.2.1, 2.2.4.1, 4.1.2.1,

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7-9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

-Class room	Data show, computers, internet.
- Laboratory facilities	Data show, computers , white board
Library	Books and Pharmacopoeia

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Pharmaceutical quality assurance by Nagori B.P. & et. Al, Leading publisher (2017).	Book
4	Quality Control of Pharmaceuticals: Compendial Standards Specifications, by Sahab Iddin (2017)	Book
5	http://www.sciencedirect.com/ http://www.google scholar.com/ http://www.pubmed.com https://www.ekb.eg	websites



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Packaging and Labeling Control: definitions, requirements of labels and containers, as well as packaging operation		✓	✓	✓				
Production and process controls: aims, important documents and their requirements as well as specifications of labels.	✓	✓	✓	✓	✓			
Holding and distribution: implementation of good practice in holding and distribution, Goods In, and Goods Out.	✓	✓	✓	✓	✓			
Reports and Records: general requirements, reasons for writing procedures in records, examples of records, batch production records, and quality Records.	✓	✓			✓			
Specifications of labels and testing procedures.	✓	✓	✓		✓	✓		
Returned and Salvaged Drug Products: rejected, recovered and returned materials	✓	✓	✓	✓	✓			
Self-inspection: definition, requirements, team, frequency, items for self-inspection.	✓	✓	✓	✓	✓			
Sampling: definitions of different types of samples.	✓	✓	✓		✓	✓		



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Repackaging (self-learning).		✓	✓		✓	✓		✓
Quality audits (self-learning).		✓	✓		✓	✓		✓

B- Practical part

Course contents / K. elements (Practical part)	Domain 1			Domain 2			Domain 4	
	1.1.1.1	1.1.3.1	1.1.7.1	2.2.2.1	2.2.4.1	2.2.4.2	4.1.2.1	4.3.2.1
Important definitions about GMP	✓	✓	✓			✓		
Introduction: What is I.P.Q.C ?	✓	✓	✓		✓			✓
I.P.Q.C tests for liquid and semisolid dosage forms.	✓	✓	✓	✓	✓			
I.P.Q.C tests for tablets: ▪ weight uniformity test, drug content and moisture content.		✓	✓	✓	✓		✓	
I.P.Q.C tests for tablets: ▪ Hardness test, disintegration and dissolution tests.		✓	✓	✓	✓		✓	
Dissolution study for different dosage forms.	✓	✓	✓	✓	✓		✓	
I.P.Q.C tests for injectables.				✓	✓		✓	



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Quality control of suppositories: ▪ Physical aspects, mechanical strength, melting point test and liquefaction time test.	✓	✓	✓	✓	✓		✓	
Quality control of suppositories: ▪ Penetration test, content uniformity and dissolution test.	✓	✓	✓	✓	✓	✓	✓	
Troubleshooting problems during tablet manufacture: ▪ Defects related to process and defects related to excipients.					✓	✓		
Troubleshooting problems during tablet manufacture: ▪ Defects related to machine and defects due to other factors.					✓	✓		
Troubleshooting problems during capsule manufacture:					✓	✓		
Troubleshooting problems during suppository manufacture:					✓	✓		



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Matrix between course contents, methods of learning and assessment

A: Theoretical part

Course Contents	Teaching and Learning Methods				Assessment methods			
	Advanced Lecture	Computer aided learning	Self-learning	Presentations	Course Work	Practical/Tutorial	Written	Oral
Introduction about Good Manufacturing Practice: definitions, objectives, applicability and general provisions as well as quality control.	√	√			√	√	√	√
Personnel as a key part of GMP: general requirements, responsibilities of key personnel, consultant and authorized personnel as well as personnel training	√	√			√	√	√	√
Buildings as a key part of GMP: general requirements, clean room, sanitation and maintenance, lighting, sewage and other waste, and containment	√	√			√	√	√	√



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Equipment as a key part of GMP: requirements of the different types of equipment	√	√			√		√	√
Materials as a key part of GMP: general requirements, starting materials and packaging materials.						√		
Packaging and Labeling Control: definitions, requirements of labels and containers, as well as packaging operation	√	√					√	√
Production and process controls: aims, important documents and their requirements as well as specifications of labels.	√	√					√	√
Holding and distribution: implementation of good practice in holding and distribution, Goods In, and Goods Out.	√	√					√	√
Reports and Records: general requirements, reasons for writing procedures in records, examples of records, batch production records, and quality Records.	√	√					√	√
Specifications of labels and testing procedures.	√	√					√	√
Returned and Salvaged Drug Products: rejected, recovered and returned materials	√	√		√			√	√



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Self-inspection: definition, requirements, team, frequency, items for self-inspection.	√	√		√			√	√
Sampling: definitions of different types of samples.	√	√		√			√	√
Repackaging (self-learning).	√	√	√	√			√	√
Quality audits (self-learning).	√	√	√	√			√	√



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B-Practical part

Course Contents	Teaching and Learning Methods					Assessment methods			
	Hybrid learning	Lab sessions	Problem solving	Self-learning	Presentations	Practical/Tutorial	Course work	Written	Oral
Important definitions about GMP	√	√				√	√	√	√
Introduction: What is I.P.Q.C ?	√	√				√	√	√	√
I.P.Q.C tests for liquid and semisolid dosage forms.	√	√	√			√	√		
I.P.Q.C tests for tablets: ▪ Weight uniformity test, drug content and moisture content.	√	√	√			√	√		
I.P.Q.C tests for tablets: ▪ Hardness test, disintegration and dissolution tests.	√	√	√			√			
Dissolution study for different dosage forms.	√	√	√			√			
I.P.Q.C tests for injectables.	√		√						



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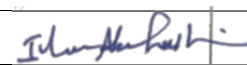
Quality control of suppositories: ▪ Physical aspects, mechanical strength, melting point test and liquefaction time test.	√	√	√			√			
Quality control of suppositories: ▪ Penetration test, content uniformity and dissolution test.	√	√	√		√	√			
Troubleshooting problems during tablet manufacture: ▪ Defects related to process and defects related to excipients.	√	√			√	√			
Troubleshooting problems during tablet manufacture: ▪ Defects related to machine and defects due to other factors.	√	√			√	√			
Troubleshooting problems during capsule manufacture:	√	√			√	√			
Troubleshooting problems during suppository manufacture:	√	√			√	√			



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Course specification
2023- 2024

Course Coordinator	Ass. Prof. Amira Mohsen Motawea
	
Head of Department	Prof. Dr. Dr. Irhan Ibrahim Abu Hashim
	

Date: 20th Sept. 2023



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Course specification
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بكالوريوس الصيدلة الإكلينيكية (فارم دي)
Pharm D-Clinical Pharmacy
Course Specification
Academic year: 2023/2024

Course name: Cosmetic preparations	اسم المقرر: مستحضرات التجميل
Academic Level: Elective Course	المستوى الأكاديمي: مقرر اختياري
Scientific department: Pharmaceutics	القسم العلمي: الصيدلانيات
Head of Department: Prof. Dr. Irhan Ibrahim Abu Hashim	رئيس القسم: أ.د/ ارهان ابراهيم ابو هاشم
Course Coordinator: Assoc. Prof/ Noha Mohamed Saleh Marie	منسق المقرر: أ.م.د/ نهي محمد صالح مرعي



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Course specification
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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	Pharm D (Clinical Pharmacy)
Academic Level	Elective Course, 2023-2024
Date of course specification approval	September 2023

A. Basic Information: Course data:

Course Title	Cosmetic preparations
Course Code	PTE09
Prerequisite	----
Teaching Hours: Lecture	1
Practical	1
Total Credit Hours	2 (Credit H)

B. Professional Information:

6- Course Aims:

This course enables the students to:

- . Know the basic principles and techniques of compounding, dispensing and evaluation of different cosmetic preparations.
- . Enumerate the different properties and classification of each cosmetic preparation.



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7- Course K. elements

Upon completing the course, the student will be able to dominate the following key elements

DOMAIN 1- FUNDAMENTAL KNOWLEDGE

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Define the different cosmetic products and bases in their preparation.
1.1.3	1.1.3.1	Classify different methods of preparation of various cosmetic products.
1.1.9	1.1.9.1	Identify the different methods of evaluation of some cosmetic preparations.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
2.2.1	2.2.1.1	Specify the factors affecting on the preparation and evaluation of different cosmetic preparations.
2.2.4	2.2.4.1	Apply quality control and quality assurance of all the processes of pharmaceutical formulations and their applications for cosmetic delivery systems evaluation such as shampoo, fragrance, nail lacquers and eye makeup.
2.2.5	2.2.5.1	Organize the basic concepts involved in the formulation and manufacture of cosmetic products.

DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Share decision-making activities with other team members and communicate verbally in a scientific language.
4.3.2	4.3.2.1	Practice self-learning to improve professional skills



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8- Course Contents

A. Theoretical part:

Week No.	Topics	Credit Hours
1	Cosmetics raw materials	1
2	Raw materials of cosmetics Pharmaceutical agents in cosmetics	1
3	Skin care products	1
4	shampoo and anti dandruff preparations	1
5	Hair dyes preparations	1
6	Fragrance preparations	1
7	Nail laquers	1
8	Face makeup	1
9	lipstick	1
10	Eye make-ups	1
11	Skin cleansers Self-learning topic	1
12	Antiperspirants and deodorant	1
13	dentifrices	1
14	acne	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final written and oral exam	-

B. Practical part:

Week No.	Practical topics	Credit hours
1	Antiperspirants	1
2	Deodorants	1
3	Shaving creams	1
4	Foundation Creams	1
5	Cleansing creams	1
6	Toothpastes	1
7	Eye makeup	1
8	Moisturizer (Hand cream)	1
9	Sunscreen cream	1
10	Acne vulgaris cream	1
11	Shampoo	1



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12	Bath preparations	1
13	Practical exam applying OSPE	

9- Teaching and Learning Methods:

Teaching and learning methods		Weeks No.	addressed K. elements to be
4.1	<ul style="list-style-type: none"> Advanced lecture Group discussion 	1-16	1.1.1.1/1.1.3.1/1.1.9.1/2.2.1.1/ 2.2.4.1/ 2.2.5.1/ 4.1.2.1/ 4.3.2.1
4.2	<ul style="list-style-type: none"> Hybrid learning 	1-14	1.1.1.1/1.1.3.1/1.1.9.1/2.2.1.1/ 2.2.4.1/ 2.2.5.1/ 4.1.2.1/ 4.3.2.1
4.3	Practical works and tutorials	1-16	4.1.2.1/ 4.3.2.1
4.4	Team-based learning	11, 14	4.1.2.1/ 4.3.2.1
4.5	Self-learning	11, 14	1.1.1.1 / 2.2.1.1/ 4.1.2.1/ 4.3.2.1

10- Student Assessment:

g- Assessment Methods:

1-Written exam	1.1.1.1 / 1.1.3.1/1.1.9.1/2.2.1.1/ 2.2.4.1/ 2.2.5.1
2-Practical exam applying OSPE	2.2.1.1/2.2. 4.1// 2.2.5.1/ 4.1.2.1
3-Oral exam	1.1.1.1 / 1.1.3.1/1.1.9.1/ 2.2.1.1/2.2. 4.1/ 2.2.5.1/ 4.1.2.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1 / 1.1.3.1/ 1.1.9.1/2.2.5.1/ 4.1.2.1/ 4.3.2.1

h- Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

11- Facilities required for teaching and learning

Classroom	Data show- Computers, Internet, Platform
Laboratory facilities	Water baths, glassware, chemicals, electronic balance
Library	Books and Pharmacopoeia

12- List of References

No	Reference	Type
1.	Electronic book prepared by staff members.	Course notes
2.	Recorded videos prepared by staff members	Videos on
3.	Harrys cosmeticology, Meyer R. Rosen, (Editor). Publisher: chemical publisher, chemical publishing company, www.chemical-publishing.com , 9 th edition, 2019.	Book
4.	Handbook of cosmetic science and technology, the theory and practice of cosmeceuticals, Patel Hardik k., Suthar Rajnikant M., Patel Meghana H, Paperback, 2015.	Book
5.	The chemistry and manufacture of cosmetics, Mitchell L. Schlossman (editor), Allureds publishing crop USA vols 1, 2008.	Book
6.	https://www.researchgate.net http://www.sciencedirect.com http://www.google.com http://www.pubmed.com https://www.ekb.eg	Websites



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13- Matrix

Matrix 1. Course content and course key elements

C. Theoretical part

Study Week	Course contents	Outcomes							
		Domains / Key elements							
		Domain 1			Domain 2			Domain 4	
		1.1.1.1	1.1.3.1	1.1.9.1	2.2.1.1	2.2. 4.1	2.2.5.1	4.1.2.1	4.3.2.1
1	Cosmetics raw materials	√		√	√		√		
2	Raw materials of cosmetics Pharmaceutical agents in cosmetics	√	√		√	√	√	√	
3	Skin care products	√		√	√	√		√	
4	shampoo and anti dandruff preparations	√		√	√	√		√	
5	Hair dyes preparations		√	√		√	√		
6	Fragrance preparations	√			√	√	√		
7	Nail laquers	√	√			√	√		
8	Face makeup	√			√	√		√	
9	lipstick	√	√	√	√	√	√		
10	Eye make-ups	√	√	√	√	√	√		
11	Skin cleansers Self-learning topic	√	√	√	√	√	√	√	√
12	Antipresirants and deodorant		√			√			
13	dentifrices	√			√			√	
14	acne	√	√		√	√		√	√



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Matrix 2. Between course contents, methods of learning and assessment
A. Theoretical part

Week No.	Theoretical course contents	Teaching and Learning Methods					Assessment methods			
		Advanced Lecture	Hybrid learning	Lab sessions	Team-based learning	Self-learning	Course Work	Practical	Written	Oral
1	Cosmetics raw materials	√	√				√		√	√
2	Bath preparations (shampoo)	√	√				√		√	√
3	Bath preparations (shampoo evaluation, bath foam, bath salts, after bath preparations) - part I	√	√				√		√	√
4	Bath preparations (shampoo evaluation, bath foam, bath salts, after bath preparations) - part II	√	√				√		√	√
5	Hair dyes	√	√				√		√	√
6	Antiperspirant preparations	√	√				√		√	√
7	Deodorants preparations	√	√						√	√
8	Shaving preparations	√	√						√	√
9	Fragrances and perfumes	√	√						√	√
10	Colour cosmetics	√	√						√	√
11	Dentifrices and self-learning topic	√	√		√	√			√	√
12	Mouth washes	√	√						√	√
13	Nail polish	√	√						√	√
14	Self-learning discussion and revision	√			√	√				



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B. Practical part

Week No.	Practical course contents	Teaching and Learning Methods					Assessment methods			
		Advanced Lecture	Hybrid learning	Lab sessions	Team-based learning	Self-learning	Course Work	Practical	Written	Oral
1	Antiperspirants			√				√		
2	Deodorants			√				√		
3	Shaving creams			√				√		
4	Foundation Creams			√				√		
5	Cleansing Creams			√				√		
6	Toothpastes			√				√		
7	Eye makeup			√				√		
8	Moisturizer (Hand cream)			√				√		
9	Sunscreen cream			√				√		
10	Acne vulgaris cream			√				√		
11	Shampoo			√				√		
12	Bath preparations			√				√		
13	Sheet and Practical exam applying OSPE									

Course Coordinator	Assoc. Prof. Dr/ Noha Mohamed Saleh Marey
	<i>Noha M. Saleh</i>
Head of Department	Prof. Dr. Irhan Ibrahim Abu Hashim
	<i>Irhan Abuhashim</i>

Date: 20/9 / 2023



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الإكلينيكية (فارم دي) بكالوريوس الصيدلة
Pharm D-Clinical Pharmacy
Course Specification
Academic year: 2023/2024

Course name: Advanced Pharmaceutical Technology	اسم المقرر : التكنولوجيا الصيدلانية المتقدمة
Academic Level: Elective Course	المستوى الأكاديمي : مقرر اختياري
Scientific department: Pharmaceutics	القسم العلمي : الصيدلانيات
Head of Department: Prof. Dr. Irhan Ibrahim Abu Hashim	رئيس القسم : أ.د/ ارهان ابراهيم أبو هاشم
Course Coordinator: To be nominated	منسق المقرر : أ.د/.....



