Mansoura University

Faculty of Pharmacy

Quality Assurance Unit

Pharm D Program

Course Specification

2023- 2024

كلية الصيدلة

جامعة المنصورة

توصيف مقررات برنامج بكالوريوس الصيدلة لائحة فارم دى 2024/2023

Created By: Quality Assurance Unit

فهرس المحتويات

بكالوريوس الصيدلة (فارم دي - **Pharm D)**

Course Specification

Academic year: 2023/2024

Course name: Advanced Pharmaceutical Analysis - Spectroscopy	اسم المقرر : التحليل الصيدلي المتقدم-تحليل طيفي
Academic Level: level 5	المستوى الأكاديمي : الخامس
Scientific department: Pharmaceutical analytical chemistry	القسم العلمي: الكيمياء التحليلية الصيدلية
Head of Department: **Prof. Dr. jenny Gihan Mohamed Ahmed Nasr**	رئيس القسم: أ.د/ جيني جيهان محمد أحمد نصر
Course Coordinator: **Prof. Dr. Manal Ibrahim Eid**	منسق المقرر: أ.د/ منال إبراهيم عيد

Mansoura University

Faculty of Pharmacy

Quality Assurance Unit

Pharm D Program

Course Specification

2023- 2024

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 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	**Advanced Pharmaceutical Analysis-Spectroscopy**
Course Code	PAE 01
Prerequisite	Registration
Teaching credit Hours: Lecture	1
Teaching Credit Hours: Practical/ tutorial	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

On completion of the course, the student will be able to

•Orienting the students to recall the basic principles of the advanced pharmaceutical analysis methods such as derivative spectrophotometry, synchronous spectrofluorimetry, chemiluminescence, and flow injection analysis.

•Knowing applications of these methods to assess pharmaceutical compounds in pharmaceutical
and biological matrices.

•Recognizing the requirements for pharmaceutical industry, such as quality control and quality assurance of pharmaceutical products.

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 advanced spectroscopic methods involved in pharmaceutical analysis such as derivative spectrophotometry, synchronous spectrofluorimetry, chemiluminescence, flow injection analysis, and lab-on-a-chip techniques.
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 new green 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 green 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.

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

1. 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 analysis, Beer's law, problems on Beer's law, and determination of pKa by spectrophotometric titrations.	1
2	**Quantitative application of UV-Vis spectroscopy: chemical and mathematical derivatization.** Fundamentals of derivative spectroscopy and its applications.	1
3	**Chemical derivatization of compounds of low molar absorptivity,**	1
4	**Stoichiometric determination by Job's method, molar ratio method, and limiting logarithmic method.**	1
5	**Chemiluminescence: Introduction and Theory**	1
6	**Chemiluminescence Applications and labelling**	1
7	**Biochemical Applications of Chemiluminescence**	1

8	**Applications of chemiluminescence in cancer detection and therapy**	1
9	**Conventional and synchronous spectrofluorimetry: fundamentals and applications.** Fluorescence and phosphorescence phenomena, Factors affecting fluorescence, fluorescence quantum efficiency, and advantages and disadvantages of spectrofluorimetry.	1
10	**Quantitative applications of spectrofluorimetry**. Analysis of inorganic compounds, organic compounds, and biochemical species, micellar enhancement of fluorescence	1
11	**Synchronous spectrofluorimetry**, derivative synchronous spectrofluorimetry.	1
12	**Flow injection analysis: fundamentals.** Definition, advantages, and examples for applications	1
13	**Lab-on-a-Chip technology: fundamentals and applications.** Introduction, advantages, applications. **Green Assessment Tools : Analytical Eco scale and GAPI (self learning)**	1
14	**Revision and quiz**	--
15	**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 (graphical method).	1
3.	Determination of pKa by spectrophotometry (algebraic method).	1
4.	Derivative spectrophotometry: Principles and applications Derivative spectrophotometric analysis of aspirin and methocarbamol binary mixture. Derivative spectrophotometric analysis of metformin and	1

	glibenclamide binary mixture.	
5.	Determination of reaction stoichiometry by Job's method.	1
6.	Determination of reaction stoichiometry by molar ratio method.	1
7.	More examples on reaction stoichiometry	1
8.	Midterm exam	-
9.	Determination of reaction stoichiometry by limiting logarithmic method.	1
10.	Derivative synchronous spectrofluorimetric determination of binary and ternary mixtures. Examples	1
11.	Spectrofluorimetric analysis of pregabalin via its reaction with certain fluorogenic reagents.	1
12.	Green assessment (Analytical-Ecoscale)	1
13	Green assessment (GAPI)	1
14	Practical Exam (OSPE)	------

2. 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** • **Online learning through my mans "Mansoura university" as recorded video lectures** • **Interactive discussion through My Mans.**	**1-14**	**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, 4.2.2.1, 4.3.1.1**
4.2	**Practical session using chemicals and laboratory equipment and/or tutorials**	**1-14**	**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**
4.3	**Self-learning**	**13**	**2.5.3.1,4.1.2.1,4.2.2.1, 4.3.2.1**

4.4	**Class Activity Discussion / Brainstorming / problem solving**	**2-5,13**	**2.5.3.1, 4.1.2.1,4.2.2.1,4.3.1.1 4.3.2.1**

3. 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, 2.2.3.1, 2.2.4.1, 2.3.1.1, 2.3.2.1, 2.5.3.1.
2-Practical exam applying OSPE/	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 exam, OSCE	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- 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	7-9th week
Assessment 2	Practical examination and tutorial	14th week
Assessment 3	Written exam	15th week
Assessment 4	Oral exam	15th 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%

Facilities required for teaching and learning

-Class room	Data show- Computers, Internet.

- Laboratory facilities	Chemicals- Glass wares- 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.	Skoog D.A., West D.M., Holler F.J., Crouch S.R., Belmont C.A., Fundamentals of Analytical Chemistry, 9th ed., Cengage Learning, USA (2014).	Essential Book
4.	Luís Pinto da Silva., A Comprehensive Guide to Chemiluminescence, Nova Science Publishers (2019)	Essential Book
5.	Ewing G.W., Instrumental Methods of Chemical Analysis, 5th ed. McGraw-hill book company, New York (1995).	Essential Book
6.	Beckett A. H., Stenlake J. B., Practical Pharmaceutical Chemistry, 4th ed., Cambridge, England (2001).	Essential Book
7.	https://www.ekb.eg http://www.sciencedirect.com http://www.google scholar.com	Websites

8. Matrix 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	4.2.2.1	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, problems on Beer's law, and determination of pKa by spectrophotometric titrations.	✓	✓	✓	✓									
Quantitative application of UV-Vis spectroscopy: chemical and mathematical derivatization. Fundamentals of derivative spectroscopy and its applications.	✓	✓	✓	✓	✓	✓							

Chemical derivatization of compounds of low molar absorptivity,	✓	✓	✓	✓		✓	✓	✓					
Stoichiometric determination by Job's method, molar ratio method, and limiting logarithmic method.	✓	✓	✓	✓	✓	✓	✓	✓					
Chemiluminescence: Introduction and Theory	✓	✓	✓	✓				✓					
Chemiluminescence Applications and labelling	✓	✓	✓	✓	✓								
Biochemical Applications of Chemiluminescence	✓	✓	✓	✓	✓								

Applications of chemiluminescence in cancer detection and therapy	✓	✓	✓	✓	✓								
Conventional and synchronous spectrofluorimetry: fundamentals and applications. Fluorescence and phosphorescence phenomena, Factors affecting fluorescence, fluorescence quantum efficiency, and advantages and disadvantages of spectrofluorimetry.	✓	✓	✓	✓	✓			✓					
Quantitative applications of spectrofluorimetry. Analysis of inorganic compounds, organic compounds, and biochemical species, micellar enhancement of fluorescence	✓	✓	✓	✓	✓	✓	✓	✓					
Synchronous spectrofluorimetr	✓	✓	✓	✓	✓	✓	✓	✓					

y, derivative synchronous spectrofluorimetry.													
Flow injection analysis: fundamentals. Definition, advantages, and examples for applications	✓	✓			✓	✓	✓	✓					
Lab-on-a-Chip technology: fundamentals and applications. Introduction, advantages, applications. Green Assessment Tools : Analytical Eco scale and GAPI (self learning)			✓				✓	✓					
<u>Practical Topics</u> Beer's law (introduction and problems solving).			✓	✓		✓			✓	✓	✓		
Determination of pKa by spectrophotometry (graphical			✓	✓	✓	✓			✓	✓	✓		

method).													
Determination of pKa by spectrophotometry (algebraic method).			✓	✓	✓	✓			✓	✓	✓		
Derivative spectrophotometric analysis of aspirin and methocarbamol binary mixture.			✓	✓		✓			✓	✓	✓		
Determination of reaction stoichiometry by Job's method.			✓	✓		✓			✓	✓	✓		
Determination of reaction stoichiometry by molar ratio method +Seminar			✓	✓		✓			✓	✓	✓		
More examples on reaction stoichiometry			✓	✓		✓			✓	✓	✓		
Determination of reaction stoichiometry by limiting logarithmic method.			✓	✓		✓			✓	✓	✓	✓	✓

+Seminars													
Derivative synchronous spectrofluorimetric determination of binary and ternary mixtures. +Seminars			✓	✓		✓	✓		✓	✓	✓	✓	✓
Spectrofluorimetric analysis of pregabalin via its reaction with certain fluorogenic reagents. +Seminars			✓	✓		✓	✓		✓	✓	✓	✓	✓
Green assessment (Analytical ecoscale) +Seminars			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
Green assessment (GAPI) +Seminars			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓

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

Theoretical part

Course Contents	Teaching and Learning methods					Assessment methods			
	Lecture	Distance leaning	Practical sessions	Self-learning	Class learning	Periodical	Practical/ Tutorial	Written	Oral
Application of UV-Vis spectroscopy: qualitative and quantitative analysis. Fundamentals of UV-Vis spectroscopy, its application in qualitative analysis, Beer's law, problems on Beer's law, and determination of pKa by spectrophotometric titrations.	✓				✓	✓		✓	✓
Quantitative application of UV-Vis spectroscopy: chemical and mathematical derivatization. Fundamentals of derivative spectroscopy and its applications.	✓				✓	✓		✓	✓
Chemical derivatization of compounds of low molar absorptivity,	✓				✓	✓		✓	✓
Stoichiometric determination by Job's method, molar ratio method, and limiting logarithmic method.	✓				✓	✓		✓	✓

Chemiluminescence: Introduction and Theory	✓				✓	✓		✓	✓
Chemiluminescence Applications and labelling	✓				✓	✓		✓	✓
Biochemical Applications of Chemiluminescence	✓	✓			✓			✓	✓
Applications of chemiluminescence in cancer detection and therapy	✓	✓			✓			✓	✓
Conventional and synchronous spectrofluorimetry: fundamentals and applications. Fluorescence and phosphorescence phenomena, Factors affecting fluorescence, fluorescence quantum efficiency, and advantages and disadvantages of spectrofluorimetry.	✓				✓			✓	✓
Quantitative applications of spectrofluorimetry. Analysis of inorganic compounds, organic compounds, and biochemical species, micellar enhancement of fluorescence	✓				✓			✓	✓
Synchronous spectrofluorimetry, derivative synchronous spectrofluorimetry.	✓				✓			✓	✓
Flow injection analysis: fundamentals. Definition, advantages, and examples for applications	✓				✓			✓	✓

Lab-on-a-Chip technology: fundamentals and applications. Introduction, advantages, applications. **Green Assessment Tools : Analytical Eco scale and GAPI (self learning)**	✓		✓	✓				✓	✓

B) Practical part:

Course Contents	**Teaching and Learning methods**					**Assessment methods**			
	Lecture	Distance leaning	Practical sessions	Self-learning	Class learning	Periodical	Practical/ Tutorial	Written	Oral
Beer Lambert's law (introduction and problems solving).		✓	✓				✓		
Determination of pKa by spectrophotometry (graphical method).			✓				✓		
Determination of pKa by spectrophotometry (algebraic method).			✓				✓		
Derivative spectrophotometry: Principles and applications. Derivative spectrophotometric analysis of aspirin and methocarbamol binary mixture. Derivative spectrophotometric analysis of metformin and glibenclamide binary mixture.		✓	✓				✓		
Determination of reaction stoichiometry by Job's method.			✓				✓		

Determination of reaction stoichiometry by molar ratio method +Seminar			✓				✓		
More examples on reaction stoichiometry			✓				✓		
Determination of reaction stoichiometry by limiting logarithmic method. +Seminars			✓				✓		
Derivative synchronous spectrofluorimetric determination of binary and ternary mixtures. +Seminars			✓	✓			✓		
Spectrofluorimetric analysis of pregabalin via its reaction with certain fluorogenic reagents. +Seminars			✓	✓			✓		
Green assessment (Analytical Ecoscale)			✓	✓			✓		
Green assessment (GAPI)			✓	✓			✓		

Course Coordinator	**Prof. Dr. Manal Ibrahim Eid**
	M. Eid
Head of Department	**Prof. Dr. Jenny Gihan Mohamed Ahmed Nasr**
	Date: 10/ 9 / 2023

(بكالوريوس الصيدلة فارم دى) (Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Therapeutic Drug Monitoring (3)	**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:** ----------

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 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, bioequivalence.
2. Studying different analytical methods for TDM of some typical drug classes such as antibiotics, anticonvulsant, immunosuppressant, cardiac medications, tranquilizers and bronchodilators

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, biostatical 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 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 administrated 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.

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, steady state and peak, trough sampling times pharmacodynamics.	1
3	Bioavailability, protein binding and biopharmaceutics.	1
4	Bioequivalence, drug metabolism and elimination.	1
5	Bioanalysis and estimation of drugs in biological fluids	1
6	Factors affecting therapeutic drug monitoring.	1
7	Personalized medicine and biomarkers.	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, bronchodilators and antiretroviral in pregnant women.	1
12	TDM of drugs used in treatment of tuberculosis.	1
13	TDM of covid medication medications in young and pregnant women (self-learning).	1
14	**Revision and quiz**	1
15	**Final written and oral exams**	---------
		Tutorial

		credit hours
1	Pharmacokinetics, distributional phase of the drug, steady state and peak, trough sampling times pharmacodynamics.	1
2	Bioavailability, protein binding and biopharmaceutics	1
3	Bioequivalence, drug metabolism and elimination.	1
4	Personalized medicine and biomarkers.	1
5	Bioanalysis and estimation of cardiovascular drugs in biological fluids	1
6	Bioanalysis and estimation of antivirals in biological fluids	1
7	Bioanalysis and estimation of antibiotics in biological fluids	1
8	**Midterm exam**	-
9	Bioanalysis and estimation of antifungals in biological fluids part 1	1
10	Bioanalysis and estimation of antifungals in biological fluids part 2	1
11	Bioanalysis and estimation of anticancer drugs in biological fluids part 1	1
12	Bioanalysis and estimation of anticancer drugs in biological fluids part 2	1
13	Seminar's	1
14	Tutorial exam	1

1- 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 • Online learning through my mans "Mansoura university" as recorded video lectures • Interactive discussion through My Mans.	1-14	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	1-14	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	1-13	4.1.2.1,4.2.2.1,4.3.1.1 4.3.2.1

5- Student Assessment:

c- 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	7-9th week

Assessment 2	Practical examination and tutorial	14th week
Assessment 3	Written exam	15th week
Assessment 4	Oral exam	15th week

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 stuff 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**

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.	✓	✓	✓			✓			✓	✓		✓

Personalized medicine and biomarkers.	✓	✓	✓			✓			✓	✓		✓
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, bronchodilators and antiretroviral in pregnant women.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
TDM of drugs used in treatment of tuberculosis.	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
TDM of covid medication medications in young and pregnant women (self-learning).	✓	✓			✓		✓		✓	✓		
Practical topics Pharmacokinetics, distributional phase of									✓	✓	✓	✓

the drug, steady state and peak, trough sampling times pharmacodynamics.												
Bioavailability, protein binding and biopharmaceutics									✓	✓	✓	✓
Bioequivalence, drug metabolism and elimination.									✓	✓	✓	✓
Personalized medicine and biomarkers.									✓	✓	✓	✓
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 and antibiotics in biological fluids									✓	✓	✓	✓
Bioanalysis and estimation of anticancer drugs in biological fluids									✓	✓	✓	✓

Seminar's									✓	✓	✓	✓

Course contents / K. elements	Domain 3			Domain 4				
	3.1.1.1	3.2.1.1	3.2.7.1	4.1.1.1	4.1.2.1	4.2.2.1	4.3.1.1	4.3.2.1
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.	✓	✓	✓	✓	✓	✓	✓	

Personalized medicine and biomarkers.	✓	✓	✓	✓	✓	✓	✓	
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, bronchodilators and antiretroviral in pregnant women.	✓	✓	✓	✓	✓	✓	✓	
TDM of drugs used in treatment of tuberculosis.	✓	✓	✓	✓	✓	✓	✓	
TDM of covid medication medications in young and pregnant women (self-learning).	✓	✓	✓	✓	✓	✓	✓	✓
Practical topics Pharmacokinetics, distributional phase of the drug, steady state and peak, trough sampling times pharmacodynamics.	✓	✓						

Bioavailability, protein binding and biopharmaceutics	✓	✓						
Bioequivalence, drug metabolism and elimination.	✓	✓						
Personalized medicine and biomarkers.	✓	✓						
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 and antibiotics in biological fluids	✓	✓		✓	✓	✓	✓	
Bioanalysis and estimation of anticancer drugs in biological fluids	✓	✓		✓	✓	✓	✓	
Seminar’s	✓	✓		✓	✓	✓	✓	

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

A) Theoretical Part:										
Course Contents	**Teaching and Learning Methods**								**Assessment Methods**	
	Lecture	**Online interactive discussion**	**Record video**	**Group discussion**	**Lab sessions**	**Problem solving**	**Quiz**	**Self-learning**	**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.	√		√	√	√	√			√	√

Personalized medicine and biomarkers.	√		√	√	√	√			√	√
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, bronchodilators and antiretroviral in pregnant women.	√		√	√					√	√
TDM of drugs used in treatment of tuberculosis.	√		√	√	√		√		√	√
TDM of covid medication medications in young and pregnant women (self-learning).	√	√	√	√	√	√	√	√	√	√

B) Practical Part:

Course Contents	Teaching and Learning Methods	Assessment methods

	Online interactive discussion	Record video	Group discussion	Lab sessions	Problem solving	Quiz	Practical/Tutorial	Written	Oral
Pharmacokinetics, distributional phase of the drug, steady state and peak, trough sampling times pharmacodynamics.	√	√	√	√			√	√	√
Bioavailability, protein binding and biopharmaceutics	√	√	√	√			√	√	√
Bioequivalence, drug metabolism and elimination.	√	√	√	√	√	√	√	√	√
Personalized medicine and biomarkers.	√	√	√	√	√	√	√	√	√
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 and antibiotics in biological fluids	√	√	√	√	√	√	√	√	√
Bioanalysis and estimation of anticancer drugs in biological fluids	√	√	√	√	√	√	√	√	√
Seminar’s	√	√	√	√	√				√

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

Date:10 / 9 / 2023

بكالوريوس الصيدلة (فارم د - Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Combinatorial Chemistry and Quantum Mechanics (POE 03)	**اسم المقرر :** الكيمياء التوافقية و ميكانيكا الكم
Academic Level: elective course	**المستوى الأكاديمي**: مقرراختيارى
Scientific department: Pharmaceutical Organic Chemistry	**القسم العلمي :** الكيمياء العضوية الصيدلية
Head of Department: Prof. Shahenda Metwally El-Messery	**رئيس القسم :** أ.د/ شاهنده متولي المسيري
Course Coordinator: Prof. Fatma E. Goda	**منسق المقرر :** أ.د/ فاطمة النبوية السيد جوده

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutical Organic Chemistry
Department supervising the course	Pharmaceutical Organic Chemistry
Program on which the course is given	Bachelor's Degree in Pharmacy- Pharm D
Academic Level	Elective course
Date of course specification approval	10/9/2023

A. Basic Information: Course data:

Course Title	Combinatorial Chemistry and Quantum Mechanics
Course Code	POE 03
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 principles of combinatorial chemistry from quantum mechanics drug design points of view.
- Have good idea about virtual libraries and molecular modeling NMR as quantum mechanics based technique in drug design.
- Be familiar with different applications of quantum mechanics and molecular modeling calculations.
- Knows the theoretical foundations, the potential and limitations of the methods of quantum chemistry.
- be able to set up and develop a simple computational chemistry project
- Understands the language of molecular modeling (acronyms and abbreviations).

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 different aspects of combinatorial chemistry including principle and techniques
	1.1.1.2	Discuss the basic principles of combinatorial methodologies and quantum chemical techniques
1.1.3	1.1.3.1	Utilize combinatorial chemistry techniques and principles to design and select an appropriate methodology.

