



Kafr el-Sheikh university
Faculty of Pharmacy
Pharm-D program
Course Specification
2025/2026



Pharm-D program
Course Specification
2025/2026
Second Level
Second Semester

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Course Specification

1. Basic Information

Course Title (according to the bylaw)	Biochemistry I			
Course Code (according to the bylaw)	PB 402			
Department/s participating in delivery of the course	Biochemistry			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	2	1		3
Course Type	Compulsory			
Academic level at which the course is taught	Second year, second semester			
Academic Program	Bachelor of Pharmacy (PharmD)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Dr/Shimaa Ali			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	Department Council			

2. Course Overview (Brief summary of scientific content)

This course covers Proteins (protein structure, biologically important peptides – fate of proteins). Amino acids as precursors for biosynthesis of biomolecules (e.g. neurotransmitters, nucleotides ...). Carbohydrates (glycoproteins and proteoglycans – glucose transporters). Lipids (physiologically important lipid molecules – cholesterol and steroids – lipoprotein metabolism). Enzymology (enzyme kinetics – regulation –enzyme inhibitors as drugs). Haemoglobin and porphyrins (Hb derivatives and types–metabolism of Hb and regulation). Biological oxidation, ATP synthesis, and clinical correlations

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	Domain 1 (fundamental knowledge) 1-1 competency		Upon finishing this course, students will be able to integrate knowledge from basic science to identify the chemistry of biomolecules such as proteins, carbohydrates, lipids and enzymology. This competency will be developed via the following key elements:
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Identify the chemical structure and classification of carbohydrates, proteins and lipids
		1.1.2	Describe enzyme action, kinetics and inhibition.
		1.1.3	Recognize porphyrin structure and metabolism, and oxidative phosphorylation
	Domain 2 (professional and ethical practice) 2-3 competency		Upon finishing this course, students will be able to handle, identify, and dispose of synthetic/natural materials used in the identification of different classes of carbohydrates and proteins. This competency will be developed via the following key elements:
2.3.1	Handle, identify, and dispose biologicals, synthetic/natural materials, biotechnology based and radio-labeled products, and other materials/products used in pharmaceutical	2.3.1	Safely handle different chemicals to avoid harm to the students
		2.3.2	Apply standard laboratory procedures and documentation

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	field		
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products.	2.3.3	Use and apply established safety standards for the safe handling and appropriate disposal of synthetic materials in compliance with regulations
Domain 3 (Pharmaceutical Care) 3-1 competency		<p>Upon finishing this course, students will be able to apply the principles of body functions, such as principles of enzymology, porphyrin, and oxidative phosphorylation, to participate in improving healthcare services.</p> <p>This competency will be developed via the following key elements:</p>	
3.1.1	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	3.1.1	Explain the biochemical and structural basis of proteins, amino acids, carbohydrates, lipids, and hemoglobin in normal body functions and disease states.
		3.1.2	Associate enzymology, biological oxidation, and energy metabolism with physiological processes and clinical disorders.
		3.1.3	Discuss genomic and molecular principles with biochemical pathways to understand disease mechanisms and support therapeutic management.
Domain 4 (personal practice) 4.2 competency		<p>Upon finishing this course, students will be able to communicate effectively verbally and non-verbally</p> <p>This competency will be developed via the following key elements:</p>	
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	4.2.1	Demonstrate effective communication and perform presentations on different topics.
		4.2.2	Use digital tools and contemporary technologies to design clear, engaging, and professional presentations

4. Teaching and Learning Methods

- 1- Lecture.
- 2- Practical.
- 3- E-learning.
- 4- Discussion.
- 5- Brainstorming.
- 6- Assignment.
- 7- Presentation.

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/)	Training (Practical/Clinical/)	Self-learning (Tasks/Assignments/Projects/ ...)	Other (to be determined)
1	Proteins - protein structure - biologically important peptides	4	2	2		
2	Proteins (Cont.) - fate of proteins	4	2	2		
3	Amino acids -Structure - Classification - Use of amino acids in biosynthesis of biomolecules	4	2	2		
4	Carbohydrates -Structure -Classification	4	2	2		
5	Carbohydrates (Cont.) - Glycoproteins and proteoglycans - Glucose transporters	4	2	2		
6	Lipids - Classification of lipids - Digestion and absorption of lipids	4	2	2		
7	Mid-term exam					
8	Lipids (Cont.) Cholesterol structure, metabolism, related diseases.	4	2	2		
9	Lipids (Cont.) - Lipoprotein metabolism	4	2	2		
10	Enzymology - Enzyme kinetics - Role of enzymes in regulation of biochemical reaction	4	2	2		
11	Enzymology (Cont.) - Enzyme inhibitors as drugs	4	2	2		
12	Hemoglobin and porphyrins -Hb derivatives and types	4	2	2		
13	Hemoglobin and porphyrins(Cont.)	4	2	2		