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (PharmD)
Academic Level	Elective Course, 2023-2024
Date of course specification approval	September 2023

A. Basic Information: Course data:

Course Title	Advanced Pharmaceutical Technology
Course Code	PTE10
Prerequisite	---
Teaching Hours: Lecture	1 عدد الساعات الزمنية
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Comprehend important aspects of quality assurance, cGMP, quality audit, and process validation.
- Gain information about the organization and operation of the major departments of pharmaceutical companies, as well as ways of dealing with regulatory and compliance issues.
- Acquire advanced information on drug discovery & development process, including INDA, NDA & ANDA, drug master file & therapeutic equivalent codes.
- Figure out various in-process quality control tests needed to assess some sterile and non-sterile products, pilot plant and scale up techniques, design, construction and operation of clean rooms as



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well as recent advances in packaging techniques for various pharmaceutical dosage forms, including stability & regulatory aspects of packaging.

2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Identify the basics of dosage from manufacture and design.
1.1.3.	1.1.3.1	Describe a quality product and its manufacturing process to consistently deliver the intended performance of the product.
1.1.7.	1.1.7.1	Recognize the patient needs by applying Quality-by-Design- principles.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.2	2.2.2.1.	Apply good manufacturing practices (GMP) involving quality assurance (QA) and quality control QC
2.2.5	2.2.5.1	Implement in-process quality control tests needed to assess sterile and non-sterile products.
2.6.1.	2.6.1.1.	Determine the modern systems in development of new trends to deliver drug molecules.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1.	4.1.1.1.	Demonstrate critical thinking, time management skills and decision-making activities
4.1.2	4.1.2.1	Retrieve and evaluate information, solve problems, and work effectively in a team.
4.2.1	4.2.1.1	Communicate effectively in a scientific language by verbal and written means in the field of health care.



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3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Quality assurance, quality audit and process validation. part I	1
2	Quality assurance, quality audit and process validation. part II	1
3	Organization and operation of departments of pharmaceutical companies. part I	1
4	Organization and operation of departments of pharmaceutical companies. Part II	1
5	Drug discovery and development	1
6	Drug production part1	1
7	Drug production part2	1
8	Operational management part I	1
9	Operational management part II	1
10	In-process quality control tests (Sterile products)	1
11	In-process quality control tests (non-sterile products)	1
12	Recent advances in packaging techniques (Principles)	1
13	Factors affecting packaging techniques part I	1
14	Factors affecting packaging techniques part II (self learning)	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final written and oral exam	-



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Week No.	Topics	Practical credit hours
1	Introduction- Packaging techniques	1
2	Design of filtration equipment	1
3	Centrifugal filtration	1
4	Particle size reduction, objectives, theory, and mechanisms.	1
5	Granulation; methods and mechanisms of granule formation	1
6	Pharmaceutical granulation equipment and pelletizers	1
7	Introduction to supercritical fluid technology	1
8	Mid-term exam	-
9	Application of supercritical fluid technology in drug extraction and particle design part1	1
10	Application of supercritical fluid technology in drug extraction and particle design part2	1
11	Derived properties of powder.	1
12	Introduction to Industrial gases	1
13	Quality control tests. part I	1
14	Quality control tests. part II	1
15	Revision and activity	1
16	Sheet and Practical exam applying OSPE	1



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4- Teaching and Learning Methods:

Teaching and learning methods		Weeks No.	K. elements to be addressed
4.1	Computer aided learning: a. Lectures using Data show, power Point presentations b. Distance learning <ul style="list-style-type: none"> • Online learning through “My Mans Platform” • Interactive discussion through My Mans. 	1-16	1.1.1.1, 1.1.3.1., 1.1.7.1, 2.2.2.1., 2.2.5.1, 2.6.1.1., 4.1.1.1., 4.1.2.1, 4.2.1.1.
4.2	Practical session	1-16	4.1.1.1., 4.2.1.1
4.3	Team-based learning	1-14	1.1.1.1, 1.1.3.1., 1.1.7.1., 2.1.6.1., 2.2.2.1., 2.6.1.1., 4.1.1.1., 4.2.1.1.
4.4	Self-learning	14	1.1.7.1., 2.1.6.1., 4.2.1.1.

5- Student Assessment:

b- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.1.1, 1.1.3.1., 1.1.7.1, 2.2.2.1., 2.2.5.1, 2.6.1.1., 4.1.1.1., 4.1.2.1, 4.2.1.1.
2-Practical exam applying OSPE	1.1.1.1, 1.1.3.1., 1.1.7.1., 2.1.6.1., 2.2.2.1., 2.6.1.1., 4.1.1.1., 4.2.1.1.
3-Oral exam	1.1.1.1, 1.1.3.1., 1.1.7.1, 2.6.1.1., 4.1.1.1, 4.2.1.1.
4- Periodical (Mid-term exam) / Course work	1.1.1.1.1, 1.1.3.1., 1.1.7.1, 2.2.2.1., 2.2.5.1, 2.6.1.1, 4.1.1.1, 4.2.1.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7-9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

6-Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	White board

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Pharmaceutical Technology; Fundamental Pharmaceutics , Eugene L. Parrott, 2016	Book
4.	http://www.sciencedirect.com / http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix

Matrix 1: Between course content and course k. elements:

A. Theoretical part:

Course contents / K. elements	Domain 1			Domain 2			Domain 4		
	1.1.1.1	1.1.3.1.	1.1.7.1.	2.2.2.1	2.2.5.1	2.6.1.1	4.1.1.1	4.1.2.1	4.2.1.1
Quality assurance, quality audit and process validation. part I	✓	✓	✓	✓	✓	✓	✓	✓	
Quality assurance, quality audit and process validation. part II	✓	✓	✓	✓	✓	✓	✓	✓	
Organization and operation of departments of pharmaceutical companies. part I		✓				✓	✓		
Organization and operation of departments of pharmaceutical companies. Part II		✓				✓	✓		
Drug discovery and development		✓				✓	✓		
Drug production part1			✓						
Drug production part2			✓						
Operational management part I	✓		✓					✓	✓
Operational management part II	✓		✓					✓	✓
In-process quality control tests (Sterile products)	✓	✓		✓	✓		✓	✓	



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In-process quality control tests (non-sterile products)		✓				✓		✓		
Recent advances in packaging techniques (Principles and Factors affecting)	✓					✓				✓
Factors affecting packaging techniques part I	✓	✓	✓		✓	✓	✓	✓	✓	✓
Factors affecting packaging techniques part II (Self-learning)	✓	✓	✓		✓	✓	✓	✓	✓	✓

B. Practical part:

Course contents / K. elements	Domain 1			Domain 2			Domain 4		
	1.1.1.1	1.1.3.1.	1.1.7.1.	2.2.2.1	2.2.5.1	2.6.1.1	4.1.1.1	4.1.2.1	4.2.1.1
Introduction- Packaging techniques							✓	✓	
Design of filtration equipment							✓		
Centrifugal filtration							✓		
Particle size reduction, objectives, theory, and mechanisms.								✓	
Granulation; methods and mechanisms of granule formation								✓	✓
Pharmaceutical granulation equipment and pelletizers							✓	✓	
Introduction to supercritical fluid technology and its application in drug extraction and particle design.							✓		
Application of supercritical fluid technology in							✓		



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drug extraction and particle design part1										
Application of supercritical fluid technology in drug extraction and particle design part2								✓		
Derived properties of powder.								✓	✓	✓
Introduction to Industrial gases										✓
Quality control tests. part I								✓		
Quality control tests. part II								✓		



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C. Practical part

Practical course contents	Teaching and Learning Methods					Assessment methods			
	Lecture	Online lecture	Lab sessions	Team-based learning	Self-learning	Course Work	Practical	Written	Oral
Introduction- Packaging techniques			√	√		√	√		
Design of filtration equipment			√	√		√	√		
Centrifugal filtration			√	√		√	√		
Particle size reduction, objectives, theory, and mechanisms.			√	√		√	√		
Granulation; methods and mechanisms of granule formation			√	√		√	√		
Pharmaceutical granulation equipment and pelletizers			√	√		√	√		
Introduction to supercritical fluid technology and its application in drug extraction and particle design.			√	√		√	√		
Derived properties of powder.			√	√		√	√		
Introduction to Industrial gases			√	√		√	√		
Application of supercritical fluid technology in drug extraction and particle design part1			√	√		√	√		



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Application of supercritical fluid technology in drug extraction and particle design part2			√	√		√	√		
Quality control tests. part I			√	√		√	√		
Quality control tests. part II			√	√		√	√		

Course Coordinator	To be nominated
Head of Department	Prof. Dr. Irhan Ibrahim Abu Hashim

Date: 20/9 / 2023



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Course name: Medical devices	اسم المقرر: الأجهزة الطبية
Academic Level: Elective Course	المستوى الأكاديمي: مقرر اختياري
Scientific department: Pharmaceutics	القسم العلمي: الصيدلانيات
Head of Department: Prof. Dr. Irhan Ibrahim Abu Hashim	رئيس القسم: أ.د/ ارهان ابراهيم ابو هاشم
Course Coordinator: To be nominated	منسق المقرر:



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	B. Pharm. (Pharm D) (Clinical Pharmacy)
Academic Level	Elective Course, 2023-2024
Date of course specification approval	September 2023

A. Basic Information: Course data:

Course Title	Medical devices
Course Code	PT E11
Prerequisite	-----
Teaching Hours: Lecture	1
Practical	1
Total Credit Hours	2 (Credit H)

B. Professional Information:

14- Course Aims:

This course enables the students to:

Understand the commercialization of safe and effective medical devices.

Gain insight into the technological, ethical, and business aspects of the highly regulated medical device industry.



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2- Course K. elements

Upon completing the course, the student will be able to dominate the following key elements

DOMAIN 1- FUNDAMENTAL KNOWLEDGE

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Define of the biomedical, administrative usage of safe and effective medical devices.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
2.2.4	2.2.4.1	Apply quality control and quality assurance of all the processes of medical devices industry and their applications for research, design, develop, regulate, test and market new medical devices and biologics.
2.3.2	2.3.2.1	Experience high ethical, legal and safety standards for management of biological and medical device products.

DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Share decision-making activities with other team members and communicate verbally in a scientific language.
4.3.2	4.3.2.1	Practice self-learning to improve professional skills.

3- Course Contents

Week No.	Topics	Credit Hours
1	Strategy and techniques for improving efficiency and effectiveness	1
2	In vitro diagnostic medical devices	1
3	Product-specific performance requirements	1
4	<u>Medical device commercialization</u> (conceptualization, planning phase, patent analysis, market relevance)	1



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5	<u>Medical Device Commercialization</u> (Regulatory Compliance, Quality Assurance, Implementation)	1
6	Quality and compliance in medical device companies	1
7	Quality Management System (QMS) part1	1
8	Quality Management System (QMS) part 2	1
9	Responsibilities of medical device companies I	1
10	Responsibilities of medical device companies II	1
11	Concepts of process ownership, individual accountability I	1
12	Concepts of process ownership, individual accountability II	1
13	Regulatory professionals in medical device companies I	1
14	Regulatory professionals in medical device companies II (Self-learning topic)	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final written and oral exam	-
Week No.	Practical topics	Credit hours
1	Quality Management System of different medical devices I	1
2	Quality Management System of different medical devices II	1
3	<u>Medical device commercialization</u> I	1
4	<u>Medical device commercialization</u> II	1
5	Marketing of new biologics part 1	1
6	Marketing of new biologics part 2	1
7	Medical device marketing plan I	1
8	Mid-term exam	-
9	Medical device marketing plan II	1
10	Applications of some advanced medical devices I	1
11	Applications of some advanced medical devices II	1
12	In vitro diagnostic devices for self-testing, (pregnancy tests).	1
13	Serological diagnostic reagents I	1
14	Serological diagnostic reagents II	1
15	Revision and activity	1
16	Sheet and Practical exam applying OSPE	1



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4- Teaching and Learning Methods:

Teaching and learning Methods		Weeks No.	K. elements to be addressed
4.1	Hybrid learning <ul style="list-style-type: none"> Online learning through my mans "Mansoura university" as recorded video lectures Interactive discussion through My Mans. 	1-16	1.1.1.1 / 2.2.4.1/ 2.3.2.1/ 4.1.2.1/ 4.3.2.1
4.2	Advanced lecture Brain storming	1-14	1.1.1.1/ 2.2.4.1/ 2.3.2.1/ 4.1.2.1/ 4.3.2.1
4.3	Self-learning	14	4.1.2.1/ 4.3.2.1
4.2	Practical works and tutorials	1-16	4.1.2.1/ 4.3.2.1

5- Student Assessment:

i- Assessment Methods:

1-Written exam	1.1.1.1 / 2.2.4.1/ 2.3.2.1
2-Practical exam applying OSPE	4.1.2.1/ 4.3.2.1
3-Oral exam	1.1.1.1 / 2.2.4.1/ 2.3.2.1/4.1.2.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1 / 2.2.4.1/ 2.3.2.1/4.1.2.1/ 4.3.2.1

j- Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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k- Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

Classroom	Data show- Computers, Internet, Platform
Laboratory facilities	Water baths, glassware, chemicals, electronic balance
Library	Books and Pharmacopoeia

8- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Design Controls for the Medical Device Industry, Marie B. Teixeira, CRC Press publisher, 3 rd edition, August 21, 2019.	Book
4.	Medical Devices (Regulations, Standards and Practices), Seeram Ramakrishna, Lingling Tian, Charlene Wang, Susan Liao and Wee Eong Teo. Woodhead Publishing ,1 st Edition, 2015.	Book
5.	http://www.sciencedirect.com / http://www.google.com / http://www.pubmed.com https://www.ekb.eg	Websites



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8- Matrix

Matrix 1: Between course content and course k. elements:

A. Theoretical part:

Course contents	Outcomes Domains / Key elements				
	Domain 1	Domain 2		Domain 4	
	1.1.1.1	2.2.4.1	2.3.2.1	4.1.2.1	4.3.2.1
Strategy and techniques for improving efficiency and effectiveness	√		√	√	
In vitro diagnostic medical devices	√		√	√	
Product-specific performance requirements		√	√	√	
<u>Medical device commercialization (conceptualization, planning phase, patent analysis, market relevance)</u>		√	√	√	
<u>Medical Device Commercialization (Regulatory Compliance, Quality Assurance, Implementation)</u>		√	√	√	
Quality and compliance in medical device companies		√	√	√	
Quality Management System (QMS) part 1		√	√	√	
Quality Management System (QMS) part 2		√	√	√	
Responsibilities of medical device companies I		√	√	√	



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Responsibilities of medical device companies II			√	√		√	
Concepts of process ownership, individual accountability I			√	√		√	
Concepts of process ownership, individual accountability II			√	√		√	
Regulatory professionals in medical device companies I			√	√		√	
Regulatory professionals in medical device companies II (Self-learning topic)			√	√		√	



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B. Practical part:

Course contents	Outcomes Domains / Key elements				
	Domain 1	Domain 2		Domain 4	
	1.1.1.1	2.2.4.1	2.3.2.1	4.1.2.1	4.3.2.1
Quality Management System of different medical devices I				√	√
Quality Management System of different medical devices II				√	√
Medical device commercialization I				√	√
Medical device commercialization II				√	√
Marketing of new biologics part 1				√	√
Marketing of new biologics part 2				√	√
Medical device marketing plan I				√	√
Medical device marketing plan II				√	√
Applications of some advanced medical devices I				√	√
Applications of some advanced medical devices II				√	√
In vitro diagnostic devices for self-testing, (pregnancy tests).				√	√
Serological diagnostic reagents I				√	√
Serological diagnostic reagents II				√	√



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Matrix 2. Between course contents, methods of learning and assessment