Domain 2: Professional and Ethical Practice

Program K. element No.	Course K. element No.	Course K. element
2.2.1	2.2.1.1	Synthetize and purify selected drugs using combinatorial methods.
2.2.3	2.2.3.1	Identify the principles of tools and instruments used for quantum chemistry calculations

Domain 4: personal practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Work effectively as a member of drug synthesis team.
4.3.2	4.3.2.1	Adapt newly NMR drug design tools and combinatorial chemistry methodologies

3- Course Contents:

A. Theoretical part:

Week No.	Topics	Hours
1	Computer aided drug design & QM	1
2	Understanding quantum mechanics of binding	1
3	Target Identification	1

4	Application of QM	1
5	Introduction to target chemistry and receptor biosynthesis	1
6	Biosensors from quantum mechanics and drug design points of view	1
7	Combinatorial chemistry Introduction	1
8	Applications of combinatorial chemistry	1
9	Techniques of Combinatorial chemistry in drug design	1
10	Planning a combinatorial Synthesis	1
11	Applications of quantum chemistry in drug synthesis (Self-learning)	1
12	Design of new materials by combinatorial chemistry	1
13	Design of new catalysts by combinatorial chemistry	1
14	Possible limitations of combinatorial chemistry	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	Hours
1.	Safety measures and general considerations	1
2.	Electrostatic Potential Map calculation	1
3.	Contact preference calculation	1
4.	Potential Energy Hypersurface (meaning, optimization methods, properties)	1
5.	searching of local and global minimums	1

6.	Searching of transition states, calculation	1
7.	Combinatorial chemistry - drug design and combinatorial methodology	1
8.	Midterm exam	-
9.	Design of new materials by combinatorial chemistry	1
10.	Design of new catalysts by combinatorial chemistry part 1	1
11.	Design of new catalysts by combinatorial chemistry part 2	1
12.	Possible limitations of combinatorial chemistry	1
13.	Redesigning combinatorial technology- from here to the unknown (part 1)	1
14.	Redesigning combinatorial technology- from here to the unknown (part 2)	1
15.	**Revision and activity**	1
16.	**Sheet and Practical exam (OSPE)**	-

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, 1.1.1.2, 1.1.3.1, 2.2.1.1, 2.2.3.1, 4.1.2.1, 4.3.2.1
4.2	Practical sessions	1-6	2.2.1.1, 2.2.3.1, 4.1.2.1
4.3	Self-learning	11	1 1.1.1.1, 1.1.1.2, 1.1.3.1, 4.1.2.1, 4.3.2.1

5- Student Assessment:

d- Assessment Methods:

Assessment Methods	K elements to be assessed

1- Periodical (Mid-term exam/ Course work)	1.1.1.1, 1.1.1.2, 1.1.3.1, 2.2.1.1, 2.2.3.1, 4.1.2.1, 4.3.2.1
2-Practical exam using OSPE	2.2.1.1, 2.2.3.1, 4.1.2.1
3- Written exam	1.1.1.1, 1.1.1.2, 1.1.3.1, 2.2.1.1, 2.2.3.1
4- Oral	1.1.1.1, 1.1.1.2, 1.1.3.1, 4.3.2.1.

b. Assessment schedule:

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

- Classroom	Wi-Fi internet connection.
- Laboratory facilities	Projectors, chemicals, and glassware.
- Library	Textbooks

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	COMBINATORIAL CHEMISTRY By Professor Beubenz April 2019 In book: INTRODUCTION TO COMBINATORIAL CHEMISTRY By Professor Beubenz (pp.1-16) Authors:	Book

3.	. F. Jensen Introduction To Computational Chemistry, II Edition, Wiley, 2007.	**Book**
4.	C. J. Cramer Essentials of Computational Chemistry Theories and Models. II Edition, Wiley, 2004	**Book**
5.	Computational Chemistry in the Undergraduate Curriculum January 2007 DOI:10.1002/9780470125816.ch4	**Periodicals**
6.	https://www.ekb.eg http://www.sciencedirect.com On line educational material (https://cloud.unibas.it/index.php/s/PccQRh3L3ZYnXaV) o Textbooks L. Piela Ideas of Quantum Chemistry, II Edition, Elsevier, 2013. A. Szabo and N.S. Ostlund Modern Quantum Chemistry – Introduction to Advanced Electronic Structure Theory, Dover, 1996. C. J. Cramer Essentials of Computational Chemistry Theories and Models. II Edition, Wiley, 2004. F. Jensen Introduction To Computational Chemistry, II Edition, Wiley, 2007.	**websites**

8- Matrix:

Matrix 1. Course contents and course key elements

A) Theoretical part:

Course contents	Course Key elements						
	Domain: 1			Domain: 2		Domain: 4	
	1.1.1.1	1.1.1.2	1.1.3.1	2.2.1.1	2.2.3.1	4.1.2.1	4.3.2.1
Computer aided drug design & QM	√	√	√		√		
Understanding quantum mechanics of binding	√	√	√		√		
Target Identification	√	√	√	√	√		
Application of QM	√	√	√	√	√		
Introduction to target chemistry and receptor biosynthesis	√	√	√	√	√	√	√
Biosensors from quantum mechanics and drug design points of view	√	√	√	√	√	√	√
Combinatorial chemistry Introduction	√	√	√	√	√	√	√
Applications of combinatorial chemistry	√	√	√	√	√	√	√
Techniques of Combinatorial chemistry in drug design	√	√	√	√	√	√	√
Planning a combinatorial Synthesis	√	√	√	√	√	√	√
Applications of quantum chemistry in drug synthesis (Self-learning)	√	√	√	√	√	√	√

Design of new materials by combinatorial chemistry				√	√	√	√
Design of new catalysts by combinatorial chemistry			√	√	√	√	√
Possible limitations of combinatorial chemistry			√	√	√	√	√

B) Practical part:

Course contents	Course Key elements						
	Domain: 1			Domain: 2		Domain: 4	
	1.1.1.1	**1.1.1.2**	**1.1.3.2**	**2.2.1.1**	**2.2.3.1**	**4.1.2.1**	**4.3.2.1**
Safety measures and general considerations				√	√		
Electrostatic Potential Map calculation				√	√		
Contact preference calculation				√	√		
Potential Energy Hypersurface (meaning, optimization methods, properties)				√	√		
searching of local and global minimums				√	√	√	
Identific Searching of transition states, calculation				√	√	√	
Combinatorial chemistry - drug design and combinatorial methodology				√	√	√	
Design of new materials by combinatorial chemistry				√	√	√	√
Design of new catalysts by combinatorial chemistry				√	√	√	√
Possible limitations of combinatorial chemistry				√	√	√	√

Redesigning combinatorial technology- from here to the unknown (Part 1)				√	√	√	√
Redesigning combinatorial technology- from here to the unknown (Part 2)				√	√	√	√

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

A) Theoretical part:

Course Contents	Teaching and Learning Methods				Assessment methods			
	Lecture	Comp. aided learning	Lab sessions	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Computer aided drug design & QM	√	√			√		√	√
Understanding quantum mechanics of binding	√	√			√		√	√
Target Identification	√	√			√		√	√
Application of QM	√	√			√		√	√
Introduction to target chemistry and receptor biosynthesis	√	√					√	√
Biosensors from quantum mechanics and drug design points of view	√	√					√	√
Combinatorial chemistry Introduction	√	√					√	√
Applications of combinatorial chemistry	√	√					√	√
Techniques of Combinatorial chemistry in drug design	√	√					√	√
Planning a combinatorial Synthesis	√	√					√	√

Applications of quantum chemistry in drug synthesis (Self-learning)	√	√		√			√	√
Design of new materials by combinatorial chemistry	√	√					√	√
Design of new catalysts by combinatorial chemistry	√	√					√	√
Possible limitations of combinatorial chemistry	√	√					√	√

B) Practical part:

Course Contents	Teaching and Learning Methods				Assessment methods			
	Lecture	Comp. aided learning	Lab sessions	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Safety measures and general considerations			√			√		
Electrostatic Potential Map calculation		√	√			√		
Contact preference calculation		√	√			√		
Potential Energy Hypersurface (meaning, optimization methods, properties)		√	√			√		
searching of local and global minimums		√	√			√		
Identific Searching of transition states, calculation		√	√			√		
Combinatorial chemistry - drug design and combinatorial methodology		√	√			√		
Design of new materials by combinatorial chemistry		√	√			√		
Design of new catalysts by combinatorial chemistry		√	√			√		
Possible limitations of combinatorial chemistry		√	√			√		
Redesigning combinatorial technology - from here to the unknown (Part 1)		√	√			√		
Redesigning combinatorial technology - from here to the unknown (Part 2)		√	√			√		

Course Coordinator	**Prof. Fatma E. Goda**	
Head of Department	**Prof. Shahenda M. El-Messery**	

Approval Date: 10/9/2023

بكالوريوس الصيدلة (فارم د - Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Modern Trends in Drug Synthesis (POE 04)	**اسم المقرر :** الاتجاهات الحديثة لتشييد الأدوية
Academic Level: elective course	**المستوى الأكاديمي**: مقرراختيارى
Scientific department: Pharmaceutical Organic Chemistry	**القسم العلمي :** الكيمياء العضوية الصيدلية
Head of Department: Prof. Shahenda Metwally El-Messery	**رئيس القسم :** أ.د/ شاهنده متولي المسيري
Course Coordinator: Prof. Khalid B. Selim	**منسق المقرر :** أ.د/ خالد بشير سليم

University	**Mansoura**
Faculty	**Pharmacy**
Department offering the course	**Pharmaceutical Organic Chemistry**
Department supervising the course	**Pharmaceutical Organic Chemistry**
Program on which the course is given	**Bachelor's Degree in Pharmacy- Pharm D**
Academic Level	**Elective course**
Date of course specification approval	**10/9/2023**

A. Basic Information: Course data:

Course Title	**Modern Trends in Drug Synthesis**
Course Code	**POE 04**
Prerequisite	**--**
Teaching credit Hours: Lecture	**1**
: Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

- This course aims to provide students with principles of eco-friendly organic synthesis of drugs.
- Emphasizing different methods and techniques that achieve efficient synthesis with lower or no waste or byproducts, preventing human or environmental hazards and more economic value.
- Identify stereochemistry aspects of chiral drugs, chiral switches, and diastereomeric interaction, and stereoselective synthesis
- Discuss polymer chemistry and its application in drug synthesis.
- Students will be familiar with different new instruments and techniques that are recently introduced in the field of the organic synthesis of drugs. The practical part includes several synthetic examples of famous drugs.

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 different aspects of green chemistry including health hazards and environmental protection
	1.1.1.2	Discuss the basic principles of different trends in organic synthesis of drugs.
1.1.3	1.1.3.1	Utilize eco-friendly synthesis principles to design and select an appropriate environmentally benign synthesis of different drugs.

Domain 2: Professional and Ethical Practice

Program K. element No.	Course K. element No.	Course K. element
2.2.1	2.2.1.1	Synthetize and purify selected drugs using different synthetic methods.
2.2.3	2.2.3.1	Identify the principles of tools and instruments used for modern organic synthesis.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Work effectively as a member of drug synthesis team.
4.3.2	4.3.2.1	Adapt the newly introduced eco-friendly benign synthetic techniques through continuous life-long learning.

3- Course Contents:

B)Theoretical part

Week No.	Topics	Hours
1	Basic Principles of Green Chemistry	1
2	Designing an eco-friendly synthesis (Green Synthesis)	1
3	Microwave Induced Green Synthesis I Introduction and basic principles	1

4	Microwave Induced Green Synthesis II Applications	1
5	Ultrasound Assisted Synthesis	1
6	Biocatalysts in Organic Synthesis	1
7	Aqueous Phase Reactions	1
8	Organic Synthesis in Solid State (Solid Phase Organic Synthesis Without Using Any Solvent)	1
9	Organic Synthesis in Solid State (Solid Supported Organic Synthesis)	1
10	Stereochemistry Aspects in Drug synthesis	1
11	Stereo selective synthesis of drugs	1
12	Polymer chemistry (Introduction and basic principles) (Self-learning)	1
13	Polymer chemistry (Application in drug synthesis)	1
14	Peptide chemistry (Application in drug synthesis)	1
15	Compensatory and alternative lecture	1
16	**Revision and quiz**	1
17	**Final written and oral exam**	-

C) Practical part

Week No.	Practical topics	Hours
1.	Safety measures and general considerations	1
2.	Synthesis of Aspirin	1
3.	Synthesis of Ibuprofen	1
4.	Synthesis of Paracetamol	1
5.	Selective Alkylation of Active Methylene Group	1

6	Selective Alkylation of Active Methylene Group (Contin.)	1
7.	Synthesis of Furfural from Biomass	1
8.	Midterm exam	-
9.	Synthesis of Citral	1
10.	Synthesis of 1,4-Dihydropyridines	1
11.	Synthesis of catechol derivatives	1
12.	Synthesis of Urethane	1
13.	Synthesis of peptides part 1	1
14.	Synthesis of peptides part 2	1
15.	**Revision and activity**	1
16.	**Sheet / and Practical exam**	-

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, 1.1.1.2, 1.1.3.1, 2.2.1.1, 2.2.3.1,
4.2	Practical sessions	1-16	2.2.1.1, 2.2.3.1
4.3	Self-learning	12	1 1.1.1.1, 1.1.1.2, 1.1.3.1, 4.1.2.1, 4.3.2.1

5- Student Assessment:

e- Assessment Methods:

Assessment Methods	**K elements to be assessed**
1- Periodical (Mid-term exam/ Course work)	1.1.1.1, 1.1.1.2, 1.1.3.1, 2.2.1.1, 2.2.3.1, 4.1.2.1, 4.3.2.1
2-Practical exam using OSPE	2.2.1.1, 2.2.3.1
3- Written exam	1.1.1.1, 1.1.1.2, 1.1.3.1, 2.2.1.1, 2.2.3.1

4- Oral	1.1.1.1, 1.1.1.2, 1.1.3.1, 4.1.2.1, 4.3.2.1

b. Assessment schedule:

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

- Classroom	Data show, computers, internet, molecular chemical models and animation files.
- Laboratory facilities	Projectors, chemicals, and glassware.
- Library	Textbooks

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Modern Drug Synthesis; Jie Jack Li, Douglas S. Johnson; John Wiley & Sons, Inc. 2013.	Book
3.	Microwave-Assisted Organic Synthesis. A Green Chemical Approach; Suresh C. Ameta, Pinki B. Punjabi, Rakshit Ameta, and Chetna Ameta, Apple Academic Press. 2015.	Book
4.	Ahluwalia VK, Kidwai M. New trends in green chemistry. New Delhi: Anamaya Publishers; 2004.	Book

5.	Green Chemistry journal https://www.rsc.org/journals-books-databases/about-journals/green-chemistry/	**Periodicals**
6.	Current Research in Green and Sustainable Chemistry https://www.journals.elsevier.com/current-research-in-green-and-sustainable-chemistry	**Periodicals**
7.	https://www.ekb.eg http://www.sciencedirect.com https://scholar.google.com http://www.orgsyn.org	**websites**

8- Matrix:

Matrix 1. Course contents and course key elements

A) Theoretical part:

Course contents	Course K. elements						
	Domain: 1			Domain: 2		Domain: 4	
	1.1.1.1	1.1.1.2	1.1.3.1	2.2.1.1	2.2.3.1	4.1.2.1	4.3.2.1
Basic Principles of Green Chemistry	√	√	√				
Designing an eco-friendly synthesis (Green Synthesis)	√	√	√				
Microwave Induced Green Synthesis I Introduction and basic principles	√	√	√	√	√		
Microwave Induced Green Synthesis II Applications	√	√	√	√	√		
Ultrasound Assisted Synthesis	√	√	√	√	√	√	√
Biocatalysts in Organic Synthesis	√	√	√	√	√	√	√
Aqueous Phase Reactions	√	√	√	√	√	√	√
Organic Synthesis in Solid State Solid Phase Organic Synthesis Without Using Any Solvent	√	√	√	√	√	√	√
Organic Synthesis in Solid State Solid Supported Organic Synthesis	√	√	√	√	√	√	√
Stereochemistry Aspects in Drug synthesis	√	√	√	√	√	√	√

Stereoselective synthesis of drugs	√	√	√	√	√	√	√
Polymer chemistry Introduction and basic principles (Self-learning)	√	√	√	√	√		√
Polymer chemistry Application in drug synthesis		√	√	√	√	√	√
Peptides chemistry Application in drug synthesis		√	√	√	√	√	√

B) Practical part:

Course contents	Course Key elements						
	Domain: 1			Domain: 2		Domain: 4	
	1.1.1.1	1.1.1.2	1.1.3.2	2.2.1.1	2.2.3.1	4.1.2.1	4.3.2.1
Safety measures and general considerations				√	√		
Synthesis of Aspirin			√	√	√		
Synthesis of Ibuprofen		√		√	√		
Synthesis of Paracetamol			√	√	√		√
Selective Alkylation of Active Methylene Group		√	√	√	√	√	
Selective Alkylation of Active Methylene Group (Contin.)		√		√	√	√	
Synthesis of Furfural from Biomass			√	√	√	√	
Synthesis of Citral		√		√	√	√	√
Synthesis of 1,4-Dihydropyridines		√		√	√	√	√
Synthesis of catechol derivatives			√	√	√	√	√
Synthesis of Urethane			√	√	√	√	√
Synthesis of peptides			√	√	√	√	√

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

A) Theoretical part:

Course Contents	Teaching and Learning Methods	Assessment methods

	Lecture	Comp. aided learning	Lab sessions	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Basic Principles of Green Chemistry	√	√			√		√	√
Designing an eco-friendly synthesis (Green Synthesis)	√	√			√		√	√
Microwave Induced Green Synthesis I Introduction and basic principles	√	√			√		√	√
Microwave Induced Green Synthesis II Applications	√	√			√		√	√
Ultrasound Assisted Synthesis	√	√					√	√
Biocatalysts in Organic Synthesis	√	√					√	√
Aqueous Phase Reactions	√	√					√	√
Organic Synthesis in Solid State Solid Phase Organic Synthesis Without Using Any Solvent	√	√					√	√
Organic Synthesis in Solid State Solid Supported Organic Synthesis	√	√					√	√
Stereochemistry Aspects in Drug synthesis	√	√					√	√
Stereoselective synthesis of drugs	√	√					√	√
Polymer chemistry Introduction and basic principles (Self-learning)	√	√		√			√	√
Polymer chemistry Application in drug synthesis	√	√					√	√
Peptides chemistry Application in drug synthesis	√	√					√	√

B) Practical part:

Course Contents	Teaching and Learning Methods				Assessment methods			
	Lecture	Comp. aided learning	Lab sessions	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Safety measures and general considerations			√			√		
Synthesis of Aspirin		√	√			√		
Synthesis of Ibuprofen		√	√			√		
Synthesis of Paracetamol		√	√			√		
Selective Alkylation of Active Methylene Group		√	√			√		
Selective Alkylation of Active Methylene Group (Contin.)		√	√			√		
Synthesis of Furfural from Biomass		√	√			√		
Synthesis of Citral		√	√			√		
Synthesis of 1,4-Dihydropyridines		√	√			√		
Synthesis of catechol derivatives		√	√			√		
Synthesis of Urethane		√	√			√		
Synthesis of peptides		√	√			√		

Course Coordinator	**Prof. Khalid B. Selim**	
Head of Department	**Prof. Shahenda M. El-Messery**	

Approval Date: 10/9/2023

بكالوريوس الصيدلة (فارم د - Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Drug Targeting	**اسم المقرر :** التهديف الدوائى
Academic Level: Level 5	**المستوى الأكاديمي :** الخامس
Scientific department: Medicinal Chemistry	**القسم العلمي :** الكيمياء الدوائية
Head of Department: Prof. Dr. Mohamed Ahmed Moustafa	**رئيس القسم :** ا.د/ محمد احمد مصطفى
Course Coordinator: Dr. Mariam A. Ghaly	**منسق المقرر:** ا.م .د/ مريم عاطف غالى

University	Mansoura
Faculty	Pharmacy
Department offering the course	Medicinal Chemistry
Program on which the course is given	Bachelor's Degree in Pharmacy - PharmD
Academic Level	Fifth level, First semester, 2023/2024
Date of course specification approval	6/9/2023

A- Basic Information: Course data:

Course Title	Drug targeting
Course Code	PDE-05
Prerequisite	Registration
Teaching Hours/ week: Lecture:	1
Practical:	1
Total Credit Hours	2

B- Professional Information:

Course Aims:

This course enables the students to:

- Recognize the main drug targets, know its structure, types and mechanism of action.
- In addition to the fundamental concepts of drug-target interaction, including enzymes, receptors, and nucleic acid.
- Explain different methods used to increase drug specificity and delivery of drugs to specific sites.
- Finally, use this information in drug design.

2- Course k. elements:

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

Domain 1: fundamental knowledge

Program Key element No.	Course Key element No.	Course Key Element
1.1.1	1.1.1.1	Recognize in-depth and breadth knowledge of pharmaceutical and biomedical science related to drug action.
1.1.4	1.1.4.1	Explain drugs' mode of action, therapeutic uses and proper selection of safe and effective drugs

Domain 2: professional and ethical practice

Program Key element No.	Course Key element No.	Course Key Element
2.5.3	2.5.3.1	Adapt concepts of medicinal chemistry used in the systematic approaches applied in drug development.

Domain 3: pharmaceutical care

Program Key element No.	Course Key element No.	Course Key Element
3.2.1	3.2.1.1	Adapt principles of medicinal chemistry and pharmacological aspects of drugs, as mode of action, therapeutic uses, proper dosage, unwanted effects and drug interactions.

Domain 4: personal practice

Program Key element No.	Course Key element No.	Course Key Element
4.1.2	4.1.2.1	Appraise information and analyze data, identify problems and present solutions, participate independently and collaboratively as drug chemistry expert within healthcare team.
4.2.1	4.2.1.1	Communicate effectively in proper scientific language by verbal and written means in the field of health care related to the studied topics
4.3.2	4.3.2.1	Practice independent learning to promote continuous professional development and lifelong learning.

-Course Contents

Theoretical part

Week No.	Topics	Hours
1	Reversible and irreversible enzyme inhibitors	1
2	Enzyme inhibitors acting at allosteric binding sites	1
3	Uncompetitive and non-competitive enzyme inhibitors	1
4	Transition-state analogues and suicide substrates of enzyme	1
5	Isozyme selectivity of inhibitors	1
6	Receptors structure and function (part 1)	1
7	Receptors structure and function (part 2)	1
8	Receptors structure and function (part 3)	1
9	Receptors structure and function (part 4)	1
10	Receptors as drug targets (part 1)	1
11	Receptors as drug targets (part 2)	1
12	Receptors as drug targets (part 3)	1
13	Self-learning: Antiviral agents targeting nucleic acids.	1
14	Revision and quiz	--
15	Final Written and Oral Exam	--

D) Practical part

Week No.	Topics	Hours
1	- Proteins (part 1)	1
2	- Proteins (part 2)	1
3	- Nucleic acid structure	1
4	- Nucleic acid as drug targets	1
5	- Enzymes (part 1) - Presentation	1
6	- Enzymes (part 2) - Presentations	1
7	- Receptors (part 1) - Presentations	1
8	- Midterm exam	-
9	- Receptors (part 2) - Presentations	1

10	- **Miscellaneous drug targets** - **Presentations**	1
11	- **Presentations**	1
12	- **Presentations**	1
13	- **Presentations**	1
14	**Practical exam**	--

3- Teaching and Learning Methods:

	Teaching and learning Methods	Weeks No.	Key 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	1-14	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.2.1.1, 4.3.2.1
4.2	Self-learning	13	4.3.2.1
4.3	Tutorial sessions using Data show, power Point presentations and possible applications of OSQE	1-14	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.2.1.1, 4.3.2.1
4.4	Class Activity: Group discussion offline and online.	1-13	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.2.1.1,
4.5	Problem based learning and brain storming.	1-13	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.2.1.1,

Student Assessment:

Assessment Methods:

Assessment Methods	Key elements to be assessed
1- Periodical (Mid-term exam / Course work)	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.3.2.1
2- Practical exam	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.3.2.1
3- Written exam	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.3.2.1
4- Oral exam	1.1.1.1, 1.1.4.1, 2.5.3.1, 3.2.1.1, 4.1.2.1, 4.2.1.1, 4.3.2.1

Assessment schedule:

Assessment 1	Periodical (Mid-term/ Course work)	7-9th week
Assessment 2	Practical exam (OSPE)	14th week
Assessment 3	Written exam	15th week
Assessment 4	Oral exam	15th week

Weighing of assessment:

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

Facilities required for teaching and learning.