	-Metabolism of Hb and regulation					
14	Biological oxidation and ATP synthesis	4	2	Practical exam		
15	Clinical correlations.	4	2	Practical exam		

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (Semester work)	Week 7	15	15%
2	Final Written Exam	Week 16-17	50	50%
3	Final Practical/Clinical/... Exam	Week 14 – 15	20	20%
4	Final Oral Exam	Week 16-17	10	10%
5	Assignments / Project /Portfolio/ Logbook	Week 2,5,11	5	5%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	<ol style="list-style-type: none"> 1. Abali, Emine Ercikan, et al. <i>Lippincott® illustrated reviews: biochemistry</i>. Lippincott Williams & Wilkins, 2025. 2. Harper's illustrated Biochemistry by Murray RK, Bender DA, Botham KM, Kennelly PJ, Rodwell VW, P. Anthony Weil PA (2018), 31th Edition, McGraw Hill. 3. Essential Biochemistry: Pratt CW and Cornely K (2017), 4th edition John Wiley & Sons Inc., USA.
	Other References	1-Biochemistry: Jeremy M. Berg, Lubert Stryer, John Tymoczko, Gregory Gatto (2019), 9th Edition, WH Freeman. 2- Biochemistry with Clinical Correlations, Devlin TM (2019), 8 th Edition ,Wiley-Liss INC, USA. 3- Biochemistry, Satyanarayana and Chakrapani (2020), 6 th Edition, Arunabha Sen USA.
	Electronic Sources (Links must be added)	http://www.freescience.info/Biology.php . www.highwire.com , www.google.com ,

		www.ncbi.nlm.nih.gov/pmc/ & www.ncbi.nlm.nih.gov/pmc/ www.ncbi.nlm.nih.gov/pmc/ www.ncbi.nlm.nih.gov/pmc/
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
	Other (to be mentioned)	1- Notes in Biochemistry I by staff-members of department of Biochemistry. 2- Lab Notes in Biochemistry I by staff-members of department of Biochemistry.
Supportive facilities & equipment for teaching and learning	Devices/Instruments	Laboratory facilities
	Supplies	Water bath, digital balances and other lab instruments
	Electronic Programs	---
	Skill Labs/ Simulators	---
	Virtual Labs	
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

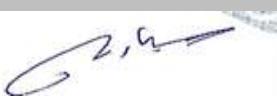
Course Plan

Week	Topic	Key Elements	Teaching & Learning Methods	Student Assessment Methods
1	Proteins - protein structure - biologically important peptides	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming,	Written, practical and oral exams
2	Proteins (Cont.) - fate of proteins	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming, assignment and presentation	Written, practical and oral exams
3	Amino acids - Structure - Classification - Use of amino acids in	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training,	Written, practical and oral exams

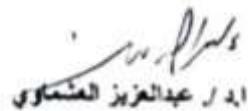
	biosynthesis of biomolecules		discussion, brain storming	
4	Carbohydrates -Structure -Classification	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
5	Carbohydrates (Cont.) - Glycoproteins and proteoglycans - Glucose transporters	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming, assignment and presentation	Written, practical and oral exams
6	Lipids - Classification of lipids - Digestion and absorption of lipids	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
7	Mid-term exam			
8	Lipids (Cont.) Cholesterol structure, metabolism, related diseases.	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
9	Lipids (Cont.) - Lipoprotein metabolism	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
10	Enzymology - Enzyme kinetics - Role of enzymes in regulation of biochemical reaction	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams

11	Enzymology (Cont.) - Enzyme inhibitors as drugs	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E- learning, practical training, discussion, brain storming, assignment and presentation	Written, practical and oral exams
12	Hemoglobin and porphyrins -Hb derivatives and types	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E- learning, practical training, discussion, brain storming	Written, practical and oral exams
13	Hemoglobin and porphyrins(Cont.) -Metabolism of Hb and regulation	1.1.1, 1.1.2, 1.1.3, 2.3.1, 2.3.2, 2.3.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E- learning, practical training, discussion, brain storming	Written, practical and oral exams
14	Biological oxidation and ATP synthesis	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E- learning, discussion, brain storming	Written, and oral exams
15	Clinical correlations..	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2, 3.1.3, 4.2.1, 4.2.2	Lectures, E- learning, discussion, brain storming	Written, and oral exams