C. Theoretical part

Theoretical course contents	Teaching and Learning Methods					Assessment methods			
	Advanced Lecture	Hybrid learning	Lab sessions	Problem solving	Self-learning	Course Work	Practical	Written	Oral
Strategy and techniques for improving efficiency and effectiveness	√	√				√		√	√
In vitro diagnostic medical devices	√	√				√		√	√
Product-specific performance requirements	√	√				√		√	√
<u>Medical device commercialization</u> , <u>planning (conceptualization phase, patent analysis, market relevance)</u>	√	√				√		√	√
<u>Medical Device Commercialization</u> , <u>Regulatory Compliance (Quality Assurance, Implementation)</u>	√	√						√	√
Quality and compliance in medical device companies	√	√						√	√
Quality Management System (QMS) part 1	√	√						√	√
Quality Management System (QMS) part 2	√	√						√	√
Responsibilities of medical device companies I	√	√						√	√
Responsibilities of medical device companies II	√	√						√	√



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Concepts of process ownership, individual accountability I	√	√						√	√
Concepts of process ownership, individual accountability II	√	√						√	√
Regulatory professionals in medical device companies I	√	√						√	√
Regulatory professionals in medical device companies II (Self-learning topic)	√	√						√	√



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D. Practical part

Practical course contents	Teaching and Learning Methods					Assessment methods			
	Advanced Lecture	Hybrid learning	Lab sessions	Practical works and	Self-learning	Course Work	Practical	Written	Oral
Quality Management System of different medical devices I			√	√			√		
Quality Management System of different medical devices II			√	√			√		
<u>I</u> Medical device commercialization			√	√			√		
<u>II</u> Medical device commercialization			√	√			√		
Marketing of new biologics part 1			√	√			√		
Marketing of new biologics part 2			√	√			√		
Medical device marketing plan I			√	√			√		
Medical device marketing plan II			√	√			√		
Applications of some advanced medical devices I			√	√			√		
Applications of some advanced medical devices II			√	√			√		
In vitro diagnostic devices for self-testing, (pregnancy tests).			√	√			√		
Serological diagnostic reagents I			√	√			√		
Serological diagnostic reagents II			√	√			√		

Course Coordinator	To be nominated
Head of Department	Prof. Dr. Irhan Ibrahim Abu Hashim

Date: 20/ 9/ 2023



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Pharm D الإكلينيكية (فارم دي – بكالوريوس الصيدلة) Course Specification

Academic year: 2023/2024

Course name: Infection control and antimicrobial stewardship	اسم المقرر: مكافحة العدوي والاشراف على مضادات الميكروبات
Academic Level: Elective course (Level four or five)	المستوى الأكاديمي: مقرر اختياري (مستوى رابع أو خامس)
Scientific department: Microbiology and Immunology	القسم العلمي: الميكروبيولوجي والمناعة
Head of Department: Prof. Dr. EL-Sayed E. Habib	رئيس القسم : ا.د/ السيد الشربيني حبيب
Course Coordinator: To be nominated	منسق المقرر: سيتم ترشيحه



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Microbiology and Immunology
Department supervising the course	Microbiology and Immunology
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (Pharm D)
Academic Level	Fourth or fifth Level, Elective course, 2023-2024
Date of course specification approval	10 th September, 2023

A. Basic Information: Course data:

Course Title	Infection control and antimicrobial stewardship
Course Code	PM E12
Prerequisite	-
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2



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B. Professional Information:

1 .Course Aims:

This course enables the students to:

On completion of the course, the student will be able to provide students with information about the specific mechanism of action of different antimicrobial and how to detect the specific mechanism of resistance for different antimicrobials, major antimicrobial associated problems and infection prevention and control practices.

2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Outline the different classes of antimicrobial agents and their use in treatment of pathogenic bacteria.
1.1.2	1.1.2.1	Define medical terms related to antimicrobials and infection control
1.1.4	1.1.4.1	Recognize the mechanism of action of each antimicrobial agent against the microbe for complete patient recovery.
	1.1.4.2	Illustrate the requirements for successful antimicrobial therapy.
1.1.5	1.1.5.1	Recognize problems and adverse effects associated with the use of antimicrobials.
	1.1.5.2	Understand the crucial role of the laboratory in detecting antimicrobial resistance
	1.1.5.3	Outline and explain approaches used to overcome microbial resistance
1.1.8	1.1.8.1	Understand the clinical and infection prevention and control decision-making process behind using source and protective isolation to protect patients.



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Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.1.1	2.1.1.1	Utilize different measures to monitor and control of infection
2.3.2	2.3.2.1	Choose best practice, legal and safety standards for management of biomedical wastes
2.4.3	2.4.3.1	Apply rational prescribing by adhering to the principles of the stewardship program for treatment and prophylaxis.

Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.1.2	3.1.2.1	Develop appropriate methods of infection control to limit infections and promote public health awareness
3.1.3	3.1.3.1	Explain the laboratory methods to detect antimicrobial resistance and resistance mechanisms and their limitations.
3.2.6	3.2.6.1	Explain the importance of antimicrobial formularies, consumption data and prescribing policies and processes to monitor use of antimicrobials
3.2.7	3.2.7.1	Determine the challenges involved in overcoming resistance problem

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Able to solve problems, decision making and time management
4.1.2	4.1.2.1	Understand ethical, legal and safety guidelines
	4.1.2.2	Use effective team work to evaluate information and solving the problems.
4.2.1	4.2.1.1	Communicate efficiently in a scientific and easy language, by verbal and written means, regardless of the person's condition.
4.3.2	4.3.2.1	Apply independent education to promote continuous professional development.



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3- Course Content:

A.Theoretical part

Week No.	Topics	Lecture credit Hours
1	Introduction to antimicrobial agent and requirements for successful antimicrobial therapy	1
2	Problems associated with the use of antimicrobials	1
3	Antimicrobial stewardship	1
4	Antimicrobial agents	1
5	Antimicrobial resistance	1
6	Classification of β -Lactamase enzymes	1
7	Phenotypic detection of ESBL& AmpC	1
8	Phenotypic detection of carbapenemase	1
9	Strategies to minimize antimicrobial resistance	1
10	Chain of infection	1
11	Infection prevention measures	1
12	Transmission based precautions	1
13	Measures applied in health care facilities	1
14	Measures applied in community	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Start of Final written and oral exam	-



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B.Practical part

Week No.	Practical Topics	Practical credit hours
1.	Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern	1
2.	Detection of methicillin resistant <i>Staphylococcus aureus</i>	1
3.	Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 1- Initial screening tests.	1
4.	Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 2- Phenotypic confirmatory tests. A- Broth dilution test	1
5.	B-Double-disc approximation test	1
6.	Detection of AmpC enzymes part 1	1
7.	Detection of AmpC enzymes part 2	1
8.	Mid-term exam	-
9.	Detection of Metallo-betalactamases	1
10.	Modified Hodge Test for Carbapenemase Detection	1
11.	Assay of efflux pump	1
12.	Efflux pump activity by EtBr cartwheel method	1
13.	MIC Determination in the presence of efflux pump inhibitor	1
14.	Infection prevention control and Standard measures	1
15.	Revision and activity	1
16.	Practical exam applying OSPE	1



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4- Teaching and Learning Methods:

Teaching and Learning Methods		Week No.	K. elements to be addressed
4.1	Computer aided learning: a. Advanced Lectures using Data show, power Point presentations b. Distance learning <ul style="list-style-type: none"> • On line learning through my mans "Mansoura university "as recorded – video lectures • Inter active discussion through My Mans 	1-16	1.1.1.1, 1.1.4.1, 1.1.5.1, 2.1.1.1, 2.3.2.1, 2.4.3.1
4.2	Self-learning	13	1.1.1.1, 1.1.4.1, 1.1.5.1, 2.1.1.1, 2.3.2.1, 2.4.3.1
4.3	Practical session using chemicals and laboratory equipment and/ or tutorials	1-16	2.1.1.1, 2.3.2.1, 2.4.3.1 3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1
4.4	Class Activity: Group discussion offline and online.	1-14	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1
4.5	Problem – based learning and brainstorming	1-14	3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1
4.6	Research assignments	6, 12	3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1
4.7	Role play	4-11	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1



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5-Student Assessment:

1- Assessment Methods:

Assessment Methods	K elements to be assessed
1- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.4.1, 1.1.5.1, 2.3.2.1
2-Practical exam applying OSPE	2.1.1.1, 2.3.2.1, 2.4.3.1, 3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1
3-Written exam	1.1.1.1, 1.1.4.1, 1.1.5.1, 1.1.5.2, 1.1.5.3, 1.1.8.1, 2.1.1.1, 2.3.2.1, 2.4.3.1, 3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1
4-Oral	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Starting from 17 th week
Assessment 4	Oral exam	Starting from 17 th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	Microscopes- chemicals- glass wares- white board



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7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Centers for Disease Control and Prevention (CDC). (2019h). Healthcare providers. Retrieved from https://www.cdc.gov/handhygiene/providers/index.html	Internet
4.	Anderson D. (2020). Infection prevention: precautions for preventing transmission of infection. <i>UpToDate</i> . Retrieved from https://www.uptodate.com/contents/infection-prevention-precautions-for-preventing-transmission-of-infection	Internet
5.	CDC. Core Elements of Hospital Antibiotic Stewardship Programs. Atlanta, GA: US Department of Health and Human Services, CDC; 2014. Available at http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html .	internet
6.	Rational for Antibiotics – Guidelines Mangesh Tiwaskar, Tanuja Manohar	Book chapter
7.	Lectures notes prepared by staff members	Course notes
6.	http://www.sciencedirect.com/ / http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	websites



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Matrix 1: Course content and course key elements:

Course contents	Course Key Elements										
	Domain 1								Domain 2		
	1.1.1.1	1.1.2.1	1.1.4.1	1.1.4.2	1.1.5.1	1.1.5.2	1.1.5.3	1.1.8.1	2.1.1.1	2.3.2.1	2.4.3.1
A) Theoretical part											
Introduction to antimicrobial agent and requirements for successful antimicrobial therapy	✓		✓	✓		✓	✓				✓
Problems associated with the use of antimicrobials	✓		✓	✓		✓	✓				✓
Antimicrobial stewardship	✓		✓	✓		✓	✓				✓
Antimicrobial agents	✓		✓		✓					✓	✓
Antimicrobial resistance	✓		✓		✓					✓	✓
Classification of β -Lactamase enzymes	✓		✓	✓	✓	✓				✓	✓
Phenotypic detection of ESBL& AmpC	✓		✓	✓	✓	✓				✓	✓
Phenotypic detection of carbapenemase	✓		✓	✓	✓	✓				✓	✓
Strategies to minimize antimicrobial resistance	✓	✓					✓	✓	✓		✓
Chain of infection	✓	✓					✓	✓	✓		✓
Infection prevention measures	✓	✓					✓	✓	✓		✓



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Transmission based precautions	✓	✓					✓	✓	✓		✓
Measures applied in health care facilities	✓	✓			✓		✓		✓	✓	✓
Measures applied in community	✓	✓			✓		✓		✓	✓	✓

Course contents	Week No.	Course Key Elements								
		Domain 3				Domain 4				
		3.1.2.1	3.1.3.1	3.2.6.1	3.2.7.1	4.1.1.1	4.1.2.1	4.1.2.2	4.2.1.1	4.3.2.1
Introduction to antimicrobial agent and requirements for successful antimicrobial therapy	1		✓	✓						
Problems associated with the use of antimicrobials	2		✓	✓						
Antimicrobial stewardship	3		✓	✓						
Antimicrobial agents	4			✓	✓					
Antimicrobial resistance	5			✓	✓			✓		
Classification of β -Lactamase enzymes	6		✓	✓	✓		✓	✓		
Phenotypic detection of ESBL& AmpC	7		✓	✓	✓		✓	✓		
Phenotypic detection of carbapenemase	8	✓		✓	✓	✓	✓	✓	✓	✓



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Course contents	Course Key Elements										
	Domain 1							Domain 2			
	1.1.1.1	1.1.2.1	1.1.4.1	1.1.4.2	1.1.5.1	1.1.5.2	1.1.5.3	1.1.8.1	2.1.1.1	2.3.2.1	2.4.3.1
B) Practical part											
Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern			✓			✓				✓	✓
Detection of methicillin resistant <i>Staphylococcus aureus</i>			✓			✓				✓	✓
Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 1- Initial screening tests.			✓			✓				✓	✓
Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 2- Phenotypic confirmatory tests. A- Broth dilution test			✓			✓				✓	✓
B-Double-disc approximation test			✓			✓				✓	✓
Detection of AmpC enzymes part 1			✓			✓				✓	✓
Detection of AmpC enzymes part 2			✓			✓				✓	✓
Detection of Metallo-betalactamases			✓			✓				✓	✓
Modified Hodge Test for Carbapenemase Detection			✓			✓				✓	✓



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Assay of efflux pump			✓			✓			✓	✓
Efflux pump activity by EtBr cartwheel method			✓			✓			✓	✓
MIC Determination in the presence of efflux pump inhibitor			✓			✓		✓	✓	✓
Infection prevention control and Standard measures		✓		✓			✓	✓		✓

Course contents	Course Key Elements								
	Domain 3				Domain 4				
	3.1.2.1	3.1.3.1	3.2.6.1	3.2.7.1	4.1.1.1	4.1.2.1	4.1.2.2	4.2.1.1.	4.3.2.1
Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern		✓							
Detection of methicillin resistant <i>Staphylococcus aureus</i>		✓							
Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 1- Initial screening tests.		✓							
Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 2- Phenotypic confirmatory tests. A- Broth dilution test		✓							
B-Double-disc approximation test		✓			✓		✓		



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Detection of AmpC enzymes part 1		✓			✓		✓		
Detection of AmpC enzymes part 2		✓			✓		✓		
Detection of Metallo-betalactamases		✓			✓		✓		
Modified Hodge Test for Carbapenemase Detection		✓			✓		✓		
Assay of efflux pump		✓			✓		✓		
Efflux pump activity by EtBr cartwheel method		✓			✓		✓		
MIC Determination in the presence of efflux pump inhibitor		✓			✓		✓		
Infection prevention control and Standard measures	✓	✓	✓	✓	✓		✓		



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Matrix 2: between course content, methods of learning and assessment

Course contents	Teaching and learning methods								Assessment methods			
	Advanced Lecture	Online lecture	Lab sessions	Group discussion	Problem based learning	Role play	Research assessment	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Introduction to antimicrobial agent and requirements for successful antimicrobial therapy	√			√	√				√		√	√
Problems associated with the use of antimicrobials	√			√	√				√		√	√
Antimicrobial stewardship	√			√	√				√		√	√
Antimicrobial agents	√			√	√				√		√	√
Antimicrobial resistance	√			√	√						√	√
Classification of β-Lactamase enzymes	√			√	√		√				√	√
Phenotypic detection of ESBL& AmpC	√	√		√	√						√	√
Phenotypic detection of carbapenemase	√			√	√						√	√
Strategies to minimize antimicrobial resistance	√			√	√						√	√
Chain of infection	√			√	√						√	√
Infection prevention measures	√			√	√						√	√
Transmission based precautions	√			√	√		√				√	√
Measures applied in health care facilities	√	√		√	√			√			√	√
Measures applied in community	√	√		√	√			√			√	√



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Course contents	Teaching and learning methods								Assessment methods			
	Advanced Lecture	Distance learning	Lab sessions	Group discussion	Problem based	Role play	Research	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern		√	√	√	√					√		
Detection of methicillin resistant <i>Staphylococcus aureus</i>		√	√	√	√					√		
Detection of Extended spectrum beta lactamases(ESBLs) producing strains. 1- Initial screening tests.		√	√	√	√					√		
Detection of Extended spectrum beta lactamases (ESBLs) producing strains. 2- Phenotypic confirmatory tests. A- Broth dilution test		√	√	√	√	√				√		
B-Double-disc approximation test		√	√	√	√	√				√		
Detection of AmpC enzymes part 1		√	√	√	√	√				√		
Detection of AmpC enzymes part 2		√	√	√	√	√				√		
Detection of Metallo-betalactamases		√	√	√	√	√				√		
Modified Hodge Test for Carbapenemase Detection		√	√	√	√	√				√		



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Assay of efflux pump		√	√	√	√	√				√		
Efflux pump activity by EtBr cartwheel method		√	√	√	√	√				√		
MIC Determination in the presence of efflux pump inhibitor		√	√	√	√	√				√		
Infection prevention control and Standard measures		√	√	√	√	√				√		

Course Coordinator	To be nominated
Head of Department	Prof. Dr. El-Sayed E. Habib
	

Date: 10/9/2023



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– بكالوريوس الصيدلة الإكلينيكية (فارم دي Pharm D) –

Course Specification

Academic year: 2023/2024

Course name: Bioinformatics	اسم المقرر : المعلوماتية الحيوية
Academic Level: Elective course (Level four or five)	المستوى الأكاديمي :مقرر اختياري (مستوى رابع أو خامس)
Scientific department: Microbiology and Immunology	القسم العلمي :الميكروبيولوجي والمناعة
Head of Department: Prof. El-Sayed El-Sherbeny Habib	رئيس القسم: إ.د/ السيد الشربيني حبيب
Course Coordinator: To be nominated	منسق المقرر: سيتم ترشيحه



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Microbiology and Immunology
Department supervising the course	Microbiology and Immunology
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (PharmD)
Academic Level	Fourth or Fifth Level, Elective course, 2023-2024
Date of course specification approval	10 th September 2023

A. Basic Information: Course data:

Course Title	Bioinformatics
Course Code	PM E13
Prerequisite	-
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2

B. Professional Information:

1 .Course Aims:

This course enables the students to:

- Understand the basic principles of Bioinformatics and its applications.
- Recognize the importance of data management and different biological databases.