- Classroom	Data show- Computers, Internet. (Available)
- Laboratory facilities	Data show- Computers, Internet. (Available)
- Library	Textbooks

List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Graham L. Patrick; "An Introduction to Medicinal Chemistry" Oxford University Press, USA; 6th Revised edition, 2017	Essential Book

3.	M. E. Wolff Burger"s Medicinal Chemistry and Drug Discovery", Donald J. Abraham, David P. Rotella (Editors), Wiley-interscience Publication, New York, 7th edition (2013).	Recommended Book
4.	Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, John Beale & John Block (Editors) Lippincott Williams & Wilkins; 12th Edition (2015).	Recommended Book
5.	Thomas, Gareth, "Fundamentals of Medicinal Chemistry" Wiley-Blackwell; Kindle Edition (2013).	Recommended Book
6.	https://www.ekb.eg http://www.sciencedirect.com / http://www.google scholar.com / http://www.pubmed.com	Website

8-Matrix:

Matrix 1. Course contents and course key elements

A) Theoretical part:

Course contents	Course Key elements						
	Domain: 1		Domain: 2	Domain: 3	Domain: 4		
	1.1.1.1	1.1.4.1	2.5.3.1	3.2.1.1	4.1.2.1	4.2.1.1	4.3.2.1
Reversible and irreversible enzyme inhibitors				✓			✓
Enzyme inhibitors acting at allosteric binding sites			✓				
Uncompetitive and non-competitive enzyme inhibitors	✓		✓	✓	✓		
Transition-state analogues and suicide substrates of enzyme			✓		✓	✓	
Isozyme selectivity of inhibitors	✓			✓	✓		
Receptors structure and function (part 1)	✓		✓		✓		
Receptors structure and function (part 2)	✓	✓	✓	✓	✓	✓	✓
Receptors structure and function (part 3)		✓	✓	✓	✓		
Receptors structure and function	✓	✓	✓	✓	✓	✓	✓

(part 4)							
Receptors as drug targets (part 1)		✓	✓	✓	✓	✓	
Receptors as drug targets (part 2)	✓	✓	✓	✓	✓	✓	✓
Receptors as drug targets (part 3)	✓	✓		✓	✓	✓	✓
Self-learning: Antiviral agents targeting nucleic acids.	✓	✓	✓	✓	✓	✓	✓

-Practical part:

Course contents	**Course Key elements**						
	Domain: 1		Domain: 2	Domain: 3	Domain: 4		
	1.1.1.1	**1.1.4.1**	**2.5.3.1**	**3.2.1.1**	**4.1.2.1**	**4.2.1.1**	**4.3.2.1**
Proteins (part 1)	✓	✓	✓	✓			
Proteins (part 2)	✓	✓	✓	✓			
Nucleic acid structure	✓	✓	✓	✓			
Nucleic acid as drug targets	✓	✓	✓	✓			
Enzymes (part 1) Presentations	✓	✓	✓	✓	✓	✓	✓
Enzymes (part 2)	✓	✓	✓	✓	✓	✓	✓

Presentations							
Receptors (part 1) Presentations	✓	✓	✓	✓	✓	✓	✓
Receptors (part 2) Presentations	✓	✓	✓	✓	✓	✓	✓
Miscellaneous drug targets Presentations	✓	✓	✓	✓	✓	✓	✓
Presentations	✓	✓	✓	✓	✓	✓	✓

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

Course Contents	**Teaching and Learning methods**				**Assessment methods**			
	Lecture	Hybrid leaning	Comp. aided learning	Self-learning	Corse Work	Poster	Written	Oral
Reversible and irreversible enzyme inhibitors	✓	✓	✓		✓		✓	✓
Enzyme inhibitors acting at allosteric binding sites	✓	✓	✓		✓		✓	✓
Uncompetitive and non-competitive enzyme inhibitors	✓	✓	✓		✓		✓	✓
Transition-state analogues and suicide substrates of enzyme	✓	✓	✓		✓		✓	✓
Isozyme selectivity of inhibitors	✓	✓	✓		✓	✓	✓	✓

Receptors structure and function (part 1)	✓	✓	✓		✓		✓	✓
Receptors structure and function (part 2)	✓	✓	✓		✓		✓	✓
Receptors structure and function (part 3)	✓	✓	✓		✓	✓	✓	✓
Receptors structure and function (part 4)	✓	✓	✓		✓		✓	✓
Receptors as drug targets (part 1)	✓	✓	✓		✓		✓	✓
Receptors as drug targets (part 2)	✓	✓	✓		✓		✓	✓
Receptors as drug targets (part 3)	✓	✓	✓		✓		✓	✓
Self-learning: Antiviral agents targeting nucleic acids.	✓	✓	✓	✓	✓		✓	✓

A) Theoretical part:

B) Practical part:

Course Contents	**Teaching and Learning methods**			**Assessment methods**	
	Lecture	Hybrid learning	Comp. aided learning	presentation	Practical/Tutorial

Protein (part 1)	✓	✓	✓		✓
Protein (part 2)	✓	✓	✓		✓
Nucleic acid structure	✓	✓	✓		✓
Nucleic acid as drug targets	✓	✓	✓		✓
Enzymes (part 1) Presentation	✓	✓	✓	✓	✓
Enzymes (part 2) Presentation	✓	✓	✓	✓	✓
Receptors (part 1) Presentation	✓	✓	✓	✓	✓
Receptors (part 2) Presentation	✓	✓	✓	✓	✓
Miscellaneous drug targets Presentation	✓	✓	✓	✓	✓
Presentation	✓	✓	✓	✓	✓

Course Coordinator	Dr. Mariam A. Ghaly 
Head of Department	Prof. Dr. Mohamed Ahmed Moustafa 

Approval Date: 6/9/2023

(بكالوريوس لصيدلة (فارم د Pham D)

Course Specification

Academic year: 2023/2024

Course Name: Advanced Medicinal Chemistry	اسم المقرر: كيمياء دوائية متقدمة
Academic Level: Fifth level	الخامس المستوى الأكاديمي:
Scientific Department: Medicinal Chemistry Department	القسم العلمي: الكيمياء الدوائية
Head of Department: Prof. Dr. Mohamed Ahmed Ahmed Moustafa	رئيس القسم: ا.د/ محمد أحمد أحمد مصطفى
Course Coordinator: Prof. Dr. Mohamed Ahmed Ahmed Moustafa	منسق المقرر : ا.د/ محمد أحمد أحمد مصطفى

University	**Mansoura**
Faculty	**Pharmacy**
Department offering the course	**Medicinal Chemistry**
Department supervising the course	**Medicinal Chemistry**
Program on which the course is given	**Bachelor in Pharmacy- Pharm D**
Academic Level	**Level 5 , second semester, 2023/2024**
Date of course specification approval	**6/9/2023**

A. Basic Information: Course data:

Course Title	**Advanced Medicinal Chemistry**
Course Code	**PDE 06**
Prerequisite	**Registration**
Teaching credit Hours: Lecture	**1 hour**
: Practical	**1 hours**
Total Credit Hours	**2 Credit hours**

B. Professional Information:

1 .Course Aims:

This course aims to:

provide the students with an advanced knowledge in medicinal chemistry; specifically, the design, synthesis and biological evaluation of small organic substances as potential lead compounds.

It provides overview of 3D structures of small molecules, forcefields types, energy minimization and conformational analysis processes. It presents principles of physicochemical properties and drug-likeness.

It introduces basics of cheminformatics including databases, libraries, substructure search and similarity searches.

It provides understanding of proteins structures, ligand interactions and protein sequence and structure homology.

It covers ligand-based and structure based design strategies as well as methods of lead generation. It provides basics of retrosynthetic analysis and diversity oriented and scaffold based syntheses.

It covers biological evaluation methods as well as virtual screening.

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	Use various in silico models to predict and/or explain the biological activity of molecules
1.1.7	1.1.7.1	Use cheminformatics to generate, assess, manage, search and analyze chemical databases and libraries

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.5.3	2.5.3.1	Apply principles of drug design, retrosynthetic analysis and biological evaluation to the design of anticipated candidate bioactive molecules, planning their synthesis and biological evaluation.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Acquire the ability to work in a team to analyze and design synthetic problems and solve them.
4.2.1	4.2.1.1	Promote students skills and capabilities for verbal and written communication in correct and clear language with team members
4.3.2	4.3.2.1	Perform self- and continuous-education and study

3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	3D structure, Forcefields, Energy minimization and Conformational analysis	1
2	Physicochemical properties and drug-likeness	1
3	Basic cheminformatics: Databases, Libraries, Substructure search and similarity search	1
4	Proteins: Structure, Ligand interactions, Sequence/structure homology	1
5	Ligand-based design and pharmacophore identification	1
6	Structure-based design	1
7	Molecular docking	1
8	Lead generation (diversity, scaffold hoping, combinatorial and click chemistry)	1
9	Synthesis of substances and retrosynthetic analysis, diversity	1

	oriented synthesis, scaffold-based synthesis	
10	**Biological evaluation of substances (cell free, cell-based and animal assays)**	**1**
11	**Biological evaluation of substances (animal assays)**	**1**
12	**Biological evaluation of substances (animal assays, part 2)**	**1**
13	**Biological evaluation of substances (animal assays, part 3)**	**1**
14	**Virtual Screening (self-learning).**	**1**
15	**Compensatory and alternative lecture**	**1**
16	**Revision and quiz**	**1**
Srtarting from 17	**Final written and oral exam**	**--**
Week No.	**Practical topics**	**Practical credit hours**
1.	**Introduction on ligand–based drug design**	**1**
2.	**Introduction on structure–based drug design**	**1**
3.	**Energy minimization and conformational searching**	**1**
4.	**Molecular surfaces**	**1**
5.	**Structure-based design and molecular docking**	**1**
6.	**Scaffold replacement**	**1**
7.	**R-group screening**	**1**
8.	**Midterm exam**	**-**
9.	**Pharmacophore Modeling- Part I**	**1**
10.	**Pharmacophore Modeling- Part II**	**1**

11.	**Similarity search and flexible alignment**	**1**
12	**Quantitative Structure-Activity Relationship (QSAR) (Part I)**	**1**
13	**Quantitative Structure-Activity Relationship (QSAR) (Part II)**	**1**
14	**Application on ligand base drug design – Part I**	**1**
15	**Application on ligand base drug design – Part II**	**1**
16	**Sheet / and Practical exam**	**--**

4- Teaching and learning Methods:

No.	Teaching and learning Methods	Week No.	K. elements to be addressed
4.1	**Computer aided learning:** **a. Lectures using Data show, power Point presentations** **b. Distance learning** **On line learning through my mans "Mansoura university "as recorded – video lectures** **Interactive discussion through My Mans**	**1-16**	**1.1.4.1, 1.1.7.1, 2.5.3.1,4.1.2.1, 4.2.1.1.**
4.2	**Self-learning**	**14**	**1.1.4.1, 2.5.3.1,4.1.2.1, 4.3.2.1.**
4.3	**Practical session using Drug design software and computers**	**1-16**	**1.1.4.1, 1.1.7.1, 2.5.3.1,4.1.2.1, 4.2.1.1.**
4.4	**Class Activity: Group discussion offline and online.**	**1-11**	**1.1.4.1, 1.1.7.1, 2.5.3.1,4.1.2.1, 4.2.1.1.**

5- Student Assessment:

Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.4.1, 1.1.7.1, 2.5.3.1, 4.2.1.1, 4.3.2.1
2-Practical exam	1.1.4.1, 1.1.7.1, 2.5.3.1, 4.2.1.1
3-Oral	2.5.3.1, 4.2.1.1, 4.3.2.1
4- Periodical (Mid-term exam) / Course work	1.1.4.1, 1.1.7.1, 4.2.1.1

b. Assessment schedule

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

Facilities required for teaching and learning

-Class room	**Data show- Computers, Internet. (Available)**
- Laboratory facilities	**Desktop Computers and Drug Design Software. (Available)**

7- List of References

No	Reference	Type
1.	**Electronic book prepared by staff members**	**Course notes**
2.	**Recorded videos prepared by stuff members**	**Videos on platform**
3.	**Blass BE. Basic principles of drug discovery and development.** **London, United Kingdom: Academic Press; 2021.**	**Book**
4.	**Cavasotto CN. In silico drug discovery and design: Theory, methods, challenges, and applications. Boca Raton: CRC Press; 2017.**	**Book**
5.	**Varnek A. Tutorials in Chemoinformatics. Hoboken, NJ: John Wiley & Sons, Inc.; 2017.**	**Book**

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

	Key elements					
Course contents /	**Domain 1**			**Domain 2**	**Domain 4**		
K. elements	**1.1.4.1**	**1.1.7.1**		**2.5.3.1**	**4.1.2.1**	**4.2.1.1**	**4.3.2.1**
Theoretical topics							
3D structure, Forcefields, Energy minimization, Conformational analysis,	✓			✓			
physicochemical properties and drug-likeness	✓			✓			
Basic cheminformatics: Databases, Libraries, Substructure search and similarity search	✓	✓		✓			
Proteins: Structure, Ligand interactions, Sequence/structure homology	✓			✓			
Ligand-based design and pharmacophore identification	✓			✓	✓		
Structure-based design	✓			✓	✓		

Molecular docking	✓			✓		✓		
Lead generation (diversity, scaffold hoping, combinatorial and click chemistry)	✓			✓				
Synthesis of substances and retrosynthetic analysis, diversity oriented synthesis, scaffold-based synthesis	✓			✓		✓		
Biological evaluation of substances (cell free, cell-based and animal assays)	✓			✓				
Biological evaluation of substances (animal assays)	✓			✓				
Biological evaluation of substances (animal assays, part 2)	✓							
Biological evaluation of substances (animal assays, part 3)	✓							
Virtual Screening (self-learning).	✓			✓		✓		✓
Practical topics								
Introduction on ligand–based drug design	✓	✓		✓		✓	✓	
Introduction on structure–based drug design	✓	✓		✓		✓	✓	

Energy minimization and conformational searching	✓			✓		✓	✓	
Molecular surfaces	✓			✓		✓	✓	
Structure-based design and molecular docking	✓	✓		✓		✓	✓	
Scaffold replacement	✓			✓		✓	✓	
R-group screening	✓			✓		✓	✓	
Pharmacophore Modeling- Part I	✓			✓		✓	✓	
Pharmacophore Modeling- Part II	✓			✓		✓	✓	
Similarity search and flexible alignment	✓	✓		✓		✓	✓	
Quantitative Structure-Activity Relationship (QSAR) (Part I)	✓	✓		✓		✓	✓	
Quantitative Structure-Activity Relationship (QSAR) (Part II)	✓	✓		✓		✓	✓	
Application on ligand base drug design	✓	✓		✓		✓	✓	

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

A) Theoretical Part:										
Course Contents	**Teaching and Learning Methods**						**Assessment methods**			
	Lecture	**Online lecture**	**Lab sessions**	**Interactive Discussion sessions**	**Videos**	**Self-learning**	**Mid-term**	**Practical/ Tutorial**	**Written**	**Oral**
3D structure, Forcefields, Energy minimization and Conformational analysis	√				√		√		√	√
Physicochemical properties and drug-likeness	√				√		√		√	√
Basic cheminformatics: Databases, Libraries, Substructure search and similarity search	√				√		√		√	√
Proteins: Structure, Ligand interactions, Sequence/structure homology	√				√		√		√	√

Ligand-based design and pharmacophore identification	√				√				√	√

Structure-based design	√	√			√				√	√
Molecular docking	√			√	√				√	√
Lead generation (diversity, scaffold hoping, combinatorial and click chemistry)	√	√			√				√	√
Synthesis of substances and retrosynthetic analysis, diversity oriented synthesis, scaffold-based synthesis	√				√				√	√
Biological evaluation of substances (cell free and cell-based)	√	√			√				√	√

Biological evaluation of substances (animal assays)	√			√	√				√	√
Biological evaluation of substances (animal assays, part 2)		√							√	√
Biological evaluation of substances (animal assays, part 3)		√							√	√
Virtual Screening (self-learning)				√		√			√	√

B) Practical Part:

Course Contents	**Teaching and Learning Methods**						**Assessment methods**			
	Lecture	**Online lecture**	**Lab sessions**	**Interactive Discussion sessions**	**Videos**	**Self-learning**	**Mid-term**	**Practical/Tutorial**	**Written**	**Oral**
Introduction on ligand–based drug design			√	√	√			√		

Introduction on structure–based drug design			√	√	√			√		
Energy minimization and conformational searching			√	√	√			√		
Molecular surfaces			√	√	√			√		
Structure-based design and molecular docking			√	√	√			√		
Scaffold replacement			√	√	√			√		

R-group screening			√	√	√			√		
Pharmacophore Modeling- Part I			√	√	√			√		

Pharmacophore Modeling- Part II			√	√	√			√		
Similarity search and flexible alignment			√	√	√			√		
Quantitative Structure-Activity Relationship (QSAR) (Part I)			√	√	√			√		
Quantitative Structure-Activity Relationship (QSAR) (Part II)			√	√	√			√		
Application on ligand base drug design			√	√	√			√		

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

Date: 6 / 9 / 2023

بكالوريوس الصيدلة (فارم د – Pharm D)

Course specification

Academic year: 2023/2024

Course name: Clinical Nutrition	**اسم المقرر: تغذية اكلينيكية**
Academic Level: Level 4	**الأكاديمي :الرابع المستوى**
Scientific department: Biochemistry	**القسم العلمي : الكيمياء الحيوية**
Head of Department: Dr. Noha M.H. Abdel- Rahman	**رئيس القسم : : د/ نهى منصور حسن عبدالرحمن**
Course Coordinator: Prof. Dr. Amal El-gayar	**منسق المقرر : أ.د/ امال الجيار**

University	Mansoura
Faculty	Pharmacy
Department offering the course	Biochemistry
Department supervising the course	Biochemistry
Program on which the course is given	Bachelor in Pharmacy-Pharm D
Academic Level	Fourth level, First semester, 2023-2024
Date of course specification approval	16/9/2023

A. Basic Information: Course data:

Course Title	Clinical nutrition
Course Code	PBE 07
Prerequisite	Registration
Teaching credit Hours: Lecture	1
Teaching Credit Hours: Practical/ tutorial	1
Total Credit Hours	2(Credit H)

Professional Information:

Course Aims:

This course enables the students to:

1. Understand the body nutrients & energy requirements.

2. Design a healthy meal for different people ages & situations.

3. Determine the diet therapy of some common diseases including cardiac, cancer, diabetes and liver disease.

4. Understand different problems of bad nutrition as malnutrition & food allergy.

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 fundamental basis of pharmaceutical, medical, social and behavioral sciences as well as management of different health conditions.
1.1.2	1.1.2.1	Utilize important pharmaceutical and medical terminology, abbreviations and symbols in pharmacy practice.
1.1.4	1.1.4.1	Articulate knowledge from fundamental sciences to evaluate drugs' action, therapeutic effects and their appropriateness, effectiveness, and safety in individuals and populations.
1.1.5	1.1.5.1	Define the principles, practice and critical understanding of fundamental sciences to solve problems related to human health.
1.1.6	1.1.6.1	Make evidence-informed professional decisions through analysis and application of relevant scientific literature and other scientific resources.
1.1.8	1.1.8.1	Understand metabolic disorders and employ health informatics to improve the quality of health and nutritional care and optimize patient safety.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.1.2	2.1.2.1	Make use of the principles of professional codes of ethics, preserving patients' rights and respecting population diversity.
2.4.3	2.4.3.1	Make decisions regarding recognized drug-related and pharmaceutical care problems.
2.4.5	2.4.5.1	Help other health care professionals when signs, symptoms and risk factors that relate to medical or health problems that fall into their scope of practice are recognized.
2.4.6	2.4.6.1	Employ principles of physical assessment and nutritional status needed to save patient's life.
2.5.2	2.5.2.1	Identify relevant and necessary evidence-based information about a patient's health-related care needs.

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 knowledge of different biochemical, metabolic and immunological changes related to disease or concomitant drug therapy.
3.1.4	3.1.4.1	Explain the etiology of cancer and characters, epidemiology, pathogenesis, laboratory diagnosis, treatment and prevention of diseases.
3.2.2	3.2.2.1	Use the principles of clinical pharmacology and clinical nutrition and the necessary technical skills to rationalize the use of medicines and medical devices.

Domain 4: personal practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Gather information and analyze data, point out problems and present solutions, participate independently and collaboratively with other team members in the healthcare system.
4.2.1	4.2.1.1	Make use of clear language, pace, tone and non-verbal communication and writing skills when dealing with patients, other health team and communities.
4.2.2	4.2.2.1	Employ advanced technologies and channels whenever possible to present relevant information.
4.3.1	4.3.1.1	Conduct self-evaluation strategies to manage and improve professional of pharmacy.
4.3.2	4.3.2.1	Encourage continuous professional development by practicing self and independent learning.