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- Gain experience in different Bioinformatics tools for sequence analysis and molecular phylogenetics.
- Predict protein secondary and tertiary structure and methods of validation.
- Develop basic skills in structural and functional genomics.

2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Recall the knowledge about the basics of bioinformatics and its applications.
1.1.5	1.1.5.1	Utilize the fundamentals and critical understanding of bioinformatics to solve problems related to human diseases and health conditions.
1.1.6	1.1.6.1	Retrieve, manipulate and analyze biological data in biological databases to make evidence-informed expert decisions.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.1.2	2.1.2.1	Utilize the fundamentals of codes of ethics professionally, and protect the confidentiality and privacy of the patient information and confidentiality of data related to the population.
2.4.3	2.4.3.1	Share in decision-making procedures especially in customized and personalized medicine.
2.5.3	2.5.3.1	Implement Bioinformatics tools to solve clinical and pharmaceutical problems.



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Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.1.1	3.1.1.1	Organize treatment plans for patients based on their genetic, physiological, biochemical and immunological differences.
3.2.3	3.2.3.1	Employ bioinformatics tools for the application of non-conventional therapy into pharmacy practice.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Demonstrate decision-making abilities with pharmacy and non-pharmacy team members.
4.2.2	4.2.2.1	Employ biological databases and bioinformatics tools to retrieve, analyze, and present relevant biological information.
4.3.2	4.3.2.1	Adopt fundamentals of lifelong professional education including evaluating our own learning needs and developing a plan to fulfill them.



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3- Course Contents:

Week No.	Topics	Lecture credit Hours
1.	Introduction to Bioinformatics and its applications	1
2.	Introduction to biological databases	1
3.	Pairwise sequence alignment	1
4.	Multiple sequence alignment	1
5.	Database similarity search	1
6.	Structural genomics	1
7.	Functional genomics	1
8.	Gene structure prediction	1
9.	Protein motifs and domain prediction	1
10.	Protein secondary and tertiary structure prediction part 1	1
11.	Protein secondary and tertiary structure prediction part 2	1
12.	Molecular Phylogenetics	1
13.	Applications of Bioinformatics in medicine	1
14.	Applications of Bioinformatics in non medical fields	1
15.	Compensatory and alternative lecture	1
16.	Revision and quiz	1
17.	Start of Final written and oral exam	-
Week No.	Practical Topics	Practical credit hours
1	Biological databases: How to access, retrieve, and manipulate biological information? Part 1	1
2	Biological databases: How to access, retrieve, and manipulate biological information? Part 2	1
3	Pairwise sequence alignment: How to perform and interpret.	1



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4	Multiple sequence alignment: How to perform and interpret.	1
5	Database similarity search: : How to perform and interpret the results.	1
6	Gene prediction: programs for prokaryotes and eukaryotes gene prediction.	1
7	Genome mapping, assembly and comparison	1
8	Mid-term exam	-
9	Transcriptome analysis: Microarray, EST, SAGE and RNA-seq.	1
10	Protein motifs and domain prediction	1
11	Protein secondary and tertiary structure prediction part 1	1
12	Protein secondary and tertiary structure prediction part 2	1
13	Molecular Phylogenetics part 1	1
14	Molecular Phylogenetics part 2	1
15	Revision and activity	1
16	Practical exam applying OSPE	1



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4- Teaching and Learning Methods:

Teaching and Learning Method		Week No.	Key elements to be addressed
4.1	Computer aided learning: a. Lectures using Data show, PowerPoint presentations b. Distance learning <ul style="list-style-type: none">On line learning through my mans "Mansoura university "as recorded – video lecturesInteractive discussion through My Mans	1-16	1.1.1.1, 1.1.5.1, 1.1.6.1, 2.1.2.1, 2.4.3.1, 2.5.3.1
4.2	Self-learning	1-13	1.1.1.1, 1.1.5.1, 1.1.6.1, 2.1.2.1, 2.4.3.1, 2.5.3.1
4.3	Practical session in computer laboratory and/ or tutorials	1-16	2.1.2.1, 2.4.3.1, 2.5.3.1, 3.1.1.1, 3.2.3.1
4.4	Class Activity: Group discussion offline and online.	1-13	3.1.1.1, 3.2.3.1, 4.1.1.1, 4.2.2.1
4.5	Problem – based learning and brainstorming	1-13	3.1.1.1, 3.2.3.1, 4.1.1.1, 4.2.2.1



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5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.5.1, 1.1.6.1, 3.1.1.1, 3.2.3.1
2-Practical exam applying OSPE	1.1.1.1, 1.1.5.1, 1.1.6.1, 3.1.1.1, 3.2.3.1, 4.2.2.1
3-Written exam	1.1.1.1, 1.1.5.1, 1.1.6.1, 2.1.2.1, 2.4.3.1, 2.5.3.1, 3.1.1.1, 3.2.3.1
4-Oral	1.1.1.1, 1.1.5.1, 1.1.6.1, 2.1.2.1, 2.4.3.1, 2.5.3.1, 4.1.1.1, 4.3.2.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th - 9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Starting from 17 th week
Assessment 4	Oral exam	Starting from 17 th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%



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6- Facilities required for teaching and learning

- Classroom	Data show, Computers, Internet.
- Laboratory facilities	Computers connected to the internet, software, ...

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Essential Bioinformatics. Jin Xiong. Cambridge University Press.	Book
4.	Introduction to Bioinformatics. Arthur M. Lesk. Oxford University Press.	Book
5.	Introduction to Bioinformatics: A Theoretical and Practical Approach. Krawetz. Stephen A. Humana Press.	Book
6.	http://www.sciencedirect.com http://www.google.scholar.com http://www.pubmed.com https://www.ekb.eg https://www.ncbi.nlm.nih.gov https://www.ebi.ac.uk https://www.ddbj.nig.ac.jp/index-e.html	websites



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8- Matrix 1: Course content and course key elements:

Course contents	Course Key Elements										
	Domain 1			Domain 2			Domain 3		Domain 4		
	1.1.1.1	1.1.5.1	1.16.1	2.1.2.1	2.4.3.1	2.5.3.1	3.1.1.1	3.2.3.1	4.1.1.1	4.2.2.1	4.3.2.1
Introduction to Bioinformatics and its applications	√	√	√		√	√	√	√			
Introduction to biological databases		√	√			√	√	√			
Pairwise sequence alignment			√					√			
Multiple sequence alignment			√			√		√			
Database similarity search			√			√	√		√		
Structural genomics			√				√		√	√	√
Functional genomics			√					√	√	√	√
Gene structure prediction											



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Protein motifs and domain prediction			√					√				√	
Protein secondary and tertiary structure prediction part1			√						√			√	
Protein secondary and tertiary structure prediction part2			√						√			√	
Molecular Phylogenetics			√					√	√			√	
Applications of Bioinformatics in medicine	√			√				√					√
Applications of Bioinformatics in non-medical fields	√		√	√		√	√	√	√		√	√	√



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Course contents	Course Key Elements										
	Domain 1			Domain 2			Domain 3		Domain 4		
	1.1.1.1	1.1.5.1	1.16.1	2.1.2.1	2.4.3.1	2.5.3.1	3.1.1.1	3.2.3.1	4.1.1.1	4.2.2.1	4.3.2.1
B) Practical part											
Biological databases: How to access, retrieve, and manipulate biological information? Part 1	√		√								
Biological databases: How to access, retrieve, and manipulate biological information? Part 2	√		√								
Pairwise sequence alignment: How to perform and interpret.	√	√	√								
Multiple sequence alignment: How	√	√	√			√		√			



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to perform and interpret.												
Database similarity search: : How to perform and interpret the results.	√	√	√			√	√					
Gene prediction: programs for prokaryotes and eukaryotes gene prediction.	√	√	√			√	√			√		
Genome mapping, assembly and comparison	√	√	√			√		√	√	√	√	√
Transcriptome analysis: Microarray, EST, SAGE and RNA-seq.			√			√	√			√		
Protein motifs and domain			√					√		√		



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prediction													
Protein secondary and tertiary structure prediction part 1			√					√	√			√	
Protein secondary and tertiary structure prediction part 2			√					√	√			√	
Molecular Phylogenetics part1	√		√	√	√			√				√	
Molecular Phylogenetics part2	√		√	√	√			√				√	



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Matrix 2: between course content, methods of learning and assessment

Theoretical part									
Course contents	Teaching and learning methods					Assessment methods			
	Lecture	Lab sessions	Group discussion	Problem based learning	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Introduction to Bioinformatics and its applications	√		√	√	√	√		√	√
Introduction to biological databases	√		√	√	√	√		√	√
Pairwise sequence alignment	√		√	√	√	√		√	√
Multiple sequence alignment	√		√	√	√	√		√	√
Database similarity search	√		√	√	√			√	√
Structural genomics	√		√	√	√			√	√
Functional genomics	√		√	√	√			√	√
Gene structure prediction	√		√	√	√			√	√
Protein motifs and domain prediction	√		√	√	√			√	√
Protein secondary and tertiary structure prediction part 1	√		√	√	√			√	√



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Protein secondary and tertiary structure prediction part 2	√		√	√	√			√	√
Molecular Phylogenetics	√		√	√	√			√	√
Applications of Bioinformatics in medicine	√		√	√	√			√	√
Applications of Bioinformatics in non medical fields	√		√	√	√			√	√

Course Coordinator	To be nominated
Head of Department	Prof. Dr. El Sayed E. Habib



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بكالوريوس الصيدلة الإكلينيكية (فارم دي)
(Pharm D –
Course Specification
Academic year: 2023/2024

Course name: Biological standardization	اسم المقرر : المعايير الاحيائية
Academic Level: level 4/5	الخامس المستوى الأكاديمي :الرابع/
Scientific department: Pharmacology and Toxicology	القسم العلمي : الادوية و السموم
Head of Department: Prof Dr Manar A Nader	رئيس القسم : أ.د/ منار احمد نادر
Course Coordinator:	منسق المقرر :



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacology& Toxicology and Microbiology
Department supervising the course	Pharmacology& Toxicology and Microbiology
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (Pharm-D)
Academic Level	Level four/five, elective course, 2023/2024
Date of course specification approval	18 th September 2023

A. Basic Information: Course data:

Course Title	Biological standardization
Course Code	PO E14
Prerequisite	Registration
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Apply different techniques for screening and bioassay of new drugs belongs to different pharmacological categories.
- Demonstrate required standards of sterile and non-sterile pharmaceutical products.



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2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.9	1.1.9.1	Accomplish specific calculations including those used to calculate doses of antibiotics and vaccines.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.1	2.2.1.1	Standardize and quantify pharmaceutical materials and from different origins.
2.2.4	2.2.4.1	Perform calculations, biostatistical analysis and assessment of procedures of pharmaceutical formulations.

Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.1.1	3.1.1.1	Adjust a dosage regimen for a patient depending on the physiological, genetic, biochemical and immunological changes occurred by disease or another drug.
3.2.1	3.2.1.1	Assimilate principles of pharmacological features of drugs, as mechanism of action, uses, dosage, undesired effects and drug interactions.
3.2.4	3.2.4.1	Endorse suitable information about toxicity of medicinal agents and other xenobiotics comprising probable signs, symptoms and treatment possibilities.



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Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.2.1	4.2.1.1	Use clear language, tone, writing skills and non-verbal communication when dealing with patients, health team and communities.

3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Introduction to biological standardization	1
2	Assay of hypophyseal hormones	1
3	Assay of thyroid hormones	1
4	Assay of parathyroid hormones	1
5	Assay of adrenocorticosteroid hormones	1
6	Assay of pancreatic hormones	1
7	Biological standardization of venoms and toxins	1
8	Biological standardization of vitamins	1
9	Screening and Biological standardization of Autonomic nervous system (part 1)	1
10	Screening and Biological standardization of Autonomic nervous system (part 2)	1
11	Antibiotic assay	1
12	Vaccine assay	1



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13	antiviral assay	1
14	Microbial limit test (self-learning)	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final theoretical exam	-
Week No.	Practical Topics	Practical credit hours
1.	Effect of drugs on isolated tissue preparation	1
2.	Study of dose response curve of acetylcholine on frog's rectus abdominis muscle	1
3.	Drugs acting on smooth muscles of the intestine	1
4.	Screening of Analgesics	1
5.	Screening of antiepileptic drugs	1
6.	Immunoassays	1
7	Immunoassays	1
8	Mid-term exam	-
9	Immunoblotting (Western Blotting) part 1	1
10	Immunoblotting (Western Blotting) part 2	1
11	Assay of Antibiotic by agar diffusion method	1
12	Assay of Antibiotic combination	1
13	Preparation of heat killed bacterial vaccine (part 1)	1
14	Preparation of heat killed bacterial vaccine (part 2)	1



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15	Revision and activity	1
16	Practical exam (OSPE)	1

4- Teaching and Learning Methods:

Teaching and Learning Method		Week number	K. elements to be addressed
4.1	Advanced lectures: <ul style="list-style-type: none"> Lectures using Data show, power Point presentations Brain storming Group discussion 	1-16	1.1.9.1, 2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1, 4.2.1.1
4.2	Hybrid learning <ul style="list-style-type: none"> Online learning through my Mans "Mansoura university " Interactive discussion through My Mans 	1-12	1.1.9.1, 2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1, 4.2.1.1
4.3	Self-learning	14	4.2.1.1
4.4	Practical classes provided with experimental animals for handling and demonstration of toxicities with data shows and white boards for data presentation	1-16	2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1, 4.2.1.1
4.5	Collaborative learning: research project	9-11	2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1, 4.2.1.1
4.6	Case study	9-11	2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1, 4.2.1.1



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5- Student Assessment:

m- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.9.1, 2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1
2-Practical exam	1.1.9.1, 2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1
3-Oral	1.1.9.1, 2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1, 4.2.1.1
4- Periodical (Mid-term exam) / Course work	1.1.9.1, 2.2.1.1, 2.2.4.1, 3.1.1.1, 3.2.1.1, 3.2.4.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%



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6- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	chemicals- glass wares- white board – Apparatus, experimental animals

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members.	Course notes
2.	Basic Principals of Drug Discovery and Development; Benjamin E. Blass. Academic Press; 2nd ed. (2021).	Book
3.	Screening Methods in Pharmacology - Volume 1 - Principles and Applications; Muralidhar Rao. Notion Press; 1 st ed. (2023).	Book
4.	http://www.sciencedirect.com/ http://www.google scholar.com/ http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content versus course k. elements:

Course contents / K. elements	Domain 1	Domain 2		Domain 3			Domain 4
	1.1.9.1	2.2.1.1	2.2.4.1	3.1.1.1	3.2.1.1	3.2.4.1	4.3.2.1
A) Theoretical part							
Introduction to biological standardization		✓				✓	
Assay of hypophyseal hormones			✓				
Assay of thyroid hormones	✓			✓			✓
Assay of parathyroid hormones	✓	✓			✓		
Assay of adrenocorticosteroid hormones	✓		✓			✓	
Assay of pancreatic hormones	✓				✓		
Biological standardization of venoms and toxins	✓			✓			✓
Biological standardization of vitamins		✓				✓	



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Screening and Biological standardization of Autonomic nervous system (part 1)	✓		✓				✓
Screening and Biological standardization of Autonomic nervous system (part 2)		✓				✓	
Antibiotic assay	✓						
Vaccine assay	✓						
antiviral assay							✓
Microbial limit test (self-learning)	✓						✓

Course contents / K. elements	Domain 1	Domain 2		Domain 3		Domain 4	
	1.1.9.1	2.2.1.1	2.2.4.1	3.1.1.1	3.2.1.1	3.2.4.1	4.3.2.1
B) Practical part							
Effect of drugs on isolated tissue preparation		✓				✓	
Study of dose response curve of acetylcholine on frog's rectus abdominis muscle			✓				
Drugs acting on smooth muscles of the intestine	✓			✓			✓



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Screening of Analgesics	✓	✓			✓		
Screening of antiepileptic drugs	✓		✓			✓	
Immunoassays	✓				✓		
Immunoassays	✓			✓			✓
Immunoblotting (Western Blotting) part 1	✓	✓				✓	
Immunoblotting (Western Blotting) part 2	✓	✓				✓	
Assay of Antibiotic by agar diffusion method	✓	✓	✓	✓	✓	✓	✓
Assay of Antibiotic combination		✓	✓	✓	✓	✓	✓
Preparation of heat killed bacterial vaccine (part 1)	✓	✓	✓	✓	✓	✓	✓
Preparation of heat killed bacterial vaccine (part 2)	✓	✓	✓	✓	✓	✓	✓



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9- Matrix between course content, method of learning and assessment:

Course contents	Teaching and learning methods					Assessment methods			
	Advanced Lectures	Hybrid learning	Lab sessions	Self-learning	Collaborative learning	Course work	Practical/tutorial	Written	Oral
Introduction to biological standardization	✓					✓		✓	✓
Assay of hypophyseal hormones	✓					✓		✓	✓
Assay of thyroid hormones	✓					✓		✓	✓
Assay of parathyroid hormones	✓					✓		✓	✓
Assay of adrenocorticosteroid hormones	✓	✓						✓	✓
Assay of pancreatic hormones	✓							✓	✓
Biological standardization of venoms and toxins	✓							✓	✓
Biological standardization of vitamins	✓	✓						✓	✓
Screening and Biological standardization of Autonomic nervous	✓				✓			✓	✓



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system (part 1)									
Screening and Biological standardization of Autonomic nervous system (part 2)	✓				✓			✓	✓
Antibiotic assay	✓	✓			✓			✓	✓
Vaccine assay	✓							✓	✓
antiviral assay	✓							✓	✓
Microbial limit test (self-learning)	✓			✓				✓	✓



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B) Practical part:										
Course contents	Teaching and learning methods						Assessment methods			
	Advanced lectures	Hybrid learning	Lab sessions	Self-learning	Case study	Collaborative learning	Course work	Practical/tutorial	Written	Oral
Effect of drugs on isolated tissue preparation		✓	✓					✓		
Study of dose response curve of acetylcholine on frog's rectus abdominis muscle		✓	✓				✓	✓		
Drugs acting on smooth muscles of the intestine		✓	✓				✓	✓		
Screening of Analgesics		✓	✓				✓	✓		
Screening of antiepileptic drugs		✓	✓				✓	✓		
Immunoassays		✓	✓				✓	✓		



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Immunoassays		✓	✓				✓	✓		
Immunoblotting (Western Blotting) part 1		✓	✓				✓	✓		
Immunoblotting (Western Blotting) part 2		✓	✓				✓	✓		
Assay of Antibiotic by agar diffusion method		✓	✓		✓	✓	✓	✓		
Assay of Antibiotic combination		✓	✓		✓	✓	✓	✓		
Preparation of heat killed bacterial vaccine (part 1)		✓	✓		✓	✓	✓	✓		
Preparation of heat killed bacterial vaccine (part 2)		✓	✓				✓	✓		

Course Coordinator	
Head of Department	Prof Dr Manar A Nader

Date: 18/9 / 2023



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بكالوريوس الصيدلة الإكلينيكية (فارم دي – Pharm D)
Course Specification
Academic year: 2023/2024

Course name: Geriatric pharmacotherapy (PO E15)	اسم المقرر : طب المسنين
Academic Level: Level 4	المستوى الأكاديمي : الرابع
Scientific department: pharmacology & Toxicology	القسم العلمي : الادوية والسموم
Head of Department: Prof Dr Manar A Nader	رئيس القسم : أ.د/ منار احمد نادر
Course Coordinator: Dr. Marwa S.Serrya	منسق المقرر : مروة سعد سرية.د



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacology & toxicology
Department supervising the course	Pharmacology & toxicology
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (Pharm-D)
Academic Level	Level four, first semester, elective course , 2023/2024
Date of course specification approval	18/9/ 2023

A. Basic Information: Course data:

Course Title	Geriatric Pharmacotherapy
Course Code	PO E15
Prerequisite	Registration
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Assimilate the basic principles of aging
- Know the importance of team-based health care of geriatric patients



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- Emphasize the importance of dealing with risk factors of aging disease and drug interaction in elderly
- Recognize the different aspects of different pharmacological classes of drugs concerning older patients.
- Identify the most common diseases in elderly patients including neurodegenerative diseases, osteoarthritis, fall and dizziness, hypertension and ischemic heart diseases

2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1-1-5	1-1-5-1	Use the principles and practice of fundamental sciences to solve problems related to human health and health systems

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2-4-3	2-4-3-1	Make decision for recognized drug-related and pharmaceutical care problems
2-4-5	2-4-5-1	Specify and take suitable action when signs, symptoms and risk factors related to health problems that fall into the scope of practice of other health professionals are encountered.

Domain 3: Pharmaceutical Care



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Program K. element no.	Course K. element no.	Course K. element
3-2-1	3-2-1-1	Assimilate principles of pharmacological aspects of drugs including mechanism of action, therapeutic uses, proper dosage, unwanted effects as well as drug interactions.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4-2-1	4-2-1-1	Apply clear language, tone and non-verbal communication when dealing with patients and other health team.
4-3-1	4-3-1-1	Plan strategies to manage and improve self-practice of pharmacy



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3- Course Contents:

A) Theoretical part:

Week No.	Topics	Lecture credit Hours
1	Introduction of aging	1
2	Introduction of aging	1
3	Neurodegenerative diseases (Parkinson's disease)	1
4	Neurodegenerative diseases (Alzheimer's disease)	1
5	Osteoarthritis	1
6	Stroke	1
7	Fall and dizziness	1
8	Hypertension (part 1)	1
9	Hypertension (part 2)	1
10	Ischemic heart disease (part 1)	1
11	Ischemic heart disease (part 2)	1
12	Ischemic heart disease (part 3)	1
13	Arrhythmias part 1(Self learning)	1
14	Arrhythmias part2	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final Written and Oral Exam	-



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B) Practical part

Week No.	Topics	Practical credit hours
1	Key concepts for pharmacist in medication management in older persons	1
2	polypharmacy	1
3	osteoarthritis case	1
4	stroke case	1
5	Alzheimer's disease	1
6	Vertigo	1
7	Parkinson's disease part 1	1
8	Mid-term exam	-
9	Parkinson's disease part 2	1
10	Ischemic heart disease case study 1	1
11	Ischemic heart disease case study 2	1
12	Hypertension special conditions	1
13	Hypertension case study 1	1
14	Hypertension case study 2	1
15	Revision and activity	1
16	Tutorial exam	1



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4- Teaching and learning Methods:

	Teaching and learning Methods:	Week. No	K. elements to be addressed
4.1	Advanced lectures: <ul style="list-style-type: none"> Lectures using Data show, power Point presentations Brain storming Group discussion 	1-16	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1
4.2	Hybrid learning: <ul style="list-style-type: none"> On line learning through My mans "Mansoura university " Interactive discussion through MyMans 	1-11	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1
4.3	Self-learning	13	4-2-1-1, 4-3-1-1
4.4	Tutorial session using data show and power point presentations	1-16	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1,
4.5	Case study	3-11	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1
4.6	Collaborative learning: Research assignments	3-12	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1
2-Tutorial exam	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1
3-Oral	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1
4- Periodical (Mid-term exam) / Course work	1-1-5-1, 2-4-3-1, 2-4-5-1, 3-2-1-1, 4-2-1-1, 4-3-1-1



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b. Assessment schedule

Assessment 1	Periodical (Mid-term/ Course work)	7-9 th week
Assessment 2	Tutorial exam	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term written examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	Microscopes- chemicals- glass wares- white board

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2	Wasserman, M.R. Geriatric and Primary Care Workforce Development. In: Healthcare Changes and the Affordable Care Act: A Physician Call to Action, Powers, 2015: 99-115.	book
3	Bente JA, Geriatrics ACCP Updates in Therapeutics® 2022: Pharmacotherapy Preparatory Review and Recertification Course	book
4	Michael Katz, Kathryn R. Matthias, Marie Chisholm-Burns (2022) Pharmacotherapy Principle and Practice 6th edition McGraw Hill	book
5	http://www.sciencedirect.com/ http://www.google scholar.com/ http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content versus course k. elements:

Course contents / K. elements	Domain 1	Domain 2		Domain 3	Domain 4	
	1.1.5.1	2.4.3.1	2.4.5.1	3.2.1.1	4.2.1.1	4.3.1.1
A) Theoretical part						
Introduction of aging	✓					
Introduction of aging	✓		✓			
Neurodegenerative diseases (Parkinson’s disease)	✓	✓	✓	✓		
Neurodegenerative diseases (Alzheimer’s disease)	✓	✓	✓	✓		
Osteoarthritis	✓	✓	✓	✓		
Stroke	✓	✓	✓	✓		
Fall and dizziness	✓	✓	✓	✓	✓	✓
Hypertension (part 1)	✓	✓	✓	✓	✓	✓
Hypertension (part 2)	✓	✓	✓	✓	✓	✓
Ischemic heart disease (part 1)	✓	✓	✓	✓	✓	✓
Ischemic heart disease (part 2)	✓	✓	✓	✓	✓	✓
Ischemic heart disease (part 3)	✓	✓	✓	✓	✓	✓
Arrhythmias part 1 (self learning)	✓	✓	✓	✓	✓	✓
Arrhythmias part 2	✓	✓	✓	✓	✓	✓



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Course contents / K. elements	Domain 1	Domain 2		Domain 3	Domain 4	
	1.1.5.1	2.4.3.1	2.4.5.1	3.2.1.1	4.2.1.1	4.3.1.1
B) Practical part						
Key concepts for pharmacist in medication management in older persons	✓		✓			
Polypharmacy	✓		✓			
osteoarthritis case	✓	✓	✓	✓		
stroke case	✓	✓	✓	✓		
Alzheimer's disease	✓	✓	✓	✓		
Vertigo	✓	✓	✓	✓		
Parkinson's disease part 1	✓	✓	✓	✓	✓	✓
Parkinson's disease part 2	✓	✓	✓	✓	✓	✓
Ischemic heart disease case study 1	✓	✓	✓	✓	✓	✓
Ischemic heart disease case study 2	✓	✓	✓	✓	✓	✓
Hypertension special conditions	✓	✓	✓	✓	✓	✓
Hypertension case study 1	✓	✓	✓	✓	✓	✓
Hypertension case study 2	✓	✓	✓	✓	✓	✓



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9-Matrix between course contents, methods of learning and assessment:

A) Theoretical Part:										
Course Contents	Teaching and Learning Methods						Assessment methods			
	Lecture	Hybrid learning	Lab sessions	Collaborative learning	Case study	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Introduction of aging	√						√		√	√
Introduction of aging	√						√		√	√
Neurodegenerative diseases (Parkinson's disease)	√			√			√		√	√
Neurodegenerative diseases (Alzheimer's disease)	√	√		√			√		√	√



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Osteoarthritis	√			√					√	√
Stroke	√			√					√	√
Fall and dizziness	√	√		√					√	√
Hypertension (part 1)	√			√					√	√
Hypertension (part 2)	√			√					√	√
Ischemic heart disease (part 1)	√	√		√					√	√
Ischemic heart disease (part 1)	√			√					√	√
Arrhythmias part1 (self learning)						√			√	√
Arrhythmias part2						√			√	√



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B) Practical Part:										
Course Contents	Teaching and Learning Methods						Assessment methods			
	Advanced Lecture	Hybrid learning	Lab sessions	Collaborative learning	Case study	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Key concepts for pharmacist in medication management in older persons		✓	✓					✓		



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polypharmacy		√	√				√	√		
osteoarthritis case		√	√	√	√		√	√		
stroke case		√	√	√	√		√	√		
Alzheimer's disease		√	√	√	√		√	√		
Vertigo		√	√	√	√		√	√		
Parkinson's disease part1		√	√	√	√		√	√		
Parkinson's disease part2		√	√	√	√		√	√		
Ischemic heart disease case study 1		√	√	√	√		√	√		
Ischemic heart disease case study 2		√	√	√	√		√	√		




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Hypertension special conditions		√	√	√	√		√	√		
Hypertension case study 1		√	√	√	√		√	√		
Hypertension case study 2		√	√	√	√		√	√		

Course Coordinator	Dr. Marwa S. Serrya
Head of Department	Prof Dr Manar A Nader 

Date: 18/9/2023



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بكالوريوس الصيدلة
(فارم دي – Pharm D) الإكلينيكية
Course Specification
Academic year: 2023- 2024

Course name: Pharmacogenetics of drug metabolism and transport	اسم المقرر : علم الادويه الجينومي المتقدم
Academic Level: Level four/ five	المستوى الأكاديمي :المستوي الرابع/ الخامس
Scientific department: Pharmacology and Toxicology	القسم العلمي : الادوية والسموم
Head of Department: Prof Dr Manar A Nader	رئيس القسم : أ.د/ منار احمد نادر
Course Coordinator:	منسق المقرر :



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacology and Toxicology
Department supervising the course	Pharmacology and Toxicology
Program on which the course is given	B. Pharm. (Clinical Pharmacy) (Pharm-D)
Academic Level	Level four/ five, elective course , 2023-2024
Date of course specification approval	18 th September 2023

A. Basic Information: Course data:

Course Title	Pharmacogenetics of drug metabolism and transport
Course Code	PO E16
Prerequisite	Registration
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

This course enables the students to:

- Discuss basic principles of genetic medicine and personalized medicine
- Describe the mechanisms by which genetic variation impacts drug metabolism, transport and describe how this will impact clinical response and outcomes
- Describe the methodology used for standard genotyping assay
- Verify the role of pharmacogenomics in drug discovery and development



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2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.4	1.1.4.1	Elucidate the mode of action of drugs and their therapeutic effects based on genetic variability in their target
	1.1.4.2	Assess the efficacy and safety of drugs in individuals and populations using knowledge from pharmacogenetics

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.4.3	2.4.3.1	Evaluate Pharmaceutical care plans for management of several disorders with reference to their particulate health problems and special considerations.
2.5.2	2.5.2.1	Collect up-to-date resources for pharmacogenomic information to decrease exposure for resistance or toxicity for in treatment
	2.5.2.2	Interpret and assess relevant, necessary evidence-based information about a patient's health-related care needs.