3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Introduction- Macronutrients	1
2	Introduction- Micronutrients	1
3	Food Energy- Energy Balance	1
4	Nutrition in Pregnancy	1

5	Nutrition in kidney diseases	1
6	Food allergy	1
7	Obesity and Management of obesity	1
8	Nutrition in pediatrics	1
9	Nutrition in geriatrics	1
10	Nutrition in cardiovascular diseases	1
11	Nutrition in G.I.T disorders	1
12	Nutrition in Respiratory disorders	1
13	Nutrition in liver disease (Hepatitis, fatty liver)	1
14	Nutrition in liver disease (fibrosis, cirrhosis,HCC)	1
15	Start of Final written and oral exam	-
Week No.	Practical topics	Practical credit hours
1.	Assessment of Nutrition	1
2.	Macronutrients	1
3.	Micronutrients	1
4.	Diet and digestive system	1
5.	Diet and renal disease	1
6.	Diet and Diabetes Mellitus	1
7.	Diet and osteoporosis	1
8.	Midterm exam	-
9.	Nutrition in Celiac disease	1
10.	Nutrition Therapy in Cancer	1
11.	Nutrition requirements during life stages (pediatrics)	1
12.	Nutrition requirements during life stages (geriatrics)	1
13	Revision	1
14	Tutorial Exam (OSPE)	-

2- Teaching and learning Methods:

No	Teaching and Learning Methods	Week	K. elements to beaddressed
4.1	Advanced lecture	1-14	1.1.1.1, 1.1.2.1, 1.1.4.1, 1.1.5.1, 1.1.8.1 3.1.1.1, 3.1.4.1
4.2	Hybrid learning: On line learning through My mans "Mansoura university "	1-14	1.1.1.1, 1.1.2.1, 1.1.4.1, 1.1.5.1, 1.1.6.1, 1.1.8.1 3.1.1.1, 3.1.4.1, 3.2.2.1
4.3	Practical works and tutorials	1-12	1.1.5.1, 2.4.5.1, 2.5.2.1, 3.1.1.1
4.4	Self-learning	13	4.1.2.1, 4.3.1.1, 4.3.2.1
4.5	Presentation	2-9	4.3.1.1, 4.3.2.1
4.6	Case study	2-8	3.1.1.1, 4.1.2.1

5- Student Assessment:

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, 1.1.8.1, 2.4.6.1, 2.5.2.1
2-Tutorial exam (OSPE)	2.1.2.1, 2.4.3.1, 2.4.5.1, 3.1.4.1, 4.2.1.1, 4.2.2.1, 4.2.2.1, 4.3.1.1, 4.3.2.1
3-Oral	1.1.1.1, 1.1.5.1, 2.1.2.1, 2.4.3.1, 2.5.2.1, 4.1.2.1, 4.2.2.1, 4.3.1.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.6.1, 4.2.1.1, 4.2.2.1, 4.2.2.1, 4.3.1.1, 4.3.2.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7-9th week
Assessment 2	Tutorial exam	14th week
Assessment 3	Written exam	Starting from 15th week
Assessment 4	Oral exam	Starting from 15th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	Tutorial exam	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.	Recorded videos prepared by staff members	Videos on platform
3.	Nutrition therapy and pathophysiology, Marcia Nelms and Kathryn P. Sucher,Wadsworth, Inc,4th edition,2020.	Books
4.	Nutrition for health and health care,Linda Kelly DeBruyne and Kathryn Pinna, Cengage learning, 6thedition,2017.	Books
5.	William's basic nutrition and diet therapy, Staci Nix, Elsevier, 16th edition,2020	Books
6.	Basic nutrition, Lori A. Smolin, Ph.D. and Mary B. Grosvenor, M.S., R.D., Chelsea house,3rd edition, 2019.	Books

7.	www.nutrition.gov/topics/healthy-living-and-weight/weight-management-youth www.nutrition.gov/topics/diet-and-health-conditions www.nutrition.gov/topics/diet-and-health-conditions/cancer https://www.ekb.eg	Web sites

8- Matrix 1. course content versus course k. elements:

Course contents / K. elements	Domain 1						Domain 2					Domain 3			Domain 4				
	1.1.1.1	1.1.2.1	1.1.4.1	1.1.5.1	1.1.6.1	1.1.8.1	2.1.2.1	2.4.3.1	2.4.5.1	2.4.6.1	2.5.2.1	3.1.1.1	3.1.4.1	3.2.2.1	4.1.2.1	4.2.1.1	4.2.2.1	4.3.1.1	4.3.2.1
Introduction- Nutrients	√					√		√	√			√	√						
Food Energy- Energy Balance Pregnancy Nutrition in kidney diseases	√		√		√	√	√		√	√	√	√	√	√					
Food allergy	√	√		√	√				√	√		√	√		√	√	√		
Obesity and Management of obesity	√	√		√	√	√	√	√		√	√	√	√	√	√	√	√		
Nutrition in pediatrics Nutrition in geriatrics Nutrition in cardiovascular diseases	√	√		√	√	√	√	√		√	√	√	√	√	√	√	√		
Nutrition in G.I.T	√	√	√	√					√	√	√	√				√	√		

disorders																					
Nutrition in Respiratory disorders	√	√		√	√			√		√					√			√	√		
Nutrition in liver disease	√	√			√					√	√						√	√		√	√
Practical topics																					
Assessment of Nutrition		√		√	√			√	√	√				√	√	√					
Macronutrients and Micronutrients			√	√	√	√			√	√	√	√			√	√					
Diet and digestive system		√	√	√	√				√	√	√	√				√					
Diet and renal disease	√			√	√	√		√	√	√		√		√		√					
Diet and Diabetes Mellitus	√		√	√		√			√	√		√			√	√			√	√	√	√
Diet and osteoporosis	√	√	√		√			√	√	√	√				√	√		√	√	√	√	
Nutrition in Celiac disease			√	√	√	√			√	√	√	√			√	√		√	√		√	√
Nutrition Therapy in Cancer	√	√		√	√			√			√	√		√		√			√	√	√	√
Nutrition requirements during life stages (pediatrics and geriatrics)			√	√	√			√	√					√	√			√		√		√
revision	√				√	√					√											√

Matrix 2. course contents, methods of learning and assessment

Theoretical Part										
Course contents	Teaching and learning methods						Assessment methods			
	Advance lectures	Hybrid leaning	Lab session	Self-learning	Presentation	Case study	Corse Work	Practical	Written	Oral
Introduction-Macronutrients	√	√					√		√	√
Introduction-Micronutrients	√	√					√		√	√
Food Energy-Energy Balance	√	√					√		√	√
Nutrition in Pregnancy	√	√					√		√	√
Nutrition in kidney diseases	√	√					√		√	√
Food allergy	√	√					√		√	√
Obesity and Management of obesity	√	√					√		√	√
Nutrition in pediatrics	√	√							√	√
Nutrition in geriatrics	√	√							√	√
Nutrition in cardiovascular diseases	√	√							√	√
Nutrition in G.I.T disorders	√	√							√	√
Nutrition in Respiratory disorders	√	√							√	√
Nutrition in liver disease (Hepatitis, fatty liver)	√	√		√					√	√
Nutrition in liver disease	√	√							√	√

(fibrosis, cirrhosis,HCC)										
Practical part										
Assessment of Nutrition		√	√					√		
Macronutrients		√	√		√	√		√		
Micronutrients		√	√		√	√		√		
Diet and digestive system		√	√		√	√		√		
Diet and renal disease		√	√		√	√		√		
Diet and Diabetes Mellitus		√	√		√	√		√		
Diet and osteoporosis		√	√		√	√		√		
Nutrition in Celiac disease		√	√		√	√		√		
Nutrition Therapy in Cancer		√	√		√			√		
Nutrition requirements during life stages (pediatrics)		√	√					√		
Nutrition requirements during life stages (geriatrics)		√	√					√		
Revision		√	√							

Mansoura University
Faculty of Pharmacy
Quality Assurance Unit
Course Specification
Pharm D Program
2023- 2024

Course Coordinator	Prof. Dr. Amal El-gayar
	
Head of Department	Dr. Noha M.H. Abdel- Rahman
	

Date: 16/9/2023

بكالوريوس الصيدلة (فارم د – Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Cancer Biology	اسم المقرر : بيولوجيا السرطان
Academic Level: Four	المستوى الأكاديمي :الرابع
Scientific department: Biochemistry	القسم العلمي : الكيمياء الحيوية
Head of Department: Dr. Noha M.H. Abdel-Rahman	رئيس القسم : د/ نهى منصور حسن عبد الرحمن
Course Coordinator: Ass. Prof. Randa zaghlol	منسق المقرر: أ.م.د/ راندا زغلول

University	**Mansoura**
Faculty	**Pharmacy**
Department offering the course	**Biochemistry**
Department supervising the course	**Biochemistry**
Program on which the course is given	**Bachelor's Degree in Pharmacy-Pharm D**
Academic Level	**Level Four, first semester,2023/2024**
Date of course specification approval	**16/9/2023**

A. Basic Information: Course data:

Course Title	**Cancer Biology**
Course Code	**PBE 08**
Prerequisite	**-**
Teaching credit Hours: Lecture	**1**
Teaching Credit Hours: Practical/ tutorial	**1**
Total Credit Hours	**2 (Credit H)**

B. Professional Information:

Course Aims:

Understand the major metabolic pathways that take place in human body.

Learn the interrelationship between carbohydrates, lipid and protein metabolism.

Practice skills that are of value to future employment in some areas of biology.

- 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 knowledge of the many different biological systems underlying cancer's development.

1.1.2	1.1.2.1	Use appropriate medical terminology, abbreviations and symbols used in biological systems and The Division of Cancer Biology.
1.1.4	1.1.4.1	Explain drugs' mode of action, therapeutic effects and evaluate their appropriateness, effectiveness.
1.1.5	1.1.5.1	Collect and apply the principles, practice and critical understanding of fundamental biological sciences to identify new targets for cancer treatment.
1.1.8	1.1.8.1	Use health informatics to improve the quality of health and optimize patient safety.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.1.2	2.1.2.1	Apply the principles of professional codes of ethics, preserving patients' rights and respecting population diversity.
2.3.1	2.3.1.1	Select, and apply appropriate methods and procedures and resources for handling and disposal of biological materials.
2.4.3	2.4.3.1	Analyze and solve drug-related and pharmaceutical care problems.
2.4.5	2.4.5.1	Interpret and take appropriate action when signs, symptoms and risk factors that relate to cancer that fall into the scope of practice of other health professionals are encountered.
2.5.2	2.5.2.1	Collect, interpret and assess relevant, necessary evidence-based information about a patient's health-related care needs.
2.5.3	2.5.3.1	Apply scientific principles of research and scholarly investigation and use systematic approaches in the search for best available evidence.

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 knowledge of different cancer types and genetic and immunological changes brought about by cancer or concomitant drug therapy.
3.1.3	3.1.3.1	conduct laboratory tests for identification of diseases.
3.1.4	3.1.4.1	Outline the characters, epidemiology, pathogenesis, laboratory diagnosis, and clinical features of cancers and their treatment, prevention and nutritional care.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Collect information and analyze data, identify problems and present solutions participate independently and collaboratively with other team members in the healthcare system.
4.2.1	4.2.1.1	Use clear language, pace, tone and non-verbal communication and writing skills when dealing with patients, other health team and communities.
4.2.2	4.2.2.1	Apply advanced technologies and channels whenever possible to present relevant information.
4.3.1	4.3.1.1	Employ self-evaluation strategies to manage and improve professional of pharmacy.
4.3.2	4.3.2.1	Promote continuous professional development by practicing self and independent learning.

3- Course Contents:

Week No.	Topics	Lecture credit Hours
1	Introduction to Cancer	1
2	Hallmarks of Cancer	1
3	DNA replication	1
4	DNA Repair	1
5	Transcription and post-transcriptional modification	1
6	Translation	1
7	Oncogenes and Proto-oncogenes	1
8	Cancer cell morphology	1
9	Cell Cycle & check points	1
10	Apoptosis	1
11	Angiogenesis	1
12	Autophagy	1
13	Autophagy and cancer	1
14	Revision and quiz	-
15	Start of Final written and oral exam	-
Week No.	Practical topics	Practical credit hours
1	Tutorial on biochemical assessment of cancer	1
2	DNA separation tutorial	1
3	DNA separation (practical)	1
4	Cell culture tutorial	1
5	PCR and QPCR (concept)	1

6	Protein assessment (ELISA)	1
7	AFP (practical)	1
8	Midterm exam	-
9	IHC (tutorial)	1
10	IHC (practical)	1
11	Assessment of apoptosis	1
12	Case studies on cancer	1
13	Case studies, activity and revision	1
14	Sheet and Practical Exam	-

4- Teaching and learning Methods:

No	Teaching and Learning Methods	Week	K. elements to beaddressed
4.1	**Advanced lecture**	**1-14**	**1.1.1.1, 1.1.5.1, 1.1.6.1, 3.1.1.1, 3.1.4.1**
4.2	**Hybrid learning: Online learning through My mans "Mansoura University"**	**1-14**	**1.1.1.1, 1.1.5.1, 1.1.6.1, 2.3.1.1, 2.3.2.1, 2.4.1.1 3.1.1.1, 4.2.2.1**
4.3	**Practical works and tutorials**	**1-14**	**2.3.1.1, 2.3.2.1, 2.4.1.1**
4.4	**Self-learning**	**13**	**1.1.1.1, 1.1.5.1, 4.1.1.1, 4.1.2.1, 4.3.1.1, 4.3.2.1**
4.5	**Case study**	**1-11**	**3.1.4.1, 4.3.2.1**
4.6	**Presentation**	**1,10**	**4.3.1.1, 4.3.2.1**

5- Student Assessment:

Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	1.1.1.1 - 1.1.2.1 - 1.1.4.1 -1.1.8.1 - 2.4.3.1 - 2.4.5.1
2-Tutorial exam (OSPE)	2.3.1.1 - 2.4.3.1 - 2.4.5.1 - 2.5.2.1 - 2.5.3.1 - 4.1.2.1- 4.2.1.1- 4.2.2.1- 4.3.1.1- 4.3.2.1
3-Oral exam	1.1.1.1 - 1.1.2.1 - 1.1.4.1 -1.1.8.1- 4.1.2.1- 4.2.1.1- 4.2.2.1- 4.3.1.1- 4.3.2.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1 - 1.1.2.1 - 1.1.4.1 -1.1.8.1- 4.1.2.1- 4.2.1.1- 4.2.2.1- 4.3.1.1- 4.3.2.1

b. Assessment schedule

Assessment 1	**Periodical (Mid-term exam) / Course work**	**7-9th week**
Assessment 2	**Tutorial exam**	**14th week**
Assessment 3	**Written exam**	**15th week**
Assessment 4	**Oral exam**	**15th week**

c. Weighing of assessments

1	Periodical (Mid-term) exam / Course work	15%
2	**Tutorial exam**	**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	Data show- Computers, Internet - white board
-Library	Textbooks

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.	Molecular Biology of the Cell: Alberts B., Johnson A., Lewis J., Raff M., Roberts K., Walter P., 6th Edition2016 .	Book
4.	Molecular Biology and Biotechnology: Walker J.M., Rapley R., 6thedition2014	Book
5.	https://www.sciencedirect.com/book/9780323900065/protocol-handbook-for-cancer-biology http://www.googlescholar.com (https://books.google.com.eg/books?id=dLF3UCIWECYC&lpg=PA5&ots=rAJ60fLkh2&dq=cancer%20biology%20books&lr&pg=PA7#v=onepage&q=cancer%20biology%20books&f=false) https://pubmed.ncbi.nlm.nih.gov/20821846/	websites

Course contents / K. elements	Domain 1					Domain 2						Domain 3			Domain 4				
	1.1.1.1	1.1.2.1	1.1.4.1	1.1.5.1	1.1.8.1	2.1.2.1	2.3.1.1	2.4.3.1	2.4.5.1	2.5.2.1	2.5.3.1	3.1.1.1	3.1.3.1	3.1.4.1	4.1.2.1	4.2.1.1	4.2.2.1	4.3.1.1	4.3.2.1
Introduction to Cancer	√	√		√	√	√		√	√	√	√			√					
Hallmarks of Cancer																			
DNA replication	√	√	√	√	√	√		√	√	√	√		√	√					
DNA Repair																			
Transcription and post-transcriptional modification	√	√		√	√	√		√	√		√	√	√	√		√		√	
Translation	√	√			√	√		√	√			√	√	√		√		√	√
Oncogenes and Proto-oncogenes	√			√	√			√	√		√	√	√	√		√		√	
Cancer cell morphology		√		√		√		√		√	√		√	√		√			√
Cell Cycle & check points	√			√	√	√			√	√	√	√	√					√	

Apoptosis		√		√		√		√	√			v		√		√			√
Angiogenesis	√	√		√	√			√	√	√		√	√	√		√		√	√
Autophagy	√			√	√			√	√		√	√	√	√		√		√	
Autophagy and cancer				√		√		√		√	√		√	√		√			√
Practical topics																			
Tutorial on biochemical assessment of cancer		√	√		√	√		√	√		√	√	√					√	
DNA separation (practical)	√	√		√	√		√	√	√	√		√	√	√	√	√		√	√
Cell culture tutorial	√	√		√	√	√			√	√	√	√	√		√	√		√	√
PCR and QPCR (concept)	√	√	√		√		√	√	√	√		√	√		√	√			
Protein assessment (ELISA)	√	√	√	√			√	√	√	√	√	√	√		√	√		√	
AFP (practical)	√												√					√	
IHC (tutorial)	√			√	√	√	√	√	√	√		√	√			√			√
IHC (practical)	√	√	√	√	√	√		√		√	√	√	√	√	√			√	√
Assessment of apoptosis	√		√	√	√	√	√	√	√	√	√	√	√			√		√	
Case studies on cancer	√			√	√	√	√	√		√	√	√	√						

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

Theoretical Part										
Course contents	Teaching and learning methods						Assessment methods			
	Advanced Lectures	Hybrid learning	Lab session	Self-learning	Presentation	Case-study	Corse work	Practical	Written	Oral
Introduction to Cancer	√	√					√		√	√
Hallmarks of Cancer	√	√				√	√		√	√
DNA replication	√	√				√	√		√	√
DNA Repair	√	√				√	√		√	√
Transcription and post-transcriptional modification	√	√					√		√	√
Translation	√	√					√		√	√
Oncogenes and Proto-oncogenes	√	√					√		√	√
Cancer cell morphology	√	√							√	√
Cell Cycle & check points	√	√							√	√
Apoptosis	√	√							√	√
Angiogenesis	√	√							√	√
Autophagy	√	√							√	√
Autophagy and cancer	√	√		√					√	√
Practical part										
Tutorial on biochemical assessment of cancer		√	√		√	√		√		
DNA separation tutorial		√	√			√		√		

DNA separation (practical)		√	√			√		√		
Cell culture tutorial		√	√			√		√		
PCR and QPCR (concept)		√	√			√		√		
Protein assessment (ELISA)		√	√			√		√		
AFP (practical)		√	√			√		√		
IHC (tutorial)		√	√			√		√		
IHC (practical)		√	√			√		√		
Assessment of apoptosis		√	√		√	√		√		
Case studies on cancer		√	√			√		√		

e Coordinator	Ass. Prof. Randa Zaghloul
Head of Department	Dr. Noha M.H Abdel-Rahman

Date: 16/9/2023

بكالوريوس الصيدلة (فارم د – P harm D)

Course Specification

Academic year: 2023/2024

Course name: Geriatrics	**اسم المقرر : طب المسنين**
Academic Level: Fourth level	**المستوى الأكاديمي : رابع**
Scientific department: Pharmacology and toxicology	**القسم العلمي : الادوية والسموم**
Head of Department: Prof. Dr. Manar A Nader	**رئيس القسم :** **ا.د/ منار احمد نادر**
Course Coordinator: Dr. Marwa S. Serrya	**منسق المقرر :** **د/ مروة سعد سرية**

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	Bachelor in Pharmacy- Pharm D
Academic Level	Level 4, elective course, first semester, 2023/2024
Date of course specification approval	18/9/ 2023

A. Basic Information: Course data:

Course Title	Geriatrics
Course Code	PHE 09
Prerequisite	-
Teaching credit Hours: Lecture	1
Teaching Credit Hours: Practical/ tutorial	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
- Know the most common problems in inpatient and outpatient elderly patients

- 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
1.1.6	1.1.6.1	Access and apply relevant scientific literature and other scientific resources to make evidence-informed professional decisions.

Domain 2: Professional and Ethical Practice

Program K. element no.	Course K. element no.	Course K. element
2.4.2	2.4.2.1	Contribute to decision making processes for recognized drug-related and pharmaceutical care problems
2.4.5	2.4.5.1	Demonstrate ability to use principles of first aid in the practice of pharmacy.

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 knowledge of different metabolic and immunological changes brought about by disease or concomitant drug therapy.

Domain 4: Personal Practice:

Program K. element no.	Course K. element no.	Course K. element
4.1.2	4.1.2.1	Participate independently and collaboratively with other team members in the healthcare system.

3- Course Contents:

A) Theoretical part:

Week No.	Topics	Lecture credit Hours
1	Introduction of aging	1
1	Introduction of aging (part 1)	1
2	Introduction of aging (part 2)	
3	Neurodegenerative diseases (Alzheimer’s disease)	1
4	Neurodegenerative diseases (Alzheimer's disease)	1
5	Neurodegenerative diseases (Parkinson’s disease)	
6	Osteoarthritis	1
7	Stroke	1
8	Fall and dizziness	1
9	Hypertension (part 1)	1
10	Hypertension (part 2)	1
11	Ischemic heart disease (part 1)	1
12	Ischemic heart disease (part 2)	1
13	Arrhythmias (Self learning)	1
14	**Revision and quiz**	1

15	**Final Written and Oral Exam**	-

B) Practical part

Week No.	Topics	Practical credit hours
1	Key concepts for pharmacist in medication management in older persons	1
2	Poly-pharmacy	1
3	Alzheimer's disease	1
4	Parkinson's case study	1
5	osteoarthritis case	1
6	stroke case	1
7	Vertigo	1
8	Midterm exam	-
9	Hypertension special conditions	1
10	Hypertension case study	1
11	Ischemic heart disease case study 1	1
12	Ischemic heart disease case study 2	1
13	Arrhythmias	1
14	**Practical exam**	1

4- Teaching and learning Methods:

	Teaching and learning Methods:	Week. No	K. elements to be addressed
4.1	**Advanced lectures:** • Lectures using Data show, power Point presentations • Brain storming • Group discussion	1-14	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4.2	**Hybrid learning:**	1-14	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1,**

	•On line learning through My mans "Mansoura university "		**4.1.2.1**
4.3	Self-learning	13	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4.4	Practical session using data show and power point presentations	1-14	**2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4.5	Class Activity	8-11	**2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4.6	Demo	4-11	**2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4.7	Case study- problem solving	4,5,6,9,10,11	**2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4.8	**Collaborative learning:** Research assignments	8-11	**2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	K elements to be assessed
1-Written exam	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1**
2-Tutorial exam	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
3-Oral	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**
4- Periodical (Mid-term exam) / Course work	**1.1.6.1, 2.4.2.1, 2.4.5.1, 3.1.1.1, 4.1.2.1**

b. Assessment schedule

Assessment 1	Periodical (Mid-term/ Course work)	7-9th week
Assessment 2	Tutorial exam	14th week
Assessment 3	Written exam	15th week

Assessment 4	Oral exam	15th 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

Classroom	Data show- Computers, sound system-Internet, Platform
Laboratory facilities	Media- Sterile tools- chemical reagent- Data show- Computers, Internet, Platform
Library	Books

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	**Course notes**
2.	Fundamentals of Geriatric Pharmacotherapy 2nd Edition. Lisa C. Hutchison (2010)	**Book**
3.	Brubaker JK. The birth of a new specialty: geriatrics. *J Lanc Gen Hosp* 2008; 3: 105–7.	**Book**
4	Oxford American Handbook of Geriatric Medicine (2010 by Oxford University Press)	**Book**
5.	http://www.sciencedirect.com / http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	**Websites**

	https://08102cvla-1104-y-https-link-springer-com.mplbci.ekb.eg/article/10.1007/BF03169786	

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

Course contents / K. elements	Domain 1	Domain 2		Domain 3	Domain 4
	1.1.6	2.4.2	2.4.5	3.1.1	4.3.2
A) Theoretical part					
Introduction of aging	✓	✓		✓	
Introduction of aging	✓	✓	✓	✓	
Neurodegenerative diseases (Alzheimer's disease)	✓				
Neurodegenerative diseases (Alzheimer's disease)	✓	✓	✓	✓	
Neurodegenerative diseases (Parkinson's disease)	✓	✓	✓	✓	
Osteoarthritis	✓				
Stroke	✓	✓	✓	✓	✓
Fall and dizziness	✓	✓	✓	✓	✓
Hypertension (part 1)	✓	✓		✓	✓
Hypertension (part 2)	✓	✓		✓	✓

Ischemic heart disease (part 1)	✓		✓			✓		✓
Ischemic heart disease (part 2)	✓		✓			✓		✓
Arrhythmias (self learning)						✓		✓

Course contents /	**Domain 1**		**Domain 2**			**Domain 3**		**Domain 4**
K. elements	**1.1.6**		**2.4.2**	**2.4.5**		**3.1.1**		**4.3.2**
B) Practical part								
Key concepts for pharmacist in medication management in older persons	✓		✓	✓		✓		
Poly-pharmacy	✓		✓	✓		✓		
Alzheimer's disease	✓							
Parkinson's case study	✓		✓	✓		✓		
osteoarthritis case	✓		✓	✓		✓		✓

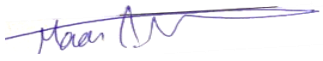
stroke case	✓							✓
Vertigo	✓		✓	✓		✓		✓
Hypertension special conditions	✓		✓	✓		✓		✓
Hypertension case study	✓		✓	✓		✓		✓
Ischemic heart disease case study 1&2	✓		✓	✓		✓		✓
Arrhythmias	✓		✓	✓		✓		✓

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

A) Theoretical Part:											
Course Contents	**Teaching and Learning Methods**							**Assessment methods**			
	Advanced Lecture	Hybrid learning	Class activity	Collaborative learning	**Demo**	Case study	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Introduction of aging	√	√		√				√		√	√
Introduction of aging	√	√		√				√		√	√
Neurodegenerative diseases (Alzheimer's disease)	√	√		√				√		√	√
Neurodegenerative diseases (Alzheimer's disease)	√	√		√	√			√		√	√
Neurodegenerative diseases (Parkinson's disease)	√	√		√	√					√	√
Osteoarthritis	√	√		√	√					√	√
Stroke	√	√	√	√	√	√				√	√
Fall and dizziness	√	√	√	√	√	√				√	√
Hypertension (part 1)	√	√	√	√	√	√				√	√
Hypertension (part 2)	√	√	√	√	√	√				√	√
Ischemic heart disease (part 1)	√	√	√	√	√					√	√
Ischemic heart disease (part 2)		√	√	√	√		√			√	√

B) Practical Part:

Course Contents	Teaching and Learning Methods						Assessment methods			
	Advanced Lecture	Hybrid learning	Lab sessions	Brain storming	Research assignments	Case study problem solving	Self-learning	Course Work	Practical/Tutorial	Written	Oral
Key concepts for pharmacist in medication management in older persons		√	√					√	√		
Poly-pharmacy		√	√					√	√		
Alzheimer's disease		√	√					√	√		
Parkinson's case study		√	√	√		√		√	√		
osteoarthritis case		√	√	√		√		√	√		
stroke case		√	√	√		√		√	√		
Vertigo		√	√					√	√		
Hypertension special conditions		√	√		√			√	√		
Hypertension case study		√	√	√	√	√		√	√		
Ischemic heart disease case study 1&2		√	√	√	√	√		√	√		
Arrhythmias		√	√	√	√	√		√	√		

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

Date: 18/9/2023

بكالوريوس الصيدلة (فارم د – P harm D)

Course Specification

Academic year: 2023/2024

Course name: Advanced Therapeutic	**اسم المقرر**: **علاجيات متقدم**
Academic Level: **Level 5**	**المستوى الأكاديمي**: **الخامس**
Scientific department: **Pharmacology & Toxicology**	**القسم العلمي**: **الأدوية والسموم**
Head of Department: **Prof Dr Manar A Nader**	**رئيس القسم:** **ا.د/ منار أحمد نادر**
Course Coordinator: **Prof Dr Manar A Nader**	**منسق المقرر:** **ا.د/ منار أحمد نادر**

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacology & Toxicology
Department supervising the course	Pharmacology & Toxicology
Program on which the course is given	**Bachelor's in pharmacy -Pharm D**
Academic Level	Fourth level, first semester, 2023/2024
Date of course specification approval	18/9/2023

C- Basic Information: Course data:

Course Title	Advanced Therapeutics
Course Code	PHE-010
Prerequisite	Pharmacology 1
Teaching Hours/ week: Lecture:	1
Practical:	1
Total Credit Hours	2 (Credit H)

D- Professional Information:

1- Course Aims:

- On completion of the course, the student will be able to describe treatment approach to various diseases, describe possible non-pharmacologic treatment, describe pharmacologic treatment options according to recent guidelines, select proper management for special population and describe appropriate monitoring for effectiveness and managing drug side effects.

2- Course k. elements:

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

DOMAIN 1- FUNDAMENTAL KNOWLEDGE

(1.1.5 (	**1.1.5.1**	Identify information from fundamental sciences to solve therapeutic problems.
(1.1.6)	**1.1.6.1**	Utilize scientific literature, and collect and interpret information to enhance professional decision

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

(2.4.3)	**2.4.3.1**	Recognize and solve any identified medicine-related and pharmaceutical care problems.
(2-4-5)	**2.4.5.1**	Take appropriate action when signs, symptoms and risk factors that relate to medical or health problems that fall into the scope of practice of other health professionals are encountered.

DOMAIN 3: PHARMACEUTICAL CARE

(3.1.1)	**3.1.1.1**	Monitor the principles of body function and basis of genomics in health and disease states to manage different diseases
(3.2.2)	**3.2.2.1**	Utilize the principles of clinical pharmacology and pharmacovigilance for the rational use of medicines and medical devices

DOMAIN 4: PERSONAL PRACTICE

(4.3.1)	**4.3.1.1**	Develop actual plans to manage and improve self-practice of pharmacy.

4- Course Contents

E) Theoretical part

1	Pharmacotherapy of ANS (maythenia gravis)	1
2	Pharmacotherapy of ANS (urinary incontinence)	1
3	Pharmacotherapy of ANS (urinary incontinence)	1
4	Pharmacotherapy of ANS (benign prostate hyperplasia)	1
5	Pharmacotherapy of PVS	1
6	Pharmacotherapy of PVS	1
7	Pharmacotherapy of hematological disorder (anemia)	1
8	Pharmacotherapy of hematological disorder (anemia)	1
9	Pharmacotherapy of hematological disorder (anemia)	1
10	Pharmacotherapy of hematological disorder (anemia)	1
11	Pharmacotherapy of ear (otitis media) self learning	1
12	Pharmacotherapy of eye (glaucoma)	1
13	Pharmacotherapy of eye (diabetic retinopathy)	1
14	Revision and quiz	-
15	Written and oral exam	-

F) Practical part

Week No.	Topics	Hours
1	Case study-Peripheral Artery Disease case study	1
2	Case study-Otitis media	1
3	Case study-Benign prostatic hyperplasia	1
4	Case study-Urinary Incontinence	1
5	Case study-Chronic anticoagulant	1
6	Case study-Vitamin B12 deficiency	1
7	Case study-Metabolic acidosis	1

8	Midterm exam	-
9	Case study-Folic acid deficiency	1
10	Case study-Hypokalemia & hypomagnesaemia	1
11	Case study-Iron deficiency anemia	1
12	Case study-Glaucoma	1
13	Case study-diabetes insipidus	1
14	**Practical exam**	1

5- Teaching and Learning Methods:

Teaching and learning Methods		Weeks No.	Key elements to be addressed
	Teaching and learning Methods:		
4.1	**Advanced lectures:** • Lectures using Data show, power Point presentations • Brain storming • Group discussion	1-14	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1**
4.2	**Hybrid learning:** • On line learning through My mans "Mansoura university "	1-14	**3.1.1.1, 3.2.2.1, 4.2.1.1,**
4.3	Self-learning	11	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1**
4.4	Practical session using data show and power point presentations	1-14	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1, 4.2.1.1,**
4.5	Case study- problem solving	1-11	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1, 4.2.1.1,**
4.6	Collaborative learning: research project	4-8	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1, 4.2.1.1,**

6- Student Assessment:

f- Assessment Methods:

Assessment Methods	Key elements to be assessed
1- Periodical (Mid-term exam / Course work)	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1,**
2- Practical exam using OSPE	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1,**
3- Written exam	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1,**
4- Oral exam	**1.1.5.1, 1.1.6.1, 2.4.3.1, 2.4.5.1, 3.1.1.1, 3.2.2.1, 4.2.1.1,**

g- Assessment schedule:

Assessment 1	Periodical (Mid-term/ Course work)	7-9th week

Assessment 2	Practical exam (OSPE)	14th week
Assessment 3	Written exam	Start from the 15th week
Assessment 4	Oral exam	Start from the 15th week

h- Weighing of assessment:

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

7- Facilities required for teaching and learning:

Classroom	Data show- Computers, sound system-Internet, Platform
Laboratory facilities	Media- Sterile tools- chemical reagent- Data show- Computers, Internet, Platform
Library	Books

8- List of References

No	Reference	Type
1.	Pharmacotherapy Principles and Practice, 3rd edition	**Book**
2.	Pharmacotherapy Casebook, A patient focused approach, 7th edition	**Book**
3.	Pharmacotherapy Handbook, 9th edition	**Book**
4.	Pharmacotherapy Principles and Practice, Study Guide 3rd edition	**Book**
5.	ACCP guidelines (https://www.accp.com/) Egyptian Knowledge Bank (https://www.ekb.eg/)	**websites**

8-Matrix:

Matrix 1. Course contents and course key elements

A) Theoretical part:

Course contents	Course Key elements						
	Domain: 1		Domain: 2		Domain: 3		Domain: 4
	1.1.5.1	1.1.6 .1	2.4.3.1	2.4.5.1	3.1.1.1	3.2.2.1	4.2.1.1
Pharmacotherapy of ANS (maythenia gravis)	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of ANS (urinary incontinence)	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of ANS (urinary incontinence)	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of ANS (benign prostate hyperplasia)	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of PVS	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of PVS	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of hematological disorder (anemia)	✓	✓	✓	✓	✓	✓	
Pharmacotherapy of hematological disorder (anemia)	✓	✓	✓	✓	✓	✓	✓
Pharmacotherapy of hematological disorder (anemia)	✓	✓	✓	✓	✓	✓	✓
Pharmacotherapy of hematological disorder (anemia)	✓	✓	✓	✓	✓	✓	✓
Pharmacotherapy of ear (otitis media) self learning							✓
Pharmacotherapy of eye (glaucoma)	✓	✓	✓	✓	✓	✓	✓
Pharmacotherapy of eye (diabetic retinopathy)	✓	✓	✓	✓	✓	✓	✓

G) Practical part:

Course contents	Course Key elements						
	Domain: 1		Domain: 2		Domain: 3		Domain: 4
	1.1.5.1	1.1.6 .1	2.4.3.1	2.4.5.1	3.1.1.1	3.2.2.1	4.2.1.1
Case study-Peripheral Artery Disease case study	✓	✓	✓	✓	✓	✓	
Case study-Otitis media	✓	✓	✓	✓	✓	✓	
Case study-Benign prostatic hyperplasia	✓	✓	✓	✓	✓	✓	
Case study-Urinary Incontinence	✓	✓	✓	✓	✓	✓	✓
Case study-Chronic anticoagulant	✓	✓	✓	✓	✓	✓	✓
Case study-Vitamin B12 deficiency	✓	✓	✓	✓	✓	✓	✓
Case study-Metabolic acidosis	✓	✓	✓	✓	✓	✓	✓
Case study-Folic acid deficiency	✓	✓	✓	✓	✓	✓	✓
Case study-Hypokalemia & hypomagnesaemia	✓	✓	✓	✓	✓	✓	✓
Case study-Iron deficiency anemia	✓	✓	✓	✓	✓	✓	✓
Case study-Glaucoma	✓	✓	✓	✓	✓	✓	✓
Case study-diabetes insipidus	✓	✓	✓	✓	✓	✓	✓

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

Course Contents	Teaching and Learning methods					Assessment methods			
	Advanced L ecture	Hybrid Learning	Collaborative learning	Self-learning	Case study	Corse Work	Practical/ Tutorial	Written	Oral
Pharmacotherapy of ANS (maythenia gravis)	✓	✓				✓		✓	✓
Pharmacotherapy of ANS (urinary incontinence)	✓	✓				✓		✓	✓
Pharmacotherapy of ANS (urinary incontinence)	✓	✓				✓		✓	✓
Pharmacotherapy of ANS (benign prostate hyperplasia)	✓	✓	✓			✓		✓	✓
Pharmacotherapy of PVS	✓	✓	✓					✓	✓
Pharmacotherapy of PVS	✓	✓	✓					✓	✓
Pharmacotherapy of hematological disorder (anemia)	✓	✓	✓					✓	✓
Pharmacotherapy of hematological disorder (anemia)	✓	✓	✓					✓	✓
Pharmacotherapy of hematological disorder (anemia)	✓	✓						✓	✓
Pharmacotherapy of hematological disorder (anemia)	✓	✓						✓	✓
Pharmacotherapy of ear (otitis media) self learning		✓		✓				✓	✓
Pharmacotherapy of eye (glaucoma)	✓	✓						✓	✓

Pharmacotherapy of eye (diabetic retinopathy)	✓	✓						✓	✓

B) Practical part:

Course Contents	Teaching and Learning methods					Assessment methods			
	Practical work/ tutorial	hybrid learning	Collaborative learning	Self-learning	Case study	Course Work	Practical/ Tutorial	Written	Oral
Case study-Peripheral Artery Disease case study	✓	✓			✓	✓	✓		
Case study-Otitis media	✓	✓			✓	✓	✓		
Case study-Benign prostatic hyperplasia	✓	✓			✓	✓	✓		
Case study-Urinary Incontinence	✓	✓	✓		✓	✓	✓		
Case study-Chronic anticoagulant	✓	✓	✓		✓	✓	✓		
Case study-Vitamin B12 deficiency	✓	✓	✓		✓	✓	✓		
Case study-Metabolic acidosis	✓	✓	✓		✓	✓	✓		
Case study-Folic acid deficiency	✓	✓	✓		✓	✓	✓		
Case study-Hypokalemia & hypomagnesaemia	✓	✓			✓	✓	✓		
Case study-Iron deficiency anemia	✓	✓			✓	✓	✓		
Case study-Glaucoma	✓	✓			✓	✓	✓		
Case study-diabetes insipidus	✓	✓			✓	✓	✓		

Course Coordinator	**Prof. Manar Ahmed Nader**
Head of Department	**Prof. Manar Ahmed Nader**

Approval Date: 18/9/2023

بكالوريوس الصيدلة (فارم دى- **Pharm D)**

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 و المناعة
Head of Department: Prof. Dr. El-Sayd E. Habib	**رئيس القسم** : أ .د **/.**السيد الشربين حبيب
Course Coordinator: Prof. Dr. Hany kenawy	**منسق المقرر** : ا.د/ هاني قيناوي

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	Bachelor in Pharmacy- Pharm D
Academic Level	Elective course (Level four or five), 2023-2024
Date of course specification approval	10/9/2023

A. Basic Information: Course data:

Course Title	Infection control and antimicrobial stewardship
Course Code	PME 011
Prerequisite	--
Teaching credit Hours: Lecture	1
Teaching Credit Hours: Practical/ tutorial	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

On completion of the course, the student will be able 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:

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.

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 practices, 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.

3- Course Contents

Week	Lecture topics	Lecture

No.		credit Hours
1	Principles of antimicrobial use	1
2	Principles of antimicrobial use	1
3	Principles of antimicrobial use	1
4	An overview of chemotherapeutic antibacterial agents and antibacterial combination	1
5	Misuse of antimicrobials	1
6	Factors leading to misuse of antimicrobial	1
7	Antimicrobial stewardship	1
8	Antimicrobial stewardship	1
9	Infection prevention in healthcare setting (**the chain of infection**)	1
10	Infection prevention in healthcare settings (**standard and transmission-based precautions, barriers and use of personal protective equipment**)	1
11	Infection prevention in healthcare settings (**strategies form preventing the spread of infectious disease to healthcare workers and patients**)	1
12	Antiseptic and preservatives used in healthcare settings (selflearning)	1
13	Management of disposal of biohazard waste	1
14	Management of disposal of biohazard waste (continued)	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	Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern	1

2	Detection of methicillin resistant *Staphylococcus aureus*	1
3	Detection of Extended spectrum beta lactamases (ESBLs) producing strains. Initial screening tests.	1
4	Phenotypic confirmatory tests	1
5	Detection of Extended spectrum beta lactamases (ESBLs) producing strains. Broth dilution test	1
6	Double-disc approximation test	1
7	Detection of AmpC enzymes	1
8	Midterm exam	
9	Detection of Metallo-betalactamases	1
10	Modified Hodge Test for Carbapenemase Detection	1
11	Assay of efflux pump Efflux pump activity by EtBr cartwheel method	1
12	MIC Determination in the presence of efflux pump inhibitor	1
13	Infection prevention control	1
14	Standard measures	1
15	Revision and activity	1
16	**Practical exam**	

4- Teaching and Learning Methods:

No	Teaching and Learning Methods	week	K. elements to be addressed
4.1	Computer aided learning: a. Lectures using Data show, power Point presentations b. Distance learning	1-16	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, 3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1, 4.1.2.1

	• On line learning through my mans "Mansoura university "as recorded – video lectures Inter active discussion through My Mans		
4.2	Self-learning	12	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1
4.3	Practical session using chemicals and laboratory equipment and/ or tutorials	1-16	1.1.1.1, 1.1.2.1, 1.1.5.1, 1.1.5.3, 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, 4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1
4.4	Class Activity: Group discussion offline and online.	12	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	11	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1
4.6	Research assignments	12	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1
4.7	Role play	12	4.1.1.1, 4.1.2.1, 4.1.2.2, 4.2.1.1, 4.3.2.1

5- Student Assessment:

a- Assessment Methods:

1- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.4.1, 1.1.4.2, 1.1.5.2, 1.1.5.3, 2.4.3.1, 3.1.3.1, 3.2.6.1
2-Practical exam using OSPE	1.1.5.1, 1.1.5.3, 2.3.2.1, 2.4.3.1, 3.1.2.1, 3.1.3.1, 3.2.7.1
3-Written exam	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, 3.1.2.1, 3.1.3.1, 3.2.6.1, 3.2.7.1
4-Oral	1.1.1.1, 1.1.2.1, 1.1.4.1, 1.1.5.1, 2.3.2.1, 2.4.3.1, 3.1.2.1, 3.1.3.1, 4.1.1.1, 4.1.2.1, 4.2.1.1

b- Assessment schedule

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

c- Weighing of assessments

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

6- Facilities required for teaching and learning

Classroom	Data show- Computers, sound system-Internet, Platform
Laboratory facilities	Media- Sterile tools- chemical reagent- Data show- Computers, Internet, Platform
Library	Books

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	Course notes
2.	Recorded videos prepared by stuff 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. *UpToDate*. 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

8- Matrix

a- Course content and key element

Course contents / K. elements	Domain : 1									Domain 2				Domain: 3				Domain: 4				
	1.1.1.1	1.1.3.1	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	2.2.1.1	2.4.3.1		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
Principles of antimicrobial use	√		√			√									√	√								
Principles of antimicrobial use	√		√	√		√	√					√			√	√								
Principles of antimicrobial use	√		√	√		√	√					√			√	√								
An overview of chemotherapeutic antibacterial agents and antibacterial	√		√		√	√					√					√	√							

combination																								
Misuse of antimicrobials			√	√	√						√	√					√	√				√		
Factors leading to misuse of antimicrobial			√	√	√						√	√			√	√	√	√			√	√		
Antimicrobial stewardship	√			√	√						√	√			√	√	√	√			√	√		
Antimicrobial stewardship	√	√		√			√	√		√	√	√			√		√	√			√	√	√	√	√
Infection prevention in healthcare setting (**the chain of infection**)		√					√	√		√	√	√			√		√	√			√	√	√	√	√
Infection, Prevention in healthcare settings (**standard and transmission-based precautions,**		√					√	√		√	√	√			√		√	√			√	√	√	√	√

barriers and use of personal protective equipment)																							
Infection prevention in healthcare settings (**strategies form preventing the spread of infectious disease to healthcare workers and patients**)		√					√	√		√	√	√			√		√	√		√	√	√	√	√
Antiseptic and preservatives used in healthcare settings		√					√	√		√	√	√			√		√	√		√	√	√	√	√
Management of disposal of biohazard waste		√					√	√		√	√	√			√		√	√		√	√	√	√	√