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Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.1.1	3.1.1.1	Adjust a dosage regimen for a patient based on the physiological, genetic and immunological changes brought about by disease.
	3.1.1.2	Adjust a dosage regimen for a patient based in case of drug-drug interaction
3.2.1	3.2.1.1	Assimilate principles of pharmacological aspects of drugs, as mode of action, therapeutic uses, proper dosage, unwanted effects and drug interactions

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Demonstrate decision-making activities with other pharmacy team members and non-pharmacy team members to enhance community quality of life through roles of pharmacogenomics and pharmacogenetics in health and disease and
	4.1.1.2	Demonstrate creativity and ability to apply effective time management skills.
4.2.1	4.2.1.1	Present clear language, pace, tone and non-verbal communication and writing skills when dealing with patients, other health team and communities.



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3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Introduction to pharmacogenomics	1
2	History of pharmacogenomics	1
3	Basic concepts in genetics, Transcription and Translation, Mutations and sequencing	1
4	Turning Single-Nucleotide-Polymorphisms (SNP) into useful tool-markers for drug response	1
5	Molecular techniques and diagnosis (methods in pharmacogenomics)/ Genomics Applications that facilitate the understanding of drug action and toxicity	1
6	Pharmacogenomics: Relationship to Human Cytochromes (PK)	1
7	Pharmacogenomics: Relationship to Human p-Glycoprotein & Multiple Drug Resistance	1
8	Pharmacodynamics and pharmacogenomics: Relationship to Asthma Treatment	1
9	Pharmacogenomics: Relationship to Endothelial Cells and Sickle Cell Diseases	1
10	Pharmacodynamics and pharmacogenomics: Relationship to Cardiovascular Diseases	1
11	Role of Pharmacogenetics in Drug Discovery and Therapeutics	1
12	Role of Pharmacogenetics in Drug Design	1
13	Pharmacodynamics and pharmacogenomics: Relationship to Chemotherapy (part 1)	1
14	Pharmacodynamics and pharmacogenomics: Relationship to Chemotherapy (part 2) (self-learning)	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1



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Week No.	Practical Topics	Practical credit hours
17	Final theoretical exam	-
1.	Introduction to pharmacogenomics	1
2.	History of pharmacogenomics	1
3.	Basic concepts in genetics, Transcription and Translation, Mutations and sequencing	1
4.	Turning Single-Nucleotide-Polymorphisms (SNP) into useful tool-markers for drug response	1
5.	Molecular techniques and diagnosis (methods in pharmacogenomics)	1
6.	Genomics Applications that facilitate the understanding of drug action and toxicity	1
7	Pharmacogenomics: Relationship to Human Cytochromes (PK)	1
8	Mid-term exam	-
9	Pharmacogenomics: Relationship to Human p-Glycoprotein & Multiple Drug Resistance	1
10	Pharmacodynamics and pharmacogenomics: Relationship to Asthma Treatment	1
11	Pharmacogenomics: Relationship to Endothelial Cells and Sickle Cell Diseases	1
12	Pharmacodynamics and pharmacogenomics: Relationship to Cardiovascular Diseases	1
13	Role of Pharmacogenetics in Drug Discovery	1
14	Role of Pharmacogenetics in Drug Design	1
15	Revision and activity	1
16	Sheet / and Practical exam	1



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4- Teaching and Learning Methods:

Teaching and Learning Method	Week number	K. elements to be addressed
4.1 Advanced lectures: <ul style="list-style-type: none"> Lectures using Data show, power Point presentations Brain storming Group discussion 	1-16	1.1.4.1, 1.1.4.2, 2.4.3.1, 2.5.2.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1
4.2 Hybrid learning <ul style="list-style-type: none"> Online learning through my Mans "Mansoura university " Interactive discussion through My Mans 	1-12	1.1.4.1, 1.1.4.2, 2.4.3.1,, 2.5.2.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1
4.3 Self-learning	14	4.1.1.1, 4.1.1.2, 4.2.1.1
4.4 Practical session using data show and power point presentations	1-16	2.4.3.1,, 2.5.2.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1
4.5 Case study- problem solving	9-11	2.4.3.1, 2.5.2.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1
4.6 Collaborative learning: research project	4-8	2.4.3.1, 2.5.2.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1



5- Student Assessment:

n- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.4.1, 1.1.4.2, 2.4.3.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1
2-Practical exam	1.1.4.1, 1.1.4.2, 2.4.3.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1
3-Oral	1.1.4.1, 1.1.4.2, 2.4.3.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1, 4.1.1.1, 4.1.1.2, 4.2.1.1
4- Periodical (Mid-term exam) / Course work	1.1.4.1, 1.1.4.2, 2.4.3.1, 2.5.2.2, 3.1.1.1, 3.1.1.2, 3.2.1.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7 th -9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%



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6-Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.
- Laboratory facilities	White board, Data show

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members.	Course notes
2.	Pharmacogenomics: Foundations, Competencies, and the Pharmacists' Patient Care Process; David F. Kisor; David R. Bright; Thomas R. Smith; Kristin Wiisanen. American Pharmacists Association; 2 nd ed. (2022).	Book
3.	Pharmacogenomics Challenges and Opportunities in Therapeutic Implementation; Yui-Wing Francis Lam, Stuart R. Scott. Academic Press; 2sd eb. (2018).	Book
4.	Pharmacogenomics and Personalized Medicine; Erika Cecchin & Gabriele Stocco. MDPI; Reprint (2020).	Book
5.	Concepts in Pharmacogenomics: Fundamentals and Therapeutic Applications in Personalized Medicine; Martin M. Zdanowicz. American Society of Health-System Pharmacists; 2 nd ed. (2017).	Book
6.	http://www.sciencedirect.com/ http://www.google scholar.com/ http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content versus course k. elements:

Course contents / K. elements	Domain 1			Domain 2			Domain 3			Domain 4		
	1.1.4.1	1.1.4.2		2.4.3.1	2.5.2.1	2.5.2.2	3.1.1.1	3.1.1.2	3.2.1.1	4.1.1.1	4.1.1.2	4.2.1.1
A) Theoretical part												
Introduction to pharmacogenomics	✓	✓										
History of pharmacogenomics	✓	✓		✓	✓	✓	✓	✓				
Basic concepts in genetics, Transcription and Translation, Mutations and sequencing												
Turning Single-Nucleotide-Polymorphisms (SNP) into useful tool-markers for drug response	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
Molecular techniques and diagnosis (methods in pharmacogenomics)/ Genomics Applications that facilitate the understanding of drug action and									✓			



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toxicity													
Pharmacogenomics: Relationship to Human Cytochromes (PK)	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓
Pharmacogenomics: Relationship to Human p-Glycoprotein & Multiple Drug Resistance	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Asthma Treatment	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓
Pharmacogenomics: Relationship to Endothelial Cells and Sickle Cell Diseases	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Cardiovascular Diseases	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓
Role of Pharmacogenetics in Drug Discovery and Therapeutics	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓
Role of Pharmacogenetics in Drug Design	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓



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Pharmacodynamics and pharmacogenomics: Relationship to Chemotherapy (part 1)	✓	✓			✓	✓	✓		✓	✓		✓	✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Chemotherapy (part 2) (self-learning)	✓	✓			✓	✓	✓		✓	✓		✓	✓	✓

Course contents / K. elements	Domain 1			Domain 2			Domain 3			Domain 4		
	1.1.4.1	1.1.4.2		2.4.3.1	2.5.2.1	2.5.2.2	3.1.1.1	3.1.1.2	3.2.1.1	4.1.1.1	4.1.1.2	4.2.1.1
B) Practical part												
Introduction to pharmacogenomics	✓	✓										
History of pharmacogenomics	✓	✓		✓	✓	✓	✓	✓				
Basic concepts in genetics, Transcription and Translation, Mutations and sequencing												



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Turning Single-Nucleotide-Polymorphisms (SNP) into useful tool-markers for drug response	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
Molecular techniques and diagnosis (methods in pharmacogenomics)									✓			
Genomics Applications that facilitate the understanding of drug action and toxicity									✓			
Pharmacogenomics: Relationship to Human Cytochromes (PK)	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
Pharmacogenomics: Relationship to Human p-Glycoprotein & Multiple Drug Resistance	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Asthma Treatment	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
Pharmacogenomics: Relationship to Endothelial Cells and Sickle Cell Diseases	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓



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Pharmacodynamics and pharmacogenomics: Relationship to Cardiovascular Diseases	✓	✓			✓	✓	✓		✓	✓		✓	✓	✓
Role of Pharmacogenetics in Drug Discovery	✓	✓			✓	✓	✓		✓	✓		✓	✓	✓
Role of Pharmacogenetics in Drug Design	✓	✓			✓	✓	✓		✓	✓		✓	✓	✓



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9- Matrix between course content, method of learning and assessment:

Course contents	Teaching and learning methods						Assessment methods			
	Advanced Lectures	Hybrid learning	Lab sessions	Self-learning	Case study	Collaborative learning	Course work	Practical/tutorial	Written	Oral
Introduction to pharmacogenomics	✓						✓		✓	✓
History of pharmacogenomics	✓						✓		✓	✓
Basic concepts in genetics, Transcription and Translation, Mutations and sequencing	✓						✓		✓	✓
Turning Single-Nucleotide-Polymorphisms (SNP) into useful tool-markers for drug response	✓					✓	✓		✓	✓
Molecular techniques and diagnosis (methods in pharmacogenomics)/ Genomics Applications that facilitate the understanding of drug action and toxicity	✓	✓				✓			✓	✓



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Pharmacogenomics: Relationship to Human Cytochromes (PK)	✓					✓			✓	✓
Pharmacogenomics: Relationship to Human p-Glycoprotein & Multiple Drug Resistance	✓					✓			✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Asthma Treatment	✓	✓				✓			✓	✓
Pharmacogenomics: Relationship to Endothelial Cells and Sickle Cell Diseases	✓				✓				✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Cardiovascular Diseases	✓				✓				✓	✓
Role of Pharmacogenetics in Drug Discovery and Therapeutics	✓	✓			✓				✓	✓
Role of Pharmacogenetics in Drug Design	✓								✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Chemotherapy (part 1)	✓								✓	✓
Pharmacodynamics and pharmacogenomics: Relationship to Chemotherapy (part 2) (self-learning)	✓			✓					✓	✓



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B) Practical part:										
Course contents	Teaching and learning methods						Assessment methods			
	Advanced lectures	Hybrid learning	Lab sessions	Self-learning	Case study	Collaborative learning	Course work	Practical/tutorial	Written	Oral
Introduction to pharmacogenomics		✓	✓					✓		
History of pharmacogenomics		✓	✓				✓	✓		
Basic concepts in genetics, Transcription and Translation, Mutations and sequencing		✓	✓				✓	✓		
Turning Single-Nucleotide-Polymorphisms (SNP) into useful tool-markers for drug response		✓	✓			✓	✓	✓		
Molecular techniques and diagnosis (methods in pharmacogenomics)		✓	✓			✓	✓	✓		
Genomics Applications that facilitate the understanding of drug action and toxicity		✓	✓			✓	✓	✓		
Pharmacogenomics: Relationship to Human		✓	✓			✓	✓	✓		



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Cytochromes (PK)										
Pharmacogenomics: Relationship to Human p-Glycoprotein & Multiple Drug Resistance		✓	✓			✓	✓	✓		
Pharmacodynamics and pharmacogenomics: Relationship to Asthma Treatment		✓	✓			✓	✓	✓		
Pharmacogenomics: Relationship to Endothelial Cells and Sickle Cell Diseases		✓	✓		✓		✓	✓		
Pharmacodynamics and pharmacogenomics: Relationship to Cardiovascular Diseases		✓	✓		✓		✓	✓		
Role of Pharmacogenetics in Drug Discovery		✓	✓		✓		✓	✓		
Role of Pharmacogenetics in Drug Design		✓	✓				✓	✓		

Course Coordinator	
Head of Department	Prof. Dr. Manar A Nader

Date: 18 / 9 / 2023



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بكالوريوس الصيدلة الإكلينيكية (فارم دي-Pharm D)
Course Specification
Academic year: 2023/ 2024

Course name: Interprofessional skills	اسم المقرر: المهارات المهنية
Academic Level: Level 4, 5	المستوى الأكاديمي: الرابع والخامس
Scientific department: Clinical Pharmacy and Pharmacy Practice	القسم العلمي: الصيدلة الإكلينيكية والممارسة الصيدلانية
Head of Department: Prof. Dr. Mohamed Elhousseiny Shams	رئيس القسم: أ.د/ محمد الحسيني شمس
Course Coordinator:	منسق المقرر:



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University	Mansoura
Faculty	Pharmacy
Department offering the course	Clinical Pharmacy and Pharmacy Practice
Department supervising the course	
Program on which the course is given	B. Pharm. (PharmD) (Clinical Pharmacy)
Academic Level	4 th or 5 th level (1 st or 2 nd semester), 2023-2024
Date of course specification approval	7 th September 2023

Basic Information: Course data:

Course Title	Interprofessional skills
Course Code	PP E17
Prerequisite	Registration
Credit Hours: Lecture	1
Tutorial	1
Total Credit Hours	2 (Credit H)

Course Aims:

Understanding and respecting the role and contribution of different health care team members to patient care plan from their perspectives.

Acquiring the necessary communication skills for the clinical pharmacist to collaborate effectively with other health care team members to optimize patient care.



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Course Learning Outcomes

Upon completing the course, the student will be able to dominate the following key elements

Domain 1: Fundamental knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.6	1.1.6.1	Recognize different scientific resources used for making evidence-based clinical decisions.

Domain 3: Pharmaceutical care

Program K. element no.	Course K. element no.	Course K. element
3.2.5	3.2.5.1	Collaborate with healthcare team members to optimize individualized patient care plan and manage drug therapy related problems.

Domain 4: personal practice

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Contribute with health care team in formulary management activities and timely decisions in emergency situations
4.1.4	4.1.4.1	Share in workplace strategic planning to meet the pharmaceutical needs
4.2.1	4.2.1.1	Apply effective communication and writing skills when dealing with patients or the health care practitioners
4.3.2	4.3.2.1	Practice self-learning to improve professional skills



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Course Contents

A. Theoretical part:

Week No.	Lecture Topics	Lecture Credit Hours
1	Communicating verbally with patients and caregivers 1: General Communication Tips	1
2	Communicating verbally with patients and caregivers 2: Developing Relationships and Maintaining Rapport During Patient Interviews	1
3	Communicating verbally with patients and caregivers 3: History Taking, Components of an initial medication history	1
4	Selecting written patient educational materials: Written Patient Health Educational Materials, Understandability	1
5	Alternative methods of communicating with patients: Telephone Tips, E-mail Etiquette	1
6	Communicating with other health care professionals 1: Making Interventions to Implement Medication-Related Recommendations for Patients	1
7	Communicating with other health care professionals 2: Providing Health and Educational Programming for Other Health Care Professionals	1
8	Documenting in the medical record: References That Outline Effective Medical Documentation,	1
9	Opportunities for patient advocacy outside the health care system 1	1
10	Opportunities for patient advocacy outside the health care system 2	1
11	Evidence supporting teaching, precepting, and learning 1: Current educational frameworks and guiding philosophies (self-learning)	1
12	Evidence supporting teaching, precepting, and learning 2: Additional thoughts on role modeling and mentoring	1
13	Evidence supporting teaching, precepting, and learning 3: Examples (self learning)	1
14	The effect of patient counseling on medical care	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Starting final theoretical exam	-



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B. Tutorial part:

Week No.	Practical topics	Credit hours
1	Communicating verbally with patients and caregivers 1	1
2	Communicating verbally with patients and caregivers 2	1
3	Communicating verbally with patients and caregivers 3	1
4	Selecting written patient educational materials	1
5	Alternative methods of communicating with patients	1
6	Communicating with other health care professionals 1	1
7	Communicating with other health care professionals 2	1
8	Mid-term exam	-
9	Documenting in the medical record	1
10	Opportunities for patient advocacy outside the health care system 1	1
11	Opportunities for patient advocacy outside the health care system 2	1
12	Opportunities for patient advocacy outside the health care system 3	1
13	Group project: Evidence supporting teaching, precepting, and learning	1
14	The effect of patient counseling on medicalcare system.	1
15	Revision and activity	1
16	Practical exams	1



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Teaching and Learning Methods:

Teaching and learning Methods		Week no.	K. element to be addressed
5.1	Hybrid learning and Computer aided learning: Lectures using Data show, power Point presentations Distance learning Online learning through my mans "Mansoura university "as recorded – video lectures Interactive discussion through My Mans	Week 1-16	1.1.6.1, 3.2.7.1
5.2	Self-learning	Week 11 & week 13	4.1.4.1, 4.3.2.1
5.3	Practical session using tutorials	Week 1-4	3.2.7.1
		Week 5-16	3.2.7.1, 4.1.1.1, 4.1.4.1, 4.2.1.1, 4.3.2.1
5.4	Class Activity: Group discussion offline and online.	Week 5-14	4.1.1.1, 4.1.4.1
5.5	Problem – based learning and brainstorming	Week 5-14	4.1.1.1, 4.1.4.1, 4.3.2.1
5.7	Role play	Week 10	4.1.1.1, 4.1.4.1, 4.3.2.1

Student Assessment:

Assessment Methods:

1-Written exam	1.1.6.1, 3.2.7.1
2-Tutorial exam	3.2.7.1, 4.1.1.1, 4.1.4.1, 4.2.1.1, 4.3.2.1
3-Oral	1.1.6.1, 3.2.7.1, 4.1.4.1, 4.2.1.1, 4.3.2.1
4- Periodical (Mid-term exam) / Course work	1.1.6.1, 3.2.7.1

Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	Week 7-9
Assessment 2	Practical examination and tutorial	16th week
Assessment 3	Written exam	Starting in week 17
Assessment 4	Oral exam	Starting in week17



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Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%

Facilities required for teaching and learning

Classroom	Data show- Computers, Internet, Platform
Library	Books and mobile applications

List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Champion VL, Skinner CS. The health belief model (Chapter 3). In: Glanz K, Rimer BK, Viswanath K, eds. Health Behavior and Health Education: Theory, Research, and Practice, 5th ed. San Francisco: John Wiley & Sons, 2015:59-77.	Essential Book
4.	http://www.sciencedirect.com/ http://www.google scholar.com/ / http://www.pubmed.com https://www.ekb.eg	Websites



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Matrix of knowledge and skills of the course

A. Theoretical part:

Course contents								
	Domain 1		Domain 3		Domain 4			
	1.1.6.1		3.2.5.1		4.1.1.1	4.1.4.1	4.2.1.1	4.3.2.1
Communicating verbally with patients and caregivers 1: General Communication Tips	√							
Communicating verbally with patients and caregivers 2: Developing Relationships and Maintaining Rapport During Patient Interviews	√							
Communicating verbally with patients and caregivers 3: History Taking, Components of an initial medication history	√							
Selecting written patient educational materials: Written Patient Health Educational Materials, Understandability	√							



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Alternative methods of communicating with patients: Telephone Tips, E-mail Etiquette	√							
Communicating with other health care professionals 1: Making Interventions to Implement Medication-Related Recommendations for Patients	√		√			√		
Communicating with other health care professionals 2: Providing Health and Educational Programming for Other Health Care Professionals	√		√			√		
Documenting in the medical record: References That Outline Effective Medical Documentation,	√		√					
Opportunities for patient advocacy outside the health care system 1	√							
Opportunities for patient advocacy outside the health care system 2	√							
Evidence supporting teaching, precepting, and learning 1: Current educational frameworks	√		√					√



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and guiding philosophies (self-learning)								
Evidence supporting teaching, precepting, and learning 2: Additional thoughts on role modeling and mentoring	√		√					
Evidence supporting teaching, precepting, and learning 3: Examples (self learning)	√		√			√	√	
The effect of patient counseling on medical care	√		√		√	√		



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B. Tutorial part:

Course contents	Domain 1		Domain 3		Domain 4			
	1.1.6.1		3.2.5.1		4.1.1.1	4.1.4.1	4.2.1.1	4.3.2.1
1- Communicating verbally with patients and caregivers 1 2- Communicating verbally with patients and caregivers 2 3- Communicating verbally with patients and caregivers 3 4- Selecting written patient educational materials			√					
5-Alternative methods of communicating with patients 6-Communicating with other health care professionals 1 7-Communicating with other health care professionals 2 8-Documenting in the medical record 9-Opportunities for patient advocacy outside the health care system 1 10-Opportunities for patient advocacy outside the health care system 2 11-Opportunities for patient advocacy outside the health care system 3 12-Group project: Evidence supporting teaching, precepting, and learning 13-The effect of patient counseling on medicalcare system.			√		√	√	√	√



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A) Theoretical Part:										
Course Contents	Teaching and Learning Methods						Assessment methods			
	Lecture	Online lecture	Lab sessions	Problem solving	Case Study	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Communicating verbally with patients and caregivers 1: General Communication Tips	√						√		√	√
Communicating verbally with patients and caregivers 2: Developing Relationships and Maintaining Rapport During Patient Interviews	√						√		√	√
Communicating verbally with patients and caregivers 3: History Taking, Components of an initial medication history	√						√		√	√



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Selecting written patient educational materials: Written Patient Health Educational Materials, Understandability	√						√		√	√
Alternative methods of communicating with patients: Telephone Tips, E-mail Etiquette	√			√			√		√	√
Communicating with other health care professionals 1: Making Interventions to Implement Medication-Related Recommendations for Patients	√			√			√		√	√
Communicating with other health care professionals 2: Providing Health and Educational Programming for Other Health Care Professionals	√			√			√		√	√



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Documenting in the medical record: References That Outline Effective Medical Documentation,	√			√					√	√
Opportunities for patient advocacy outside the health care system 1	√			√					√	√
Opportunities for patient advocacy outside the health care system 2	√			√					√	√
Evidence supporting teaching, precepting, and learning 1: Current educational frameworks and guiding philosophies (self-learning)	√			√					√	√
Evidence supporting teaching, precepting, and learning 2: Additional thoughts on role modeling and mentoring	√			√					√	√



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Evidence supporting teaching, precepting, and learning 3: Examples (self learning)	√	√		√		√			√	√
The effect of patient counseling on medical care	√	√		√					√	√



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B) Tutorial Part:

Course Contents	Teaching and Learning Methods						Assessment methods			
	Lecture	Online lecture	Lab sessions	Problem solving	Case Study	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Communicating verbally with patients and caregivers 1			√		√			√		
Communicating verbally with patients and caregivers 2			√		√			√		
Communicating verbally with patients and caregivers 3			√		√			√		
Selecting written patient educational materials			√		√			√		
Alternative methods of communicating with patients			√		√			√		
Communicating with other health care professionals 1			√		√			√		
Communicating with other health care professionals 2			√		√			√		
Documenting in the medical record			√		√			√		



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Opportunities for patient advocacy outside the health care system 1			√		√			√		
Opportunities for patient advocacy outside the health care system 2			√		√			√		
Opportunities for patient advocacy outside the health care system 3			√		√			√		
Group project: Evidence supporting teaching, precepting, and learning			√	√	√	√		√		
The effect of patient counseling on medical care			√		√			√		

Course Coordinator	
Head of Department	Dr. Mohamed Elhusseiny Shams
	<i>Mohamed Elhusseiny</i> 7/9/2023



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بكالوريوس الصيدلة الإكلينيكية (فارم دي-Pharm D)

Course Specification

Academic year: 2023-2024

Course name: Advanced Pharmacoeconomics	اسم المقرر: إقتصاديات الدواء - مستوى متقدم
Academic Level: Level 4, 5	المستوى الأكاديمي: الرابع والخامس
Scientific department: Clinical Pharmacy and Pharmacy Practice	القسم العلمي: الصيدلة الإكلينيكية والممارسة الصيدلانية
Head of Department: Prof. Dr. Mohamed Elhosseiny Shams	رئيس القسم: أ.د. /محمد الحسيني شمس
Course Coordinator:	منسق المقرر:



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Course specification
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University	Mansoura
Faculty	Pharmacy
Department offering the course	Clinical Pharmacy and Pharmacy Practice
Department supervising the course	
Program on which the course is given	B. Pharm. (PharmD) (Clinical Pharmacy)
Academic Level	4 th or 5 th level, 2023-2024
Date of course specification approval	7 th September 2023



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Course
specification
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1- Basic Information: Course data:

Course Title	Advanced Pharmacoeconomics
Course Code	PP E18
Prerequisite	Registration
Credit Hours: Lecture	1
Tutorial	1
Total Credit Hours	2 (Credit H)

2- Course Aims:

This course includes an in-depth review of the principles of Pharmacoeconomics, and how they are conducted and how to use the extracted evidence from Pharmacoeconomics studies to support policy makers. The students will also be able to discuss advanced concepts of cost-effectiveness and cost- utility, how to perform the calculations involved in decision trees, Markov modeling and how to read and assess pharmacoeconomic studies



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3- Course Learning Outcomes

Upon completing the course, the student will be able to dominate the following key elements DOMAIN 1-
FUNDAMENTAL KNOWLEDGE

Program K. element no.	Course K. element no.	Course K. element
1.1.2	1.1.2.1	Define different scientific pharmacoeconomics terminologies
1.1.5	1.1.5.1	Identify different interventions scenarios.
1.1.6	1.1.6.1	Recognize different scientific resources to make evidence-based clinical decisions.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
2.4.3	2.4.3.1	Formulate pharmaceutical care plans for management of several disorders and drug-related problems with reference to their particulate health problems and special considerations.



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DOMAIN 3: Pharmaceutical care

Program K. element no.	Course K. element no.	Course K. element
3.1.1	3.1.1.1	Interpret monitoring parameters of patient's response and therapeutic agents to manage drug therapy problems effectively.

DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Contribute with health care team in formulary management activities related to the choice of purchased drugs based on their cost-effectiveness
4.3.2	4.3.2.1	Practice self-learning to improve professional skills



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4- Course Contents:

A. Theoretical part:

Week No.	Lecture Topics	Lecture Credit Hours
1	Pharmacoeconomics basic terminology	1
2	Types of costs (Medical, non-medical, direct, indirect)	1
3	Various study perspectives: Governmental, Payer, Social	1
4	Assessing Cost-Minimization Analysis 1: When to use	1
5	Assessing Cost-Minimization Analysis 2: How to calculate	1
6	Cost-Benefit Analysis: When to use	1
7	Cost-Benefit Analysis: How to calculate	1
8	Health-related Quality-of-Life: When to use, how to calculate	1
9	Cost-Utility Analysis: When to use	1
10	Cost-Utility Analysis: How to calculate	1
11	Cost-Effectiveness Analysis: When to use, how to calculate part 1(self- learning)	1
12	Cost-Effectiveness Analysis: When to use, how to calculate part2	1
13	When an average cost-effectiveness ratio is appropriate to use 1	1
14	When an average cost-effectiveness ratio is appropriate to use 2 (Self-learning)	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Starting the final theoretical and oral exam	-



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B. Tutorial part:

Week No.	Practical topics	Credit hours
1	Pharmacoeconomics basic terminology	1
2	Types of costs (Medical, non-medical, direct, indirect)	1
3	Various study perspectives	1
4	Assessing Cost-Minimization Analysis 1	1
5	Assessing Cost-Minimization Analysis 2	1
6	Cost-Benefit Analysis 1	1
7	Cost-Benefit Analysis 2	1
8	Mid-term exam	-
9	Health-related Quality-of-Life	1
10	Cost-Utility Analysis 1	1
11	Group project: Cost-Effectiveness Analysis	1
12	When an average cost-effectiveness ratio is appropriate to use	1



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13	Different situations to select the appropriate analysis method part1	1
14	Different situations to select the appropriate analysis method part2	1
15	Revision and activity	1
16	Tutorial exam applying OSCE	1



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Teaching and Learning Methods:

Teaching and learning Methods		Weeks no.	K. element to be addressed
5.1	Computer aided and hybrid learning: Lectures using Data show, power Point presentations Distance learning Online learning through my mans "Mansoura university "as recorded – video lectures Inter active discussion through My Mans	Week 1-16	1.1.2.1, 1.1.5.1, 1.1.6.1
5.2	Self-learning	Week 11, 13	4.3.2.1
5.3	Practical session using tutorials	Week 1-4	2.1.7.1, 3.1.1.1
		Week 5-16	2.1.7.1, 3.1.1.1, 4.1.1.1, 4.3.2.1
5.4	Class Activity: Group discussion offline and online.	Week 5-13	4.1.1.1
5.5	Problem – based learning and brainstorming	Week 5-13	4.1.1.1, 4.3.2.1
5.7	Role play	Week 11	4.1.1.1, 4.3.2.1



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Student Assessment:

Assessment Methods:

1-Written exam	1.1.2.1, 1.1.5.1, 1.1.6.1
2-Tutorial exam	2.1.7.1, 3.1.1.1, 4.1.1.1, 4.3.2.1
3-Oral	1.1.2.1, 1.1.5.1, 1.1.6.1, 4.3.2.1
4- Periodical (Mid-term exam) / Course work	1.1.2.1, 1.1.5.1, 1.1.6.1

Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	Week 7-9
Assessment 2	Practical examination and tutorial	16th week
Assessment 3	Written exam	Starting in Week 17
Assessment 4	Oral exam	Starting in Week 17

Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
Total		100%



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7- Facilities required for teaching and learning

Classroom	Data show- Computers, Internet, Platform
Library	Books and mobile applications

8-List of References

No.	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Akobundu E, Ju J, Blatt L, et al. Cost-of-illness studies: a review of current methods. <i>Pharmacoeconomics</i> 2006;24:869-90.	Essential Book
4.	http://www.sciencedirect.com / http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	Websites



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9.1- Matrix of knowledge and skills of the course

A. Theoretical part:

Course contents	Domains							
	Domain 1			Domain 2	Domain 3	Domain 4		
	1.1.2.1	1.1.5.1	1.1.6.1	2.4.3.1	3.1.1.1	4.1.1.1	4.3.2.1	
Pharmacoeconomics basic terminology	√	√	√					
Types of costs (Medical, non-medical, direct, indirect)	√	√	√					
Various study perspectives: Governmental, Payer, Social	√	√	√					
Assessing Cost-Minimization Analysis 1: When to use	√	√	√					
Assessing Cost-Minimization Analysis 2: How to calculate	√	√	√					
Cost-Benefit Analysis:	√	√	√					

When to use								
Cost-Benefit Analysis: How to calculate	√	√	√					
Health-related Quality- of-Life: When to use, how to calculate	√	√	√					
Cost-Utility Analysis: When to use	√	√	√					
Cost-Utility Analysis: How to calculate	√	√	√					
Cost-Effectiveness Analysis: When to use, how to calculate part 1 (self- learning)	√	√	√					√
Cost-Effectiveness Analysis: When to use, how to calculate part2	√	√	√					√
When an average cost- effectiveness ratio is appropriate to use 1	√	√	√					
When an average cost- effectiveness ratio is appropriate to use 2 (Self-learning)	√	√	√					√



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B. Tutorial part:

Course contents	Domains							
	Domain 1			Domain 2	Domain 3	Domain 4		
	1.1.2.1	1.1.5.1	1.1.6.1	2.1.7.1	3.1.1.1	4.1.1.1	4.3.2.1	
1- Pharmacoeconomics basic terminology								
2- Types of costs (Medical, non-medical, direct, indirect)				√	√			
3- Various study perspectives								
4- Assessing Cost-Minimization Analysis 1								
5- Assessing Cost-Minimization Analysis 2								
6- Cost-Benefit Analysis 1				√	√	√	√	
7- Cost-Benefit Analysis 2								
8- Health-related Quality-of-Life								
9- Cost-Utility								



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<p>Analysis 1</p> <p>10- Group project: Cost-Effectiveness Analysis</p> <p>11- When an average cost-effectiveness ratio is appropriate to use 1</p> <p>12-Different situations to select the appropriate analysis method part1</p> <p>13- Different situations to select the appropriate analysis method part2</p>							
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Course Contents	Teaching and Learning Methods							Assessment methods			
	Lecture	Online lecture	Lab sessions	Problem solving	Case Study	Self-learning	Hybrid learning	Course Work	Practical/Tutorial	Written	Oral
Pharmacoeconomics basic terminology	√						√	√		√	√
Types of costs (Medical, non-medical, direct, indirect)	√						√	√		√	√
Various study perspectives: Governmental, Payer, Social	√						√	√		√	√
Assessing Cost-Minimization Analysis 1: When to use	√						√	√		√	√
Assessing Cost-Minimization Analysis 2: How to calculate	√			√			√	√		√	√
Cost-Benefit Analysis: When to use	√			√			√	√		√	√



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Cost-Benefit Analysis: How to calculate	√			√			√	√		√	√
Health-related Quality-of-Life: When to use, how to calculate	√			√			√			√	√
Cost-Utility Analysis: When to use	√			√			√			√	√
Cost-Utility Analysis: How to calculate	√			√			√			√	√
Cost-Effectiveness Analysis: When to use, how to calculate part1 (self- learning)	√	√		√		√	√			√	√
Cost-Effectiveness Analysis: When to use, how to calculate part2	√	√		√		√	√			√	√
When an average cost-effectiveness ratio is appropriate to use 1	√			√			√			√	√



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When an average cost-effectiveness ratio is appropriate to use 2 (Self-learning)	√	√		√		√	√			√	√
--	---	---	--	---	--	---	---	--	--	---	---

						B) Tutorial Part:					
Course Contents	Teaching and Learning Methods						Assessment methods				
	Lecture	Online lecture	Lab sessions	Problem solving	Case Study	Self-learning	Hybrid learning	Course Work	Practical/Tutorial	Written	Oral
Pharmacoeconomics basic terminology			√		√						
Types of costs (Medical, non-medical, direct, indirect)			√		√						
Various study perspectives			√		√						
Assessing Cost-Minimization Analysis 1			√		√						
Assessing Cost-Minimization Analysis 2			√		√						



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Cost-Benefit Analysis 1			√		√						
Cost-Benefit Analysis 2			√		√						
Health-related Quality-of-Life			√		√						
Cost-Utility Analysis 1			√		√						
Group project: Cost-Effectiveness Analysis			√	√	√	√					
When an average cost-effectiveness ratio is appropriate to use			√		√						
Different situations to select the appropriate analysis method part1			√		√						
Different situations to select the appropriate analysis method part2			√		√						

Course Coordinator to be nominated

Head of Department Prof. Dr. Mohamed Elhusseiny Shams

Date: 7/9/2023



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بكالوريوس الصيدلة الإكلينيكية (فارم دي)

Pharm D-Clinical Pharmacy

Course Specification

Academic year: 2023/2024

Course name: Green Chemistry	اسم المقرر: الكيمياء الخضراء
Academic Level: Level 4	المستوى الأكاديمي : الرابع
Scientific department: Pharmaceutical Analytical Chemistry	القسم العلمي : الكيمياء التحليلية الصيدلانية
Head of Department: Prof. Dr. Jenny Jeehan Nasr	رئيس القسم : أ.د/ جيني جيهان محمد نصر
Course Coordinator: Prof. Dr. Jenny Jeehan Nasr	منسق المقرر : أ.د/ جيني جيهان محمد نصر



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University	Mansoura University
Faculty	Faculty of Pharmacy
Department offering the course	Pharmaceutical Analytical Chemistry
Department supervising the course	Pharmaceutical Analytical Chemistry
Program on which the course is given	Bachelor in clinical Pharmacy-Pharm D
Academic Level	Fourth level, Second semester, 2023-2024
Date of course specification approval	10/ 09 / 2023

A. Basic Information: Course data:

Course Title	Green Chemistry
Course Code	PC E06
Prerequisite	Registration
Teaching credit Hours: Lecture	1
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

1. Appreciate the history of chemical accidents and how Green Chemistry can be used to design safer products and industrial systems without harming the environment and subsequent human health.
2. Understand the historical and current role of chemicals in our society and economy.
3. Examine the impacts qualitatively and quantitatively on human health and the environment of chemical products and processes.



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4. Recognize the tools available to scientists and engineers in the design of new chemical processes including energy efficiency.
5. Understand the transformational role of Green Analytical Chemistry in the global economy and the associated material and energy benefits.

2- Course k. elements:

Upon completing the course, the student will be able to dominate the following key elements

Domain 1- Fundamental Knowledge

Program K. element no.	Course K. element no.	Course K. element
1.1.1	1.1.1.1	Recognize the basic principles of green chemistry, atom Economy, sustainability, Life Cycle Assessment, Green Analytical Chemistry, sample preparation, green chromatography, and metric tools for evaluation of analytical method greenness.
1.1.3	1.1.3.1	Combine the principles of fundamental sciences to understand the historical and current role of chemicals in our society and economy

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.2.1	2.2.1.1	Design new green analytical methods for the identification and quantification of pharmaceutical compounds in different pharmaceutical formulations.
2.2.3	2.2.3.1	Use different kinds of simulation software within depth knowledge to evaluate the greenness of the analytical procedure used for raw materials and finished pharmaceutical products.
	2.2.3.2	Classify the modern systems in the development of new trends for green analytical chemistry in pharmaceutical industry.
2.3.1	2.3.1.1	Select appropriate green methods for handling and disposal of chemicals used in the analytical procedure to provide safety to the operator and reduce the deleterious environmental impact.
2.3.2	2.3.2.1	Select best practices for the management of raw materials and pharmaceutical products.



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Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Communicate effectively in team working.
4.1.2	4.1.2.1	Acquire and evaluate information to solve problems, and work successfully both independently and in groups.
4.2.2	4.2.2.1	Make use of artificial technologies to provide pertinent information.
4.3.1	4.3.1.1	Utilize sensible approaches to control and enhance pharmaceutical self-practice.

3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	- Accidents and Their Unintentional Consequences, Reimaging Chemistry	1
2	- Twelve Principles of Green Chemistry	1
3	- Limiting Reagent, Yield, Atom Economy.	1
4	- Eco-scale and Lab vs Nature	1
5	- Sustainability	1
6	- Life Cycle Assessment	1
7	- Renewable Feedstocks.	1
8	- Designing for Recycling, Degradation & Catalysis	1
9	- Solvents: Understanding Their Role	1
10	- Sample preparation, and green solvents and its applications.	1
11	- Green Chromatography and its application	1
12	- GreenChemistry Metrics for the evaluation of analytical method greenness.	1
13	- Green miniaturized technologies in analytical and bioanalytical chemistry (self-learning)	1
14	Green miniaturized technologies in analytical and bioanalytical chemistry (cont.)	1
15	- Compensatory and alternative lecture	1



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16	- Revision and quiz	1
17	- Final written and oral exam	---
Week No.	Practical topics	Practical credit hours
1.	Tutorial: Industrial Chemical Disasters and Green Chemistry	1
2.	Tutorial: Twelve Principles of Green Chemistry	1
3.	Tutorial: Limiting Reagent, and Yield part 1	1
4.	Tutorial: Limiting Reagent, and Yield part 2	1
5.	Tutorial: Atom Economy and Eco-scale Part 1	1
6.	Tutorial: Atom Economy and Eco-scale Part 2	1
7.	Tutorial: Biomimicry.	1
8	Mid-term exam	-
9.	Tutorial: Circular Economy.	1
10.	Tutorial: Biodegradability	1
11	Tutorial: Working without Solvents	1
12	Tutorial: Green solvents in sample preparation	1
13	Tutorial: Green chromatography in analytical chemistry	1
14	Tutorial: Green Analytical Chemistry Metrics.	1
15	Revision and activity	1
16.	Practical Exam (OSPE)	1



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4- Teaching and Learning Methods:

Teaching and learning Methods		Weeks No.	K. elements to be addressed
4.1	Computer-aided learning: a. Lectures using Data show, power Point presentations. b. Distance learning <ul style="list-style-type: none"> Online learning through mymans "Mansoura university" as recorded video lectures Interactive discussion through My Mans. 	1-16	1.1.1.1, 1.1.3.1, 2.2.1.1, 2.2.3.2, 2.3.1.1, 2.3.2.1
4.2	Practical session using chemicals and laboratory equipment and/or tutorials	1-16	2.2.1.1, 2.2.3.1, 2.2.3.2, 2.3.1.1, 2.3.2.1, 4.1.1.1, 4.1.2.1, 4.2.2.1
4.3	Self-learning	13	4.2.2.1, 4.3.1.1
4.4	Class Activity Discussion / Brainstorming / problem solving	1-14	4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K. elements to be assessed
1-Written exam	1.1.1.1, 1.1.3.1, 2.2.1.1, 2.2.3.2, 2.3.1.1, 2.3.2.1
2-Practical exam applying OSPE	2.2.1.1, 2.2.3.1, 2.2.3.2, 2.3.1.1, 2.3.2.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1
3-Oral exam	1.1.1.1, 1.1.3.1, 4.1.1.1, 4.1.2.1, 4.2.2.1, 4.3.1.1
4- Periodical exam / Course work	1.1.1.1, 1.1.3.1, 2.2.1.1, 4.2.2.1

b. Assessment schedule

Assessment 1	Periodical exam / Course work	7-9 th week
Assessment 2	Practical examination and tutorial	16 th week
Assessment 3	Written exam	Start from 17 th week
Assessment 4	Oral exam	Start from 17 th week



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c. Weighing of assessments

1	Periodical exam / Course work	15%
2	Practical examination and tutorial	25%
3	Final-term written examination	50%
4	Oral examination	10%
Total		100%

6- Facilities required for teaching and learning

- Classroom	Data show- Computers, Internet.
- Laboratory facilities	Equipment and glassware.

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by staff members	Videos on platform
3.	Jacek Namiesnik, Green analytical chemistry: Past, present and perspectives, Springer, 2019	Book
4.	Abu-Baker S, Ghaffari S, Frazier C, Frazier N, Mayo D, Thamburaj R. Review of Chemistry in Context: Applying Chemistry to Society, A Project of the American Chemical Society.	Book
5.	Vinod K Tiwari, Abhijeet Kumar, Sanchayita Rajkhowa, Garima Tripathi, Anil Kumar Singh, Green chemistry: introduction, application and scope. 2022	Book
6.	http://www.sciencedirect.com http://www.scholar.google.com http://www.pubmed.com https://www.ekb.eg	websites



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8- Matrix of course content versus course k. elements:

Course contents / K. elements	Domain 1			Domain 2					Domain 4			
	1.1.1.1	1.1.3.1		2.2.1.1	2.2.3.1	2.2.3.2.	2.3.1.1	2.3.2.1	4.1.1.1	4.1.2.1	4.2.2.1	4.3.1.1
Accidents and Their Unintentional Consequences, Reimaging Chemistry	✓	✓									✓	✓
Twelve Principles of Green Chemistry	✓								✓	✓		
Limiting Reagent, Yield, Atom Economy.	✓	✓					✓	✓	✓			✓
Eco-scale and Lab vs Nature	✓	✓					✓	✓	✓			✓
Sustainability	✓			✓			✓	✓				✓
Life Cycle Assessment	✓							✓		✓		



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Renewable Feedstocks.	✓			✓				✓				✓	✓
Designing for Recycling, Degradation & Catalysis	✓						✓	✓		✓			
Solvents: Understanding Their Role	✓	✓				✓		✓		✓			✓
Sample preparation, and green solvents and its applications.	✓			✓	✓			✓		✓		✓	
Green Chromatography and its application	✓			✓	✓								
Green Chemistry Metrics for the evaluation of analytical method greenness.	✓			✓	✓								
Green miniaturized technologies in analytical and bioanalytical chemistry (self-learning)	✓			✓	✓			✓		✓	✓		✓



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Green miniaturized technologies in analytical and bioanalytical chemistry (cont.)	✓			✓	✓			✓		✓	✓		✓
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Practical Topics													
Tutorial: Industrial Chemical Disasters and Green Chemistry				✓		✓	✓	✓				✓	✓
Tutorial: Twelve Principles of Green Chemistry				✓	✓	✓	✓			✓	✓		
Tutorial: Limiting Reagent, and Yield part 1				✓	✓	✓	✓	✓		✓			✓
Tutorial: Limiting Reagent, and Yield part 2				✓	✓	✓	✓	✓		✓			✓
Tutorial: Atom Economy and Eco-scale part1				✓	✓	✓	✓	✓		✓			✓
Tutorial: Atom Economy and Eco-scale part2				✓	✓	✓	✓	✓		✓			✓
Tutorial: Biomimicry.				✓	✓	✓	✓	✓					✓
Tutorial: Circular Economy.				✓	✓	✓	✓	✓			✓		



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Tutorial: Biodegradability				✓	✓	✓	✓	✓			✓	✓
Tutorial: Working without Solvents				✓	✓	✓	✓	✓	✓			
Tutorial: Green solvents in sample preparation				✓	✓	✓	✓	✓	✓			✓
Tutorial: Green chromatography in analytical chemistry				✓	✓	✓	✓	✓	✓		✓	
Tutorial: Green Analytical Chemistry Metrics.				✓	✓	✓	✓	✓		✓	✓	



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Matrix 2. between course contents, methods of learning and assessment

A) Theoretical Part:												
Course Contents	Teaching and Learning Methods							Assessment methods				
	Lecture	Online interactive lecture	recorded video	Self-learning	Group discussion	Problem solving	Lab Session	Course Work (presentation)	Course Work Periodical Exam	Practical- /sheet	Written	Oral
Accidents and Their Unintentional Consequences, Reimaging Chemistry	✓		✓					✓	✓		✓	✓
Twelve Principles of Green Chemistry	✓	✓	✓		✓			✓	✓		✓	✓
Limiting Reagent, Yield, Atom Economy.	✓		✓		✓	✓		✓	✓		✓	✓
Eco-scale and Lab vs Nature	✓	✓	✓		✓			✓	✓		✓	✓
Sustainability	✓		✓		✓	✓		✓			✓	✓
Life Cycle Assessment	✓		✓		✓						✓	✓
Renewable Feedstocks.	✓	✓	✓		✓	✓					✓	✓
Designing for Recycling, Degradation & Catalysis	✓		✓		✓						✓	✓
Solvents: Understanding Their Role	✓		✓		✓	✓					✓	✓
Sample preparation, and green solvents and its applications.	✓		✓								✓	✓
Green Chromatography and its application	✓		✓						✓		✓	✓



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Green Chemistry Metrics for the evaluation of analytical method greenness.	✓		✓						✓		✓	✓
Green miniaturized technologies in analytical and bioanalytical chemistry (self-learning)	✓		✓	✓				✓	✓		✓	✓
Green miniaturized technologies in analytical and bioanalytical chemistry (cont.)	✓		✓					✓	✓		✓	✓



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Matrix 2. between course contents, methods of learning and assessment

A) Practical Part:												
Course Contents	Teaching and Learning Methods							Assessment methods				
	Lecture	Online interactive lecture	recorded video	Self-learning	Group discussion	Problem solving	Lab Session	Corse Work (presentation)	Corse Work Periodical Exam	Practical- /sheet	Written	Oral
Tutorial: Industrial Chemical Disasters and Green Chemistry			✓				✓	✓		✓		
Tutorial: Twelve Principles of Green Chemistry			✓				✓	✓		✓		
Tutorial: Limiting Reagent, and Yield part1			✓				✓	✓		✓		
Tutorial: Limiting Reagent, and Yield part2			✓				✓	✓		✓		
Tutorial: Atom Economy and Eco-scale part1			✓				✓	✓		✓		



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Tutorial: Atom Economy and Eco-scale part2			✓				✓	✓		✓		
Tutorial: Biomimicry.			✓				✓	✓		✓		
Tutorial: Circular Economy.			✓				✓			✓		
Tutorial: Biodegradability			✓				✓			✓		
Tutorial: Working without Solvents			✓				✓			✓		
Tutorial: Green solvents in sample preparation			✓				✓			✓		
Tutorial: Green chromatography in analytical chemistry			✓				✓			✓		
Tutorial: Green Analytical Chemistry Metrics.			✓				✓			✓		
Tutorial: Industrial Chemical Disasters and Green Chemistry			✓				✓			✓		

Course Coordinator	Prof. Dr. Jenny Jeehan Nasr
Head of Department	Prof. Dr. Jenny Jeehan Nasr

Date:10/ 9 / 2023



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