Management of disposal of biohazard waste (continued)		√					√	√		√	√	√			√		√	√							
B) Practical part																									
Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern	√	√									√					√		√				√	√	√	√	
Detection of methicillin resistant *Staphylococcus aureus*					√		√				√					√		√				√	√	√		
Detection of Extended spectrum beta lactamases(ESBLs) A- Broth dilution test					√		√				√					√		√				√	√	√		
B-Double-disc approximation test					√		√				√					√		√				√	√	√		

Detection of AmpC enzymes												√					√		√				√	√	√		
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		√									√		√			√							√	√		√	
Standard measures											√		√			√		√						√			
Revision											√	√	√			√		√	√				√	√	√	√	

Matrix 2. Between course contents, learning methods and assessment

A) Theoretical Part:

Course Contents	Teaching and Learning Methods							Assessment methods			
	Advanced lecture	On line learning	Self-learning	Collaborative learning: Research Project	Collaborative learning:	العروض التوضيحية		Corse Work mid-term Exam)	Practical/sheet	Written	Oral
Principles of antimicrobial use	✓					✓		✓		✓	✓
Principles of antimicrobial use	✓					✓		✓		✓	✓
Principles of antimicrobial use	✓					✓		✓		✓	✓
An overview of chemotherapeutic antibacterial agents and antibacterial combination	✓					✓		✓		✓	✓
Misuse of antimicrobials	✓					✓				✓	✓
Factors leading to misuse of antimicrobial	✓					✓				✓	✓
Antimicrobial stewardship	✓	✓				✓				✓	✓
Antimicrobial stewardship	✓					✓				✓	✓
Infection prevention in healthcare setting (**the chain of infection**)	✓					✓				✓	✓

Infection, prevntion in healthcare settings (**standard and transmission-based precautions, barriers and use of personal protective equipment**)	✓					✓					✓	✓
Infection prevention in healthcare settings (**strategies form preventing the spread of infectious disease to healthcare workers and patients**)	✓			✓		✓					✓	✓
Antiseptic and preservatives used in healthcare settings	✓		✓	✓	✓	✓					✓	✓
Management of disposal of biohazard waste	✓	✓				✓					✓	✓
Management of disposal of biohazard waste (continued)	✓	✓				✓					✓	✓

B) Practical Part:

Course Contents	Teaching and Learning Methods							Assessment methods		
	Practical works and tutorials	On line learning	Self-learning	Collaborative learning: Research Project learning: Research Project	Collaborative learning: Role play	العروض التوضيحية Demos		Corse Work	Sheet	Practical exam
Disk Diffusion Testing and Determination of antimicrobial susceptibility pattern	✓	✓				✓		✓	✓	✓
Detection of methicillin resistant *Staphylococcus aureus*	✓	✓				✓		✓	✓	✓
Detection of Extended spectrum beta lactamases(ESBLs) A- Broth dilution test	✓	✓				✓		✓	✓	✓
B-Double-disc approximation test	✓	✓				✓		✓	✓	✓
Detection of AmpC enzymes	✓	✓				✓		✓	✓	✓
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	✓	✓				✓		✓	✓	✓
Standard measures	✓	✓				✓		✓	✓	✓
Revision	✓	✓						✓		

Course Coordinator	Prof. Dr. Hany kenawy
Head of Deartment	Prof. Dr. El-Sayed E. Habib

Date: 10/9/ 2023

بكالوريوس الصيدلة (فارم دى- Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Microbiological control of pharmaceutical products PME 012	**اسم المقرر: المراقبة الميكروبيولوجية للمستحضرات الصيدلية**
Academic Level: Elective course (Level four or five)	**المستوى الأكاديمي:** **الرابع والخامس**
Scientific department: Microbiology and Immunology	**القسم العلمي:** **الميكروبيولوجى والمناعة**
Head of Department: **Prof. Dr. El-Sayed El-Sherbeny Habib**	**رئيس القسم:** **أ .د /.السيد الشربينى حبيب**
Course Coordinator: Prof. Dr. Eman Salama Ahmed	**منسق المقرر: أ.د. ايمان سلامة أحمد**

Course Specification

2023- 2024

Pharm D Program

Faculty of Pharmacy

Mansoura University

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	**Bachelor in Pharmacy -Pharm D bylaw**
Academic Level	**Elective course (Level four or five), First semester, 2023/2024**
Date of course specification approval	**10/9/2023**

A-Basic Information: Course data:

Course Title	**Microbiological control of pharmaceutical products**
Course Code	**PME 012**
Prerequisite	**No**
Teaching Credit Hours: Lecture	**1**
Teaching Credit Hours: Practical/ tutorial	**1**
Total Credit Hours	**2**

B. Professional Information:

1. Course Aims:

On completion of the course, the student will be able to

Determine the basic principles of microbiological quality control

Understand the difference between sterile and non-sterile pharmaceutical products

Know how to determine the biological activity of different pharmaceutical products.

Understand the methods of estimation of antimicrobial agents, vaccines and non-sterile pharmaceutical products.

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 various methods of sterilization
	1.1.1.2	Distinguish appropriate Quality Control (QC) criteria to aseptic and sterile production facilities and other pharmaceutical industry
1.1.2	1.1.2.1	Discuss the principles of source of contamination, control of microbial contamination, sanitation, disinfection, and microbiological QC of pharmaceutical products.
1-1-3	1.1.3.1	Evaluation of activity of different antimicrobial agents, vaccines

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 laboratory practice (GLP), good clinical practice (GCP) and good pharmacy practice
	2.2.2.2	Apply the appropriate pharmacopeia principles in the estimation of antimicrobial agents, vaccines, non-sterile pharmaceutical products
2.3.3	2. 3.3.1	Utilize legal and ethical guidelines to ensure the correct and safe supply of medical products to the general public.

	2. 3.3.2	Examine the sterility and the efficiency of sterilization of pharmaceutical preparation
	2.3.3.3	Apply biological methods for quality control (QC) and quantitative estimation of antimicrobial agents, vaccines, non-sterile pharmaceutical products.
	2. 3.3.4	Determination of endotoxin limit

Domain 3: pharmaceutical care

Program K. element no.	Course K. element no.	Course K. element
3.1.1	3.1.1.1	Relate principles of public health and microbiology for monitoring and control of factors contributing in microbial contamination.

DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.1.1	4.1.1.1	Share decision-making activities with other team members and apply effective time management skills.
4.1.2	4.1.2.1	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team
4.3.2	4.3.2.1	Practice self-learning to improve professional skills

3-Course Contents

Theoretical part

Week No.	Topics	Credit Hours
1	Introduction: important definitions and aspects of quality assurance	1
2	Microbial contamination of pharmaceutical products	1
3	Preservation of pharmaceutical products	1
4	Microbial estimation of non-sterile pharmaceutical products	1
5	Enumeration methods of microorganisms (Plate methods)	1
6	Enumeration methods of microorganisms (membrane filtration and most probable number methods)	1
7	Microbial Enumeration of Non-sterile Products: Tests for Specified Microorganisms and identification of microorganisms	1
8	Determination of endotoxin limit in pharmaceutical products	1
9	Sterility testing of pharmaceutical products	1
10	Quantitative estimation of antimicrobial agents- antibiotics	1
11	Quantitative estimation of antimicrobial agents- antifungal	1
12	Quantitative estimation of vaccines	1
13	Assay of antiviral agents	1
14	Start of Final written and oral exam	-

Practical part

Week No.	Practical topics	Credit hours
1	Enumeration of microorganisms (Pour plate and membrane filtration methods)	1

2	Enumeration of microorganisms (Surface drop and most probable number methods)	1
3	Raw material testing	1
4	Growth promotion testing	1
5	Sterility testing	1
6	Bulk and Finished Product Testing	1
7	Poisoned food method	1
8	Time-kill test Antibiotic combinations	1
9	Vaccines.	1
10	Assay of antiviral agents	1
11	Water testing	1
12	Practical exam	-

4- Teaching and Learning Methods:

No	Teaching and Learning Methods	Week	K. elements to be addressed
4.1	Advanced Lectures using Data show, PowerPoint presentations	1-13	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2)
4.2	Distance learning: a. On line learning through My mans "Mansoura university	1-13	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2), (3.1.1.1)

	b. Inter active discussion through My Mans		
4.3	Practical sessions	1-11	(1.1.1.2), (1.1.3.1), (2.1.5.2), (2.1.5.3), (2.1.5.4), (2.2.2.1), (2.2.2.2), (3.1.1.1)
4.4	Self-learning	13	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2), (3.1.1.1) (4.1.1.1),(4.1.2.1), (4.3.2.1)
4.5	Research assignments	13	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2), (3.1.1.1) (4.1.1.1),(4.1.2.1), (4.3.2.1)
4.6	Class Activity: Group discussion offline and online.	1-13	(4.1.1.1),(4.1.2.1), (4.3.2.1)
4.7	Collaborative learning: Research Project	3-7	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2), (4.1.1.1),(4.1.2.1), (4.3.2.1)
4.8	Case study	1-13	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2), (4.1.1.1),(4.1.2.1), (4.3.2.1)

5- Student Assessment:

a-Assessment Methods:

1- Periodical (Mid-term exam)/ Course work	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2.3.3..1), (2.3.3.2), (2. .3.3..3), (2.3.3..4), (2.2.2.1), (2.2.2.2) (3.1.1.1)
2-Practical exam applying OSPE	(1.1.1.2), (1.1.3.1), (2.1.5.2), (2.1.5.3), (2.1.5.4), (2.2.2.1), (2.2.2.2), (3.1.1.1)
3-Written exam	(1.1.1.1), (1.1.1.2), (1.1.2.1), (1.1.3.1), (2 .3.3.1), (2.3.3..2), (2.3.3.3), (2.3.3..4), (2.2.2.1), (2.2.2.2), (3.1.1.1)
4-Oral	(1.1.1.2), (1.1.2.1), (1.1.3.1), (2.3.3.1), (2.3.3.2), (2.3.3..3), (2. .3.3.4), (2.2.2.1), (2.2.2.2). (3.1.1.1) (4.1.1.1),(4.1.2.1), (4.3.2.1)

b-Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	7th week
Assessment 2	Practical	12th week
Assessment 3	Written	Start from 14th week
Assessment 4	Oral	Start from 14th week

c-Weighing of assessments

1	Periodical (Mid-term exam)/ Course work	15%
2	Practical examination & tutorial	25%
3	Final-term examination	50%
4	Oral examination	10%
5	Other types of assessment	0 %
Total		100%

- Facilities required for teaching and learning

Classrooms	Data show- Computers, Internet, Platform

Laboratory facilities	Data show- Computers, Internet, Platform- tools for role play
Library	Books

7- List of References

No	Reference	Type
1.	Roesti, D. and Goverde, M. (2020): Pharmaceutical Microbiological Quality Assurance and Control: Practical Guide for Non-Sterile Manufacturing. Wiley.	Book
2.	Electronic book prepared by staff members	Electronic Book
3.	Kar, A. (2007). Pharmaceutical Microbiology. India: New Age International (P) Limited.	Textbook
4.	Recorded videos prepared by staff members	Videos on platform
5.	https://0510edent-1106-y-https-onlinelibrary-wiley-com.mplbci.ekb.eg/doi/epub/10.1002/9781119356196 WHO | World Health Organization https://www.who.int https://08122ozhv-1103-y-https-iopscience-iop-org.mplbci.ekb.eg/article/10.1088/1755-1315/615/1/012015 https://08122ozhw-1103-y-https-iopscience-iop-org.mplbci.ekb.eg/article/10.1088/1755-1315/761/1/012115 https://08102ozhk-1103-y-https-link-springer-com.mplbci.ekb.eg/referenceworkentry/10.1007/978-3-642-27769-6_902-2	Websites

	https://08102ozhq-1103-y-https-link-springer com.mplbci.ekb.eg/article/10.1007/s15010-013-0491-2 https://08102ozhs-1103-y-https-link-springer com.mplbci.ekb.eg/chapter/10.1007/978-1-4612-2476-1_15	

8-**Matrix:**

Matrix 1. Course contents and course key elements

A) **Theoretical** part:

Week No.	Course contents	Course Key elements													
		Domain: 1				Domain: 2						**Domain: 3**	Domain: 4		
		1.1.1.1	1.1.1.2	1.1.2.1	1.1.3.1	2.2.2.1	2.2.2.2	2. 3.3.1	2. 3.3.2	2.3.3.3	2. 3.3.4	3.1.1.1	4.1.1.1	4.1.2.1	4.3.2.1
1	Introduction: important definitions and aspects of quality assurance	✓	✓	✓	✓	✓	✓								
2	Microbial contamination of pharmaceutical products	✓	✓	✓	✓	✓	✓					✓			
3	Preservation of pharmaceutical products											✓			
4	Microbial estimation of non-sterile pharmaceutical products					✓	✓	✓	✓	✓	✓	✓			
5	Enumeration methods of microorganisms (Plate methods)							✓	✓	✓	✓		✓	✓	✓

6	Enumeration methods of microorganisms (membrane filtration and most probable number methods)							✓	✓	✓	✓		✓	✓	✓
7	Microbial Enumeration of Non-sterile Products: Tests for Specified Microorganisms and identification of microorganisms				✓	✓						✓	✓	✓	✓
8	Determination of endotoxin limit in pharmaceutical products							✓			✓				
9	Sterility testing of pharmaceutical products											✓	✓	✓	✓
10	Quantitative estimation of antimicrobial agents-antibiotics				✓							✓	✓	✓	✓

11	Quantitative estimation of antimicrobial agents- antifungal				✓										
12	Quantitative estimation of vaccines				✓										
13	Assay of antiviral agents				✓							✓			

B) Practical part:

Week No.	Course contents	Course Key elements													
		Domain: 1				Domain: 2						Domain: 3	Domain: 4		
		1.1.1.1	1.1.1.2	1.1.2.1	1.1.3.1	2.2.2.1	2.2.2.2	2. 3.3.1	2. 3.3.2	2.3.3.3	2. 3.3.4	3.1.1.1	4.1.1.1	4.1.2.1	4.3.2.1
1	Enumeration of microorganisms (Pour plate and membrane filtration methods)	✓	✓			✓	✓								
2	Enumeration of microorganisms (Surface drop and most probable number methods)			✓	✓							✓			

3	Raw material testing	✓	✓									✓			
4	Growth promotion testing											✓	✓	✓	✓
5	Sterility testing			✓	✓	✓	✓	✓				✓	✓	✓	✓
6	Bulk and Finished Product Testing											✓			
7	Poisoned food method						✓	✓	✓	✓	✓	✓			
8	Time-kill test Antibiotic combinations	✓											✓	✓	✓
9	Vaccines.			✓			✓						✓	✓	✓
10	Assay of antiviral agents			✓			✓		✓	✓			✓	✓	✓
11	Water testing			✓			✓		✓	✓		✓			✓

Matrix 2. Between course contents, learning methods and assessment

Theoretical part													
Week No.	Course Contents	Teaching and learning methods							Assessment methods				
		Advanced lecture	On line learning	Self-learning	Collaborative learning: Research Project Research Project	Research assignments	Case study	Class Activity: Group discussion offline and	Course Work mid-term Exam)	Practical/sheet	Written	Oral
1	Introduction: important definitions and aspects of quality assurance	✓					✓	✓	✓		✓	✓
2	Microbial contamination of pharmaceutical products	✓					✓	✓	✓		✓	✓
3	Preservation of pharmaceutical products	✓			✓		✓	✓	✓		✓	✓
4	Microbial estimation of non-sterile pharmaceutical products	✓			✓		✓	✓	✓		✓	✓
5	Enumeration methods of microorganisms (Plate methods)	✓			✓		✓	✓			✓	✓

6	Enumeration methods of microorganisms (membrane filtration and most probable number methods)	✓			✓		✓	✓			✓	✓
7	Microbial Enumeration of Non-sterile Products: Tests for Specified Microorganisms and identification of microorganisms	✓	✓		✓		✓	✓			✓	✓
8	Determination of endotoxin limit in pharmaceutical products	✓					✓	✓			✓	✓
9	Sterility testing of pharmaceutical products	✓					✓	✓			✓	✓
10	Quantitative estimation of antimicrobial agents- antibiotics	✓					✓	✓			✓	✓
11	Quantitative estimation of antimicrobial agents- antifungal	✓					✓	✓			✓	✓

12	Quantitative estimation of vaccines	✓					✓	✓			✓	✓
13	Assay of antiviral agents	✓	✓	✓			✓	✓			✓	✓

Practical part

Week No.	Course Contents	Teaching and learning methods							Assessment methods		
		Lab sessions	On line learning	Self-learning	Collaborative learning: Research Project learning:	Research assignments	Case study	Class Activity: Group discussion	Course Work	Sheet	Practical exam
1	Enumeration of microorganisms (Pour plate and membrane filtration methods)	✓	✓					✓	✓	✓	✓
2	Enumeration of microorganisms (Surface drop and most probable number methods)	✓	✓			✓	✓	✓	✓	✓	✓
3	Raw material testing	✓	✓					✓	✓	✓	✓
4	Growth promotion testing	✓	✓			✓	✓	✓	✓	✓	✓
5	Sterility testing	✓	✓			✓	✓	✓		✓	✓

6	Bulk and Finished Product Testing	✓	✓					✓		✓	✓
7	Poisoned food method	✓	✓			✓	✓	✓		✓	✓
8	Time-kill test Antibiotic combinations	✓	✓			✓	✓	✓		✓	✓
9	Vaccines.	✓	✓					✓		✓	✓
10	Assay of antiviral agents	✓	✓					✓		✓	✓
11	Water testing	✓	✓					✓			

Course Coordinator	Prof. Dr. Eman Salama Ahmed
Head of Department	Prof. Dr. El-Sayed El-Sherbeny Habib
	

Date: 10/9/2023

بكالويوس الصيدلة (فارم د – Pharm D

Course Specification

Academic year: 2022/2023

Course name: **Nano&Radiopharmaceuticals**	**اسم المقرر: النانو والمستحضرات الصيدلية المشعة**
Academic Level: Level 5	**المستوى الأكاديمي: الخامس**
Scientific department: Pharmaceutics	**القسم العلمي: الصيدلانيات**
Head of Department: **Prof. Dr. Irhan Ibrahim Abu Hashim**	**رئيس القسم:** **أ.د/ أرهان ابراهيم ابو هاشم**
Course Coordinator:	**منسق المقرر:**

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	**B. Pharm. (PharmD)**
Academic Level	Fifth level, second semester, 2022-2023
Date of course specification approval	October 2022

A- Basic Information: Course data:

Course Title	**Nano&Radiopharmaceuticals**
Course Code	**PT E 013**
Prerequisite	**..**
Teaching Hours: Lecture	**1**
Practical	**1**
Total Credit Hours	**2 (Credit H)**

B. Professional Information:

- Course Aims:

2.1. Knowing the basic principles of nanotechnology and various nano-disperse system.
2.2. Enumerating the different properties, applications of nanoparticles.
2.3. Organizing the different properties, applications of nano metals and nanotubes with the evaluation of different radio pharmaceutical preparations.

2- 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
1.1.1	1.1.1.1	Define the different nano products using different bases.
1.1.3	1.1.3.1	Classify different methods of preparation of nano-emulsion, nanocrystals, polymeric nanoparticles and nanosuspension besides their applications.

Domain 2: professional and ethical practice

Program K. element no.	Course K. element no.	Course K. element
2.2.5	2.2.5.1	Organize the basic concepts involved in the formulation and manufacture of nano products and nanometals (silver, gold, carbon and nanotubes).
2.3.1	2.3.1.1	Specify the factors affecting on the preparation and evaluation of different radio pharmaceutical preparations.

Domain 3: pharmaceutical care

Program K. element no.	Course K. element no.	Course K. element
3.1.4	3.1.4.1	Outline the use of radio pharmaceuticals in characterizing, epidemiology, pathogenesis, laboratory diagnosis, features of infections/diseases and their treatment and prevention.

Domain 4: personal practice

Program K. element no.	Course K. element no.	Course K. element
4.2.1	4.2.1.1	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	Lecture Hours
1	Definition of nano products and types. .	1

2-3	Nano-disperse system (nanoemulsion and nanosuspension)	2
4	Polymeric nanoparticles	1
5	Nanocrystals	1
6	Applications of nanoparticles	1
7	Applications of nanoparticles	1
8	Nanometals (silver)	1
9	Nanometals (gold).	1
10	Nanometals (carbon and nanotubes).	1
11	Basic principles of nanotechnology Part 1	1
12	Basic principles of nanotechnology Part 2	1
13	Basic principles of radiopharmaceuticals part 1	1
14	Basic principles of radiopharmaceuticals part 2	1
15	Compensatory and alternative lecture	1
16	Revision and quiz	1
17	Final and written exams	-
Week No.	**Practical topics**	**Credit hours**
1	Definition of nano products and types. .	1
2	Nano-disperse system (nanoemulsion)	1
3	Nano-disperse system (nanosuspension)	1
4	Polymeric nanoparticles	1
5	Nanocrystals	1
6	Applications of nanoparticles part 1	1
7	Applications of nanoparticles part 2	1
8	Mid-Term Exam	-
9	Nanometals (silver).	1
10	Nanometals (gold).	1
11	Nanometals (carbon).	1
12	Nanometals (nanotubes).	1
13	Basic principles of nanotechnology	1
14	Basic principles of radiopharmaceuticals.	1
15	Revision and activity	1

16	Practical exam / sheet	1

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.	Weeks 1-16	1.1.1.1, 1.1.3.1, 2.2.5.1, 2.3.1.1, 3.1.4.1
4.2	Practical tutorial session	1-16	2.3.1.1, 2.2.5.1
4.3	Self-learning	12	4.3.2.1/4.2.1.1
4.4	Class Activity /Problem – based learning and brainstorming	4	4.2.1.1
4.5	Presentations	8	4.3.2.1

5- Student Assessment:

i- Assessment Methods:

1-Written exam	**1.1.1.1/ 1.1.3.1/ 2.2.5.1/ 2.3.1.1 /4.2.1.1/ 4.3.2.1**
2-Practical exam	1.1.1.1/ 1.1.3.1/ 2.2.5.1/ 2.3.1.1 /4.2.1.1/ 4.3.2.1
3-Oral	1.1.1.1/ 1.1.3.1/ 2.2.5.1/ 2.3.1.1
4-Formative Assessment	1.1.1.1/ 1.1.3.1/ 2.2.5.1/ 2.3.1.1

j- Assessment schedule

Assessment 1	**Mid-term**	7-9th week
Assessment 2	**Practical**	16th week
Assessment 3	**Written**	17th week
Assessment 4	**Oral**	17th week
Other assessment		

k- Weighing of assessments

1	**Mid-term examination**	15%
2	**Practical examination & Semester work**	25%
3	**Final-term examination**	50%
4	**Oral examination**	10%
5	**Other types of assessment**	
Total		100%

6- Facilities required for teaching and learning

Classroom	Data show- Computers, Internet, Platform
Library	Books and Pharmacopoeia

7- Matrix of knowledge and skills of the course

Course contents	Outcomes Domains / Key elements						
	Domain 1		Domain 2		Domain 3	Domain 4	
	1.1.1.1	1.1.3.1	2.2.5.1	2.3.1.1	3.1.4.1	4.2.1.1	4.3.2.1
Definition of nano products and types. .	√	√	√	√		√	√
Nano-disperse system(nanoemulsion and nanosuspension)	√	√	√	√		√	√
Polymeric nanoparticles	√	√	√	√		√	√
Nanocrystals	√	√	√	√		√	√
Applications of nanoparticles	√	√	√	√	√	√	√
Mid-Term Exam	√	√	√	√		√	√
Applications of nanoparticles	√	√	√	√	√	√	√
Nanometals (silver, gold, carbon and nanotubes).	√	√	√	√		√	√
Basic principles of nanotechnology and radiopharmaceuticals.	√	√	√	√	√	√	√
Practical topics	√	√	√	√		√	√

8- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	**Course notes**
2.	Recorded videos prepared by stuff members	**Videos on platform**

3.	"**Design of Nanostructures for Theranostics Applications**", Alexandru Grumezescu, Elseiver Science Publishing Co Inc, United states, Jan 2018	**Book**
4.	" **Handbook of Nanotechnology Applications: Environment, Energy, Agriculture and Medicine**", Kajornsak Faungnawaki, Woei Jye Lau , Urachu Ruktanonchai and Kaukoon Piyachomkwan, Elseiver Science Publishing Co Inc, United states, October 2020	**Book**
5.	https://www.researchgate.net/publication/325023106 http://www.sciencedirect.com / http://www.google.com / http://www.pubmed.com https://www.ekb.eg/web/guest/home	**Websites**

Course Coordinator	
Head of Department	**Prof. Dr. Irhan Ibrahim Abu Hashim**

Date: 10/ 2022

بكالوريوس الصيدلة (فارم دى – **((Pharm D)**

Course Specification

Academic year: 2023/2024

Course name: Cosmetic preparations	اسم المقرر: مستحضرات التجميل
Academic Level: Level 4	المستوى الأكاديمي: الرابع
Scientific department: Pharmaceutics	القسم العلمي: الصيدلانيات
Head of Department: **Prof. Dr. Irhan Ibrahim Abu Hashim**	رئيس القسم: أ.د/ ارهان ابراهيم أبوهاشم
Course Coordinator: **Prof. Dr. Yosry Elsaid Ebrahim**	منسق المقرر: أ.د/ يسري السعيد ابراهيم

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmaceutics
Department supervising the course	Pharmaceutics
Program on which the course is given	**Bachelor in Pharmacy -Pharm D**
Academic Level	Fourth level, First semester, 2023-2024
Date of course specification approval	**20th September 2023**

A.Basic Information: Course data:

Course Title	**Cosmetic preparations**
Course Code	**PTE 014**
Prerequisite	**No**
Teaching Hours: Lecture	**1**
Practical	**1**
Total Credit Hours	**2(Credit H)**

B. Professional Information:

1- Course Aims:

1. Knowing the basic principles and techniques of compounding and dispensing of different cosmetic preparations.
2. Enumerating the different properties and classification of cosmetic preparations.

3. Identify different components of cosmetic products.
4. Recognize different quality control tests to evaluate the cosmetic preparations.

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 the different cosmetic products using different bases.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
2.2.5	**2.2.5.1**	Organize the basic concepts involved in the formulation and manufacture of cosmetic products such as shampoos, fragrance preparations, nail lacquers, dentifrices, face make-up, and eye make-up.

DOMAIN 3: PROFESSIONAL AND ETHICAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
3.2.5	**3.2.5.1**	Provide education to support the patients and community in making informed decisions about the proper selection of OTC preparations such as skin moisturizers and emollients, acne preparations, anti-dandruff preparations, as well as antiperspirants and deodorants.

DOMAIN 4: PERSONAL PRACTICE

Program K. element no.	Course K. element no.	Course K. element
4.2.1	**4.2.1.1**	Use communication through clear language in dealing with others.
4.3.2	**4.3.2.1**	Practice self-learning to improve professional skills

3-Course Contents:

A. Theoretical Part

Week No.	Topics	Lecture credit Hours
1	Introduction: - Raw materials of cosmetics. - Pharmaceutical agents in cosmetics.	1
2	Skin care products: - Skin Moisturizers & Emollients - Selection of the emollient product - Eczema & Psoriasis	1
3	Shampoos and anti-dandruff preparations: - Ingredients, types, and evaluation of shampoo - Cause and treatments of dandruff	1
4	Hair dye preparations: - How hair dye works - Types of Hair Dyes - Adverse effect of hair dying and how to minimize it - Quality control tests for hair dye products	1
5	Fragrance preparations: - Basic Difference between Perfume & Attars - Composition of Perfume - Classification of Fragrances - Manufacturing process - Adverse effects of perfume and precautions	1
6	Nail lacquers: - Characteristics of ideal Nail lacquers - Formulation of Nail lacquer system - Nail lacquer remover - Evaluation of nail lacquers	1
7	Face make-up: - Foundation - Setting Powder - Blusher	1
8	Lipstick: - Basic categories of lipsticks - Composition of lipsticks - Defects of lipsticks - Quality control tests of lipstick	1

9	Eye make-up: - Types of eye makeup products - Ingredients and formulation of eye makeup products - Evaluation of eye makeup products	1
10	Skin Cleansers - Classification of skin cleansers - Formulation of skin cleansers	1
11	Antiperspirants - Active ingredients for antiperspirants - Typical application forms for antiperspirants - Testing antiperspirants	1
12	Dentifrices - Types of dentifrices - Formulation of dentifrices - Dentifrice manufacture - Evaluation of dentifrices	1
13	Acne - Types of Acne - Treatment of Acne - Dosage forms of Acne preparations	1
14	Deodorants - Active ingredients for deodorants - Typical application forms for deodorants - Testing deodorants	
15	**Final written and oral exam**	

B. practical part:

Week No.	Practical topics	Practical credit hours
1	Shampoo	1
2	Hair conditioner and antidandruff cream	1
3	Fragrance preparations and liquid foundation	1
4	Lip stick Blusher	1

5	**Eye makeup** • Mascara Liquid • Mascara Cake • Stick Eye Shadow • Eye Shadow Cake	1
6	Skin moisturizer cream Cleansing gel	1
7	Nail lacquers	1
8	Midterm exam	-
9	Antiperspirant	1
10	Cosmetic Serums: Vitamin-Blend Whitening Serum and hair dye preparation	1
11	Body Scrub “Exfoliation and toothpaste	1
12	Anti-acne lotion and acne vulgaris cream	1
13	Deodorant creams	1
14	**Practical exam applying OSPE**	-

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. Hybrid learning ● Online learning through my mans "Mansoura university" as recorded video lectures ● Online learning through my mans "Mansoura university" as recorded video of practical session ● Interactive discussion through My Mans.	1-14	1.1.1.1/ 2.2.5.1/3.2.5.1
4.2	Practical session using chemicals and laboratory equipment	1-14	2.2.5.1
4.3	Self-learning	2&6	4.3.2.1/4.2.1.1

4.4	Class Activity / assignment	7	4.2.1.1
4.5	Developed lecture (brain storming)	1-14	3.2.5.1//4.2.1.1

5- Student Assessment:

a- Assessment Methods:

Assessment Methods	**K. elements to be assessed**
1-Written exam	To assess 1.1.1.1/2.2.5.1
2-Practical exam applying OSPE	1.1.1.1/2.2.5.1//3.2.5.1
3-Oral	1.1.1.1/2.2.5.1/4.2.1.1/4.3.2.1
4-Periodical (Mid-term exam) / assignment	1.1.1.1/2.2.5.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / assignment	7-9th week
Assessment 2	Practical examination	14th week
Assessment 3	Written exam	Starts at 15th week
Assessment 4	Oral exam	Starts at 15th week

c. Weighing of assessments

1	Periodical (Mid-term) exam / assignment	15%
2	Practical examination	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, and Internet.**
- Laboratory facilities	**Water baths, glassware, chemicals, electronic balance.**

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	**Course notes**
2.	Recorded videos prepared by stuff members	**Videos on platform**
3.	Baki, Gabriella. Introduction to cosmetic formulation and technology. John Wiley & Sons, 2022.	Book
4.	Cosmetic Formulation: Principles and Practice- 1st edition by Heather A.E. Benson, Michael S. Roberts, Vania Rodrigues Leite-Silva, Kenneth Walters, ISBN 9781032093079, CRC Press, June 2021.	Book
5.	Handbook of cosmetic science and technology, the theory and practice of cosmeceuticals by patel Hardik k.Suthar Rajnikant M. Patel Meghana H, Paperback, 2015.	Book
6.	https://www.researchgate.net/publication/325023106 http://www.sciencedirect.com / http://www.google.com http://www.pubmed.com https://www.ekb.eg/web/guest/home	Websites

8. Matrix:

1-course content versus course k. elements

A. Theoretical part

Course contents / K. elements	**Domain 1**		**Domain 2**		**Domain 3**		**Domain 4**	
	1.1.1.1		**2.2.5.1**		**3.2.5.1**		**4.2.1.1**	**4.3.2.1**
Introduction	✓						✓	
Skin care products	✓				✓		✓	✓
Shampoos and anti-	✓		✓		✓		✓	

dandruff preparations								
Hair dye preparations	✓		✓				✓	
Fragrance preparations	✓		✓				✓	
Nail lacquers	✓		✓				✓	✓
Face make-up	✓		✓				✓	
Lipstick	✓		✓				✓	
Eye make-up	✓		✓				✓	
Skin Cleansers	✓		✓		✓		✓	
Antiperspirants	✓				✓		✓	
Dentifrices	✓		✓				✓	
Acne	✓				✓		✓	
Deodorants - Active ingredients for deodorants - Typical application forms for deodorants - Testing deodorants	✓				✓		✓	

C. Practical topics

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

A. Theoretical part

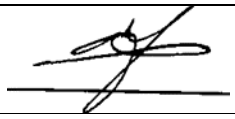
Course contents / K. elements	Domain 1	Domain 2	Domain 3	Domain 4	
	1.1.1.1	2.2.5.1	3.2.5.1	4.2.1.1	4.3.2.1
Shampoo	✓	✓		✓	
Hair conditioner and antidandruff cream	✓	✓	✓	✓	
Fragrance preparations and liquid foundation	✓	✓		✓	
Lip stick Blusher	✓	✓		✓	
Eye makeup • Mascara Liquid • Mascara Cake • Stick Eye Shadow • Eye Shadow Cake	✓	✓		✓	
Skin moisturizer cream Cleansing gel			✓	✓	
Nail lacquers	✓	✓		✓	✓
Antiperspirant creams			✓	✓	
Cosmetic Serums: Vitamin-Blend Whitening Serum and hair dye preparation	✓	✓		✓	
Body Scrub “Exfoliation and toothpaste	✓	✓		✓	
Anti-acne lotion and acne vulgaris cream			✓	✓	
Deodorant creams			✓	✓	

	Developed lecture	Hybrid learning	Self-learning	Periodical (Mid-term) exam / assignment	Written exam	Oral exam
	Developed lecture	Hybrid learning	Self-learning	Periodical (Mid-term) exam / assignment	Written exam	Oral exam
Introduction	√			√	√	√
Skin care products	√		√	√	√	√
Shampoos and anti-dandruff preparations	√			√	√	√
Hair dye preparations	√			√	√	√
Fragrance preparations	√				√	√
Nail lacquers	√		√		√	√
Face make-up	√	√			√	√
Lipstick	√				√	√
Eye make-up	√				√	√
Skin Cleansers	√				√	√
Antiperspirants	√				√	√
Dentifrices	√				√	√
Acne	√				√	√
Deodorants	√				√	√

A. Practical part

Practical course contents	Teaching and Learning Methods			Assessment methods
	Lab sessions	Hybrid learning	Team-based learning	Practical exam
Shampoo	√	√	√	√
Hair conditioner and antidandruff cream	√	√	√	√
Fragrance preparations and liquid foundation	√	√	√	√
Lip stick Blusher	√	√	√	√
Eye makeup • Mascara Liquid • Mascara Cake • Stick Eye Shadow • Eye Shadow Cake	√	√	√	√
Skin moisturizer cream Cleansing gel	√	√	√	√
Nail lacquers	√	√	√	√
Antiperspirant creams	√	√	√	√
Cosmetic Serums: Vitamin-Blend Whitening Serum and hair dye preparation	√	√	√	√
Body Scrub “Exfoliation and toothpaste	√	√	√	√

Anti-acne lotion and acne vulgaris cream	√	√	√	√
Deodorant creams				

Course Coordinator	**Prof. Dr. Yosry Elsaid Ibrahim**
	
Head of Department	**Prof. Dr. Iran Ibrahim Abu Hashim**
	

Date: 20/9 / 2023

بكالوريوس الصيدلة (فارم د – Pharm D)

Course Specification

Academic year: 2023/2024

Course name: Complementary & Alternative medicine	اسم المقرر : الطب التكميلي والبديل
Academic Level: Five (Elective)	المستوى الأكاديمي : الخامس
Scientific department: Pharmacognosy	القسم العلمي : العقاقير
Head of Department: Prof. Dr. Mahmoud F. Elsebai	رئيس القسم : أ. د./ محمود فهمي السباعي
Course Coordinator: Prof. Dr. Weaam Ebrahim	منسق المقرر : أ.د/وئام نبيل السيد ابراهيم

Course Specification
2023- 2024
Pharm D Program
Faculty of Pharmacy
Mansoura University

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy
Program on which the course is given	Bachelor in Pharmacy- Pharm D
Academic Level	Level Five, First semester, 2023-2024
Date of course specification approval	6-9-2023

A. Basic Information: Course data:

Course Title	Complementary & Alternative medicine
Course Code	PGE 015
Prerequisite	Registration
Teaching credit Hours: Lecture	1
Teaching Credit Hours: Tutorial & Practical	1
Total Credit Hours	2

B. Professional Information:

1. Course Aims:

Complementary and Alternative medicine course enables the students to**:**

1. Gain valuable knowledge about the Complementary and alternative medicine (CAM): including a summary of different domains of CAM: mind- body interventions, alternative medical systems, biologically based, manipulative and body based therapies and energy therapies.
2. Emphasize the feasible use of nutraceuticals as types of biologically based therapies. including dietary supplements, vitamins and minerals, functional foods and medical foods.
3. Master the concept, effective application and safety guidelines of aromatherapy.

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	Gain a comprehensive understanding of different types of complementary and alternative medicines including bodywork therapies, energy medicine, biologically based nutritional medicine, ayurvedic medicine and aromatherapy.
1.1.3	1.1.3.1	Combine the principles of complementary and alternative medicine to identify, extract, analyze and ensure high quality natural pharmaceutical raw materials and dietary supplements.
1.1.4	1.1.4.1	Explain the mode of action and therapeutic effects of natural 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 of complementary and alternative medicine to alleviate problems concerning 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 using dietary supplements, vitamins and minerals, functional foods, medical foods processing, identification, standardization, effective application and safety guidelines.
2.3.1	2.3.1.1	Employ the applicable practices for aromatherapy and herbal therapies formulation, 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 evaluation and standardization of herbal therapies and aromatherapy .

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.
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
1	Alternative medical systems (traditional Chinese medicine , Ayurveda, homeopathy)	1
2	Mind-body interaction (prayer ,meditation, yoga, hypnotherapy, laughter)	1
3	Mind-body interaction (continue: Tai chi, yoga, art and music therapy)	1
4	Manipulative and Body Based Practices: (Massage, Chiropractic & other Bodywork therapies.	1
5	Energy therapies, Acupuncture, Reflexology and ozone therapy	1
6	Aromatherapy bioactivity and role in well being	1
7	Nutraceutical: definition, classification. Dietary Supplements	1
8	Dietary Supplements (Continued)	1
9	Vitamins	1
10	minerals	1
11	Functional foods	1
12	Medical foods	1
13	Homeopathic medicine	1
14	**Revision and quiz**	1
15	Start of Final written and oral exams	-
Week	**Practical Topics (tutorial & practical)**	Practical credit

No.		hours
1.	Introduction to (CAM), Homeopathic Medicine, Naturopathy	1
2.	Ayurvedic Medicine & Traditional Chinese Medicine	1
3.	Mind-body interaction (Tai chi and Yoga) Psycho-biology of Mindful, art practice, music therapy	1
4.	Manipulative and Body Based Practices (Massage , Acupressure, Reflexology, Chiropractic .)	1
5.	Aromatherapy: methods and effectiveness	1
6.	Acupuncture & Energy medicine: methods and evaluation.	1
7.	Apitherapy +Hypnotherapy+ cupping	1
8.	Mid-term exam	-
9	Thalasso therapy + Hydrotherapy	1
10	Nutritional medicine for cardiovascular disease and hypertension	1
11	Nutritional medicine for obesity, diabetes and degenerative disease	1
12	Herbals healing + Natural cosmetics	1
13	Safety, Efficacy & Effectiveness of herbal medicine.	1
14	Practical sheet exam	1

4- Teaching and Learning Methods:

	Teaching and Learning Methods	**Week No.**	**K. elements to be addressed**
5.1	Advanced lecture	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
5.2	Hybrid learning Distance learning: On line learning through My mans "Mansoura university	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
5.3	Self-learning	10	1.1.1.1, 1.1.3.1

5.4	Tutorial and Practical work	1-14	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.	4-11	1.1.1.1, 1.1.3.1, 1.1.4.1
5.5	Case study	2-11	1.1.5.1, 2.31.1, 2.2.1.1, 3.2.3.1
5.6	Research assignments and presentations	8-10	1.1.4.1, 2.2.1.1

5- Student Assessment:

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
2-tutorial & practical	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, 1.1.3.1, 1.1.4.1, 2.2.1.1

b. Assessment schedule

Assessment 1	Periodical (Mid-term exam) / Course work	6^{th} -8^{th} week
Assessment 2	Practical examination	12^{th} week
Assessment 3	Written exam	Starting from 14^{th} - week
Assessment 4	Oral exam	Starting from 14^{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	Glassware- chemicals-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.	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.	Fundamentals of complementary, alternative, and integrative medicine .Marc S. Micozzi , Elsevier Health Sciences, 2018.	Book
7.	The foundations of Chinese medicine: A comprehensive text By Maciocia, Giovanni. Elsevier Health Sciences, 2015.	Book
8.	Essential oil safety: a guide for health care professionals. Tisserand Robert, and Rodney Young. Elsevier Health Sciences, 2013.	Book
9.	http://www.sciencedirect.com / http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	websites

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

Course contents / K. elements	Domain 1					Domain 2			Domain 3		Domain 4		
	1.1.1.1	1.1.3.1	1.1.4.1	1.1.5.1		2.2.1.1	2.3.1.1		3.2.3.1		4.1.2.1	4.2.1.1	4.3.2.1
Introduction of CAM (Complementary and Alternative Medicine), definition, characters, domains and use.	✔	✔	✔	✔		✔			✔		✔		✔
Alternative medical systems (traditional Chinese medicine , Ayurveda, homeopathy)	✔					✔					✔		
Mind-body interaction (prayer ,meditation, yoga, hypnotherapy, laughter)						✔					✔	✔	✔
Mind-body interaction (continue: Tai chi, yoga , art and music therapy)			✔				✔				✔		✔
Manipulative and Body Based Practices: (Massage, Chiropractic & other Bodywork therapies.	✔	✔	✔	✔		✔					✔		✔
Energy therapies, Acupuncture, Reflexology and ozone therapy	✔	✔	✔	✔		✔					✔		✔

Aromatherapy bioactivity and role in well being	✔	✔	✔	✔		✔			✔		✔		✔
Nutraceutical: definition, classification. Dietary Supplements	✔	✔	✔	✔		✔			✔		✔		✔
Dietary Supplements	✔	✔	✔	✔		✔			✔		✔		✔
Vitamins and minerals	✔	✔	✔	✔		✔			✔				
Functional foods	✔	✔	✔	✔		✔			✔				
Medical foods	✔	✔	✔	✔		✔	✔		✔		✔	✔	✔
Homeopathic medicine	✔	✔	✔	✔		✔	✔		✔		✔	✔	✔

Practical topics (tutorial)	1.1.1.1	1.1.3.1	1.1.4.1	1.1.5.1		2.2.1.1	2.3.1.1		3.2.3.1		4.1.2.1	4.2.1.1	4.3.2.1
Introduction to (CAM), Homeopathic Medicine, Naturopathy	✔	✔	✔	✔		✔	✔				✔	✔	✔
Ayurvedic Medicine & Traditional Chinese Medicine	✔	✔	✔	✔		✔	✔				✔	✔	✔
Mind-body interaction (Tai chi and Yoga) Psycho-biology of Mindful, art practice, music therapy	✔	✔	✔			✔	✔				✔	✔	✔
Manipulative and Body Based Practices (Massage , Acupressure, Reflexology, Chiropractic .)	✔	✔	✔	✔		✔	✔				✔	✔	✔
Aromatherapy: methods and effectiveness	✔	✔	✔			✔	✔				✔	✔	✔
Acupuncture & Energy medicine: methods and evaluation.	✔	✔	✔			✔	✔		✔		✔	✔	✔
Apitherapy +Hypnotherapy+ cupping	✔	✔	✔			✔	✔				✔	✔	✔
Thalasso therapy + Hydrotherapy	✔	✔	✔			✔	✔				✔	✔	✔
Nutritional medicine for cardiovascular disease and hypertension	✔	✔	✔	✔		✔	✔				✔	✔	✔

Nutritional medicine for obesity, diabetes and degenerative disease	✔	✔	✔			✔	✔		✔		✔	✔	✔
Herbals healing + Natural cosmetics Safety, Efficacy & Effectiveness of herbal medicine.	✔	✔	✔	✔		✔	✔		✔		✔	✔	✔
Practical sheet exam													

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

Course Contents	Teaching and Learning Methods					Assessment methods		
	Advanced Lecture	online learning	Self-learning	Group discussion	Case Study	Corse Work	Written	Oral
Introduction of CAM (Complementary and Alternative Medicine), definition, characters, domains and use.	√					√	√	√
Alternative medical systems (traditional Chinese medicine , Ayurveda, homeopathy)	√					√	√	√
Mind-body interaction (prayer,meditation, yoga, hypnotherapy, laughter)	√					√	√	√
Mind-body interaction (continue: Tai chi, yoga , art and music therapy)	√			√		√	√	√
Manipulative and Body Based Practices: (Massage, Chiropractic & other Bodywork therapies.	√			√	√		√	√
Energy therapies, Acupuncture, Reflexology and ozone therapy	√				√		√	√
aromatherapy bioactivity and role in well being	√	√		√	√		√	√
Nutraceutical: definition, classification. Dietary Supplements	√			√	√		√	√
Dietary Supplements	√			√	√		√	√
Vitamins and minerals	√		√	√	√		√	√
Functional foods	√			√	√		√	√

Medical foods	√			√	√		√	√
Homeopathic medicine	√						√	√

B) Practical Part:

Course Contents	Teaching and Learning Methods					Assessment methods	
	Lab sessions	Hybrid learning	Group discussion offline	Case study	Practical sessions	Course Work	Practical sheet
Introduction to (CAM), Homeopathic Medicine, Naturopathy	√		√			√	√
Ayurvedic Medicine & Traditional Chinese Medicine	√	√	√	√		√	√
Mind-body interaction (Tai chi and Yoga) Psycho-biology of Mindful, art practice, music therapy	√	√	√	√		√	√
Manipulative and Body Based Practices (Massage , Acupressure, Reflexology, Chiropractic .)	√	√	√	√		√	√
Aromatherapy: methods and effectiveness	√	√	√		√	√	√
Acupuncture & Energy medicine: methods and evaluation.	√	√	√	√		√	√
Apitherapy +Hypnotherapy+ cupping	√	√	√	√		√	√
Thalasso therapy + Hydrotherapy	√	√	√	√		√	√
Nutritional medicine for cardiovascular disease and hypertension	√	√	√	√		√	√
Nutritional medicine for obesity, diabetes and degenerative disease	√	√	√	√		√	√
Herbals healing + Natural cosmetics Safety, Efficacy & Effectiveness of herbal medicine.	√	√	√	√		√	√
Practical Sheet Exam							

Mansoura University

Faculty of Pharmacy

Quality Assurance Unit

Course Specification

Pharm D Program

2023- 2024

Course Coordinator	Prof. Dr. Weaam Ebrahim
	
Head of Department	Prof. Dr. Mahmoud F. Elsebai 

Date: 6-9-2023

بكالوريوس الصيدلة (فارم د – **Pharm D**)

Course Specification

Academic year: 2023/2024

Course name: Production and Manufacture of Medicinal Plants	اسم المقرر: إنتاج وتصنيع النباتات الطبية
Academic Level: Four/ Five (Elective)	المستوى الأكاديمي : الرابع/الخامس
Scientific department: Pharmacognosy	القسم العلمي : العقاقير
Head of Department: Prof. Dr. Mahmoud F. Elsebai	رئيس القسم : أ. د./ محمود فهمي السباعي
Course Coordinator: Prof. Dr. Mahmoud F. Elsebai	منسق المقرر : أ. د./ محمود فهمي السباعي

Mansoura University

Faculty of Pharmacy

Quality Assurance Unit

Course Specification

Pharm D Program

2023- 2024

University	Mansoura
Faculty	Pharmacy
Department offering the course	Pharmacognosy
Department supervising the course	Pharmacognosy department
Program on which the course is given	Bachelor in pharmacy - Pharm D
Academic Level	Level Four/ Five
Date of course specification approval	6/9/2023

A. Basic Information: Course data:

Course Title	Production and Manufacture of Medicinal Plants
Course Code	PGE 016
Prerequisite	Registration
Teaching Hours/ week: Lecture	1
Teaching Credit Hours: Practical/ tutorial	1
Total Credit Hours	2

B. Professional Information:

1 . Course Aims:

The course introduces the students to the technologies of the processing, scaling up and industrial production of medicinal plants. It also describes all aspects related to the manufacturing of products from medicinal herbs including cultivation, collection, preparation, storage, modern methods for extraction, isolation of biologically active constituents, structure elucidation and formulation of medicinal plants. It will also encompass studying of the using of natural products in the preparation of pharmaceutical forms and dietary supplements.

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. elements
1.1.1	1.1.1.1	List the basic steps of processing medicinal plants to products and identify new technology for production of medicinal plants in the industry.
1.1.3	1.1.3.1	Draw the basics of macro and microscopical characters of different medicinal plant organs, detection of adulteration as well as, their proper collection, drying, storage and marketing in addition to chemotaxonomic classification of medicinal plants.
1.1.4	1.1.4.1	Recognize pharmacological effects of plant derived natural products and antioxidants drugs as well as their medicinal uses.

Domain 2: Professional and Ethical Practice

Program K. element no	Course K. element no	Course K. elements
2.2.1	2.2.1.1	Select appropriate methods of extraction, isolation, purification, identification, standardization and formulation of medicines from plant source.

2.2.2	2.2.2.1	Analyze and standardization of active ingredients and select the proper method for authentication of medicinal plants or in the pharmaceutical preparation for quality management
2.3.1	2.3.1.1	Recognize the appropriate methods for preparation, analysis and handling of plant natural products and production of pharmaceuticals
2.5.1	2.5.1.1	Apply the requirement of the regulatory authority in manufacturing of medicinal plants including quality, safety, and efficacy requirements.

Domain 3: Pharmaceutical Care

Program K. element no.	Course K. element no.	Course K. element
3.2.3	3.2.3.1	Provide evidence-based information about safe use of medicinal plants.

Domain 4: Personal Practice:

Program K. element no	**Course K. element no**	Course K. elements
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	Plant-derived medicines and their role in global health.	2
2.	Collection of medicinal plants, Factors Causing Variability in Drug Activity: I- genetic factors: polyploidy, hybridization, selection, mutation.	2
3.	II- Ecological factors: 1- Light & temperature, 2- Latitude, 3- Altitude, 4- Minerals, water and oxygen, 5- Precursors, 6- Parasites, 7- allelopathy, 8- Plant growth regulators.	2
4.	III- Subsequent factors (changes taking place in drugs after collection and drying: desirable changes, undesirable changes).	2
5.	Technologies for the Processing of Medicinal Plants, e.g., grinding and extraction of the drug, concentration and drying of the extracts.	2
6.	Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (introduction).	2
7.	Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (definitions).	2
8.	Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (callus induction)	2
9.	Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (suspension cultures and scaling up) (self-learning).	2
10.	Formulation of plant extracts into dosage forms.	2
11.	Quality Control of Plant Extracts.	2
12	Instrumental Analysis of Plant Extracts.	2
13	Good Manufacturing Practice for Herbal Medicines.	2
14	Regulatory aspects of medicinal product production.	2
15	**Final written and oral exam**	--

Week	Practical topics	Practical

No.		credit hours
1.	Lab rules and explanation for the course assignments	1
2.	Collection of medicinal plants	1
3.	segregation of medicinal plants	1
4.	Chemical authentication of medicinal plants	1
5.	Botanical vs. chemical authentication of medicinal plants	1
6.	Methods of drying for medicinal plants	1
7	Extraction methods	1
8.	Mid-term	-
9.	Demo on extraction facilities.	1
10.	Plant extract formulation examples	1
11	Field visit	1
12	Students' presentations	1
13	Students' presentations	1
14	**Practical exam** (OSPE)	1

4- Teaching and Learning Methods:

	Teaching and Learning Methods	Week No.	**K. elements to be addressed**
5.1	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 Inter active discussion through My Mans	1-14	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1, 2.2.2.1, 2.3.1.1, 2.5.1.1, 3.2.3.1, 4.2.1.1, 4.3.2.1
5.2	Self-learning	9	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1
5.3	Practical session using chemicals and laboratory equipment	1-14	2.2.1.1, 2.2.2.1, 2.3.1.1,

	and/ or tutorials		2.5.1.1 4.2.1.1, 4.1.2.1
5.4	Class Activity: Group discussion offline and online.	3-6, 9-11	1.1.4.1, 2.2.1.1., 2.5.1.1
5.5	Field visit	9-14	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1
5.6	Presentation	4-6, 11	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1

5- Student Assessment:

a- Assessment Methods:

1-Written exam	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1, 2.2.2.1
2-Practical exam applying OSPE	2.2.1.1, 2.2.2.1, 2.3.1.1, 2.5.1.1 4.2.1.1, 4.1.2.1
3-Oral	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1., 2.5.1.1, 3.2.3.1, 4.2.1.1
4- Periodical (Mid-term exam) / Course work	1.1.1.1, 1.1.3.1, 1.1.4.1, 2.2.1.1

b. Assessment schedule

Assessment 1	Mid-term	6-8th week
Assessment 2	Practical	12th week
Assessment 3	Written	14/15th week
Assessment 4	Oral	14/15th week

c. Weighing of assessments

1	Mid-term examination & Semester 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

7- List of References

No	Reference	Type
1.	Electronic book prepared by staff members	**Course notes**
2.	Recorded videos prepared by stuff members	Videos on platform
3.	The Medicinal Plant Industry. 1st edition. R.OB. Wijsekera. CRC Press, 1991	Book
4.	Textbook of Industrial Pharmacognosy. 1st edition. A.N. Kalia. CBS Publishers, 2011.	Book
5.	Drugs from discovery to approval. 2nd edition, Rich N.G. Wiley-Blackwell, 2009	Book
6.	Good Pharmaceutical Manufacturing Practice. 1st edition, John Sharp. CRC Press, 2005.	Book
7.	Medicinal Plants: From Farm to Pharmacy 1st ed. 2019, by Nirmal Joshee, Sadanand A. Dhekney, Prahlad Parajuli (Editors), Springer	Book
8.	Medicinal Plants: Production, Cultivation and Uses. Aubert Matthias, Nicolas Laisné (Editors). NOVA science publishers, New York, 2017	Book
9.	From medicinal plant raw material to herbal remedies. Aromatic and Medicinal Plants: Back to Nature Djordjevic, S.M., InTech Open, Croatia, 2017.	Book
10.	http://www.sciencedirect.com / http://www.google scholar.com / http://www.pubmed.com https://www.ekb.eg	websites

8-Matrix 1. Course contents and course key elements

Course contents	Study Week	Course Key Elements									
		Domain: 1			Domain: 2				Domain: 3	Domain: 4	
		1.1.1.1	1.1.3.1	1.1.4.1	2.2.1.1	2.2.2.1	2.3.1.1	2.5.1.1	3.2.3.1	4.1.2.1	4.3.2.1
A) Theoretical part											
Plant-derived medicines and their role in global health.	**1**	√	√	√	√	√	√			√	√
Collection of medicinal plants, Factors Causing Variability in Drug Activity: I- genetic factors: polyploidy, hybridization, selection, mutation.	**2**	√	√	√	√	√	√				
II- Ecological factors: 1- Light & temperature, 2- Latitude, 3- Altitude, 4- Minerals, water and	**3**	√	√	√	√	√	√				

oxygen, 5- Precursors, 6- Parasites, 7- allelopathy, 8- Plant growth regulators.											
III- Subsequent factors (changes taking place in drugs after collection and drying: desirable changes, undesirable changes).	**4**	√	√	√	√	√	√				
Technologies for the Processing of Medicinal Plants, e.g., grinding and extraction of the drug, concentration and drying of the extracts.	**5**	√	√	√	√	√	√				
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and	**6**	√	√	√	√	√	√				√

tissue cultures (introduction).											
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (definitions).	**7**	√	√	√	√						
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (callus induction)	**8**	√	√	√	√						
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (suspension cultures	**9**	√	√	√	√						

and scaling up) (self-learning).											
Formulation of plant extracts into dosage forms.	**10**		√	√					√	√	√
Quality Control and Instrumental Analysis of Plant Extracts.	**11**		√	√					√	√	√
Good Manufacturing Practice for Herbal Medicines.	**12**		√	√					√	√	√
Regulatory aspects of medicinal product production.	**13**	√	√	√	√	√	√			√	

Course contents	**Study Week**	**Course Key Elements**									
		Domain: 1			Domain: 2				Domain: 3	Domain: 4	
		1.1.1.1	**1.1.3.1**	**1.1.4.1**	**2.2.1.1**	**1.1.1.1**	**1.1.3.1**	**1.1.4.1**	**2.2.1.1**	**1.1.1.1**	**1.1.3.1**

B) Practical part									
Lab rules and explanation for the course assignments	**1**	√	√		√	√	√	√	√
Collection of medicinal plants	**2**	√	√		√	√	√	√	√
segregation of medicinal plants	**3**	√	√		√	√	√	√	√
Chemical authentication of medicinal plants	**4**	√	√		√	√	√	√	√
Botanical vs. chemical authentication of medicinal plants	**5**	√	√		√	√	√	√	√
Methods of drying for medicinal plants	**6**	√	√		√	√	√	√	√
Extraction methods	**7**	√	√		√	√	√	√	√

Demo on extraction facilities.	**8**	√	√		√	√	√	√	√
Plant extract formulation examples	**9**	√	√		√	√	√	√	√
Field visit	**10**	√	√		√	√	√	√	√
Students' presentations	**11**	√	√		√	√	√	√	√

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

A) Theoretical Part:

Course Contents	Teaching and Learning Methods	Assessment methods

	Lecture	Online lecture	Lab sessions	Problem solving	Case Study	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Plant-derived medicines and their role in global health.	√		√				√		√	√
Collection of medicinal plants, Factors Causing Variability in Drug Activity: I- genetic factors: polyploidy, hybridization, selection, mutation.	√		√				√		√	√
II- Ecological factors: 1- Light & temperature, 2- Latitude, 3- Altitude, 4- Minerals, water and oxygen, 5- Precursors, 6- Parasites, 7- allelopathy, 8- Plant growth regulators.	√		√				√		√	√
III- Subsequent factors (changes taking place in drugs after collection and drying: desirable changes, undesirable changes).	√		√						√	√

Technologies for the Processing of Medicinal Plants, e.g., grinding and extraction of the drug, concentration and drying of the extracts.	√		√				√		√	√
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (introduction).	√		√				√		√	√
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (definitions).	√		√				√		√	√
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (callus induction)	√		√						√	√
Production of bioactive compounds from medicinal plants by tissue culture techniques: Plant cell and tissue cultures (suspension cultures and scaling up) (self-learning).	√		√			√			√	√

Formulation of plant extracts into dosage forms.	√		√						√	√
Quality Control and Instrumental Analysis of Plant Extracts.	√		√						√	√
Good Manufacturing Practice for Herbal Medicines.	√		√						√	√
Regulatory aspects of medicinal product production.	√		√				√		√	√

B) Practical Part:

Course Contents	Teaching and Learning Methods	Assessment methods

	Lecture	Online lecture	Lab sessions	Problem solving	Case Study	Self-learning	Corse Work	Practical/Tutorial	Written	Oral
Lab rules and explanation for the course assignments			√					√		
Collection of medicinal plants			√					√		
segregation of medicinal plants			√					√		
Chemical authentication of medicinal plants			√					√		
Botanical vs. chemical authentication of medicinal plants			√					√		
Methods of drying for medicinal plants			√					√		

Extraction methods			√					√		
Demo on extraction facilities.			√					√		
Plant extract formulation examples			√					√		
Field visit			√					√		
Students' presentations			√					√		

Mansoura University

Faculty of Pharmacy

Quality Assurance Unit

Course Specification

Pharm D Program

2023- 2024

Course Coordinator	**Prof. Dr. Mahmoud F. Elsebai** 
Head of Department	**Prof. Dr. Mahmoud F. Elsebai** 

Date: 6 / 9 / 2023

بكالوريوس الصيدلة (فارم دى-Phrm D)

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 الصيدلية
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

Mansoura University

Faculty of Pharmacy

Quality Assurance Unit

Course Specification

Pharm D Program

2023- 2024

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.

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 evaluatethe 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.

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	- GreenChemistry Metrics for the evaluation of analytical method greenness (continued)	1
14	- Green miniaturized technologies in analytical and bioanalytical chemistry (self-learning)	1
15	Compensatory and alternative lecture	1

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	1
4.	Tutorial: Atom Economy and Eco-scale.	1
5.	Tutorial: Biomimicry.	1
6.	Tutorial: Circular Economy.	1
7.	Tutorial: Biodegradability	1
8	Midterm exam	-
9.	Tutorial: Working without Solvents	1
10.	Tutorial: Green solvents in sample preparation	1
11.	Tutorial: Green chromatography in analytical chemistry	1
12.	Tutorial: Green Analytical Chemistry Metrics-PartI	1
13.	Tutorial: Green Analytical Chemistry Metrics -PartII	1
14	Tutorial: Green miniaturized technologies in analytical and bioanalytical chemistry-PartI	1
15.	Tutorial: Green miniaturized technologies in analytical and bioanalytical chemistry-PartII	1
16.	**Practical Exam (OSPE)**	--

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 • 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 equipmentand/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	14	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:

l- 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	7-9th week
Assessment 2	Practical examination and tutorial	16th week
Assessment 3	Written exam	17th week
Assessment 4	Oral exam	17th week

c. Weighing of assessments

1	Periodical exam / Course work	15%

6-

2	Practical examination and tutorial	25%
3	Final-term written examination	50%
4	Oral examination	10%
Total		100%

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.	Vinod K Tiwari, Abhijeet Kumar, Sanchayita Rajkhowa, Garima Tripathi, Anil Kumar Singh, Green chemistry: introduction, application and scope. 2022	**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.	Jacek Namiesnik, Green analytical chemistry: Pasr, present and prespectives, springer, 2019	**Book**
6.	http://www.sciencedirect.com http://www.scholar.google.com http://www.pubmed.com https://www.ekb.eg	**websites**

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	✓							✓			✓		

Renewable Feedstocks.	✓			✓				✓				✓	✓
Designing for Recycling, Degradation & Catalysis	✓						✓	✓		✓			
Solvents: Understanding Their Role	✓	✓				✓		✓		✓			✓
Sample preparation, and green solvents and its applications.	✓			✓	✓			✓		✓		✓	
Green Chromatography and its application	✓			✓	✓								
GreenChemistry Metrics for the evaluation of analytical method greenness	✓			✓	✓								
GreenChemistry Metrics for the evaluation of analytical method greenness (continued)	✓			✓	✓								

Green miniaturized technologies in analytical and bioanalytical chemistry (self-learning)	✓			✓	✓			✓		✓	✓		✓
Practical Topics													
Tutorial: Industrial Chemical Disasters and Green Chemistry				✓		✓	✓	✓				✓	✓
Tutorial: Twelve Principles of Green Chemistry				✓	✓	✓	✓			✓	✓		
Tutorial: Limiting Reagent, and Yield				✓	✓	✓	✓	✓		✓			✓
Tutorial: Atom Economy and Eco-scale.				✓	✓	✓	✓	✓		✓			✓
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-PartI				✓	✓	✓	✓	✓			✓	✓	
Tutorial: Green Analytical Chemistry Metrics -PartII				✓	✓	✓	✓	✓			✓	✓	
Tutorial: Green miniaturized technologies in analytical and bioanalytical chemistry-PartI				✓	✓	✓	✓	✓			✓	✓	
Tutorial: Green miniaturized technologies in analytical and bioanalytical chemistry-PartII				✓	✓	✓	✓	✓			✓	✓	

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	presentation	Quiz	Corse Work (presentation)	Corse 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	✓		✓				✓			✓		✓	✓
Green Chemistry Metrics for the evaluation of analytical method greenness.	✓		✓				✓	✓		✓		✓	✓
Green Chemistry Metrics for the evaluation of analytical method greenness. (continued)	✓		✓				✓	✓		✓		✓	✓

Green miniaturized technologies in analytical and bioanalytical chemistry (self-learning)	✓		✓				✓			✓		✓	✓

B) Practical Part:

Course Contents	Teaching and Learning Methods						Assessment methods		
	Online interactive discussion	recorded video	Group discussion	Lab sessions	Problem solving	Quiz	Practical Corse Work/ Tutorial	sheet	Practical/ Tutorial
Tutorial: Industrial Chemical Disasters and Green Chemistry		✓		✓			✓	✓	✓
Tutorial: 12 Principles of Green Chemistry		✓	✓	✓	✓		✓	✓	✓
Tutorial: Limiting Reagent, and Yield		✓	✓	✓	✓		✓	✓	✓
Tutorial: Atom Economy and Eco-scale.		✓	✓	✓		✓	✓	✓	✓
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-PartI		✓	✓	✓	✓		✓	✓	✓
Tutorial: Green Analytical Chemistry Metrics -PartII		✓	✓	✓	✓		✓	✓	✓
Tutorial: Green miniaturized technologies in analytical and bioanalytical chemistry-PartI		✓	✓	✓	✓		✓	✓	✓
Tutorial: Green miniaturized technologies in analytical and bioanalytical chemistry-PartII		✓	✓	✓	✓		✓	✓	✓

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

Date:10/ 9 / 2023