Name and Signature
Course Coordinator
Dr/ Shima'a Ali



Name and Signature
Program Coordinator



د/ عبدالعزيز العنزي

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	General microbiology and genetics			
Course Code (according to the bylaw)	PM 401			
Department/s participating in delivery of the course	Microbiology and immunology department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practica I	Other (specify)	Total
	2	1	----	3
Course Type	Compulsory			
Academic level at which the course is taught	Second level , semester 2			
Academic Program	Bachelor of Pharmacy (Pharm D program)			
Faculty	Faculty of Pharmacy			
University	Kafrelsheikh University			
Name of Course Coordinator	DR. Nesma maged			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	Department Council			

2. Course Overview (Brief summary of scientific content)

This course covers a combination of laboratory and theoretical experience exploring the general aspects of microbiology. It includes knowledge of microorganisms, their morphology, diversity, cell structure and function, cultural characteristics, growth, metabolism, role of microorganisms in infectious diseases and microbial pathogenesis. It also clarifies different mechanisms of transport across bacterial cell membrane, metabolic pathways and physiology of bacteria. The course also covers the principles of genetic characters including DNA and RNA structures, replication, different forms of mutation and mutagenic agents. It also explores the basic concepts of microbial growth, cultivation and reproduction. It also provides the student with the concept of genetic engineering and its applications.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		Upon finishing this course, students will be able to integrate knowledge from basic microbiology and genetics science to know the different types of microbes, methods of cultivation and microbial genome structures. This competency will be developed via the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Identify microbial structures and functions (e.g., cell wall, membrane, organelles).
		1.1.2	Classify microorganisms based on taxonomy (bacteria, viruses, fungi, protozoa).
		1.1.3	Recognize microbial growth, reproduction, and nutritional requirements.
		1.1.4	Explain the structure and function of prokaryotic and eukaryotic cells .

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
		1.1.5	Describe genetic engineering, molecular biology, and principles of bioinformatics
DOMAIN 3: pharmaceutical care 3-1- COMPETENCY		<p>Upon finishing this course, students will be able to apply the principles of general microbiology and genetics to monitor and control microbial growth and participate in identification of the cause of the disease, manage diseases and infection control ...</p> <p>This competency will be developed via the following key elements:</p>	
3.1.2 Apply the principles of public health and pharmaceutical microbiology to select and assess proper methods of infection control.		3.1.1	Identify common bacterial, viral, and fungal pathogens relevant to public health concerns
		3.1.2	Use the microbiological information in prevention and control of different types of infections .
		3.1.3	Apply aseptic techniques to prevent microbial contamination in pharmaceutical and healthcare settings.
		3.1.4	Apply biosafety and biosecurity measures in laboratory and clinical settings to prevent disease transmission.
Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
3.1.3 Monitor and control microbial growth and carry out laboratory tests for identification of infections/diseases		3.1.5	Identify microorganisms through microscopy, staining, and biochemical tests.
		3.1.6	Apply culture-based techniques for microbial identification
		3.1.7	Utilize aseptic techniques for safe handling of microorganisms in laboratory setting

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
		3.1.8	Interpret results from laboratory tests to confirm bacterial identification.
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their chemotherapeutic approaches	3.1.9	Identify microorganisms (bacteria, viruses, and Fungi)
		3.1.10	Apply laboratory techniques to identify microorganisms.

4. Teaching and Learning Methods

- 1- Lectures (✓)
- 2- E-learning (✓)
- 3- Practical training/ laboratory (✓)
- 4- Assignment (✓)
- 5- Presentation (✓)
- 6- Virtual lab (✓)
- 7- Discussion (✓)

Course Schedule

		Expected number of the Learning Hours				
Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Theoretical teaching (lectures/discussion groups/.....)	Training (Practical /Clinical/.....)	Self-learning (Tasks/Assignments/Projects/...)	Other (to be determined)
	Introduction (eukaryotic & prokaryotic) and microbial diversity	4	2	2		
2	Characterization, classification and identification of bacteria.	4	2	2		
3	Morphology and fine structures of prokaryotes.	4	2	2		
4	Cell wall of bacteria	4	2		2	
5	Structure internal to cell wall	4	2	2		
6	Transport of solutes across cell membrane	4	2	2		
7	Periodical exam					
8	Cultivation of bacteria	4	2	2		
9	Bacterial physiology	4	2	2		
10	Reproduction and growth of bacteria	4	2	2		

11	Macromolecular biosynthesis in bacteria	4	2	2		
12	Structure and classification of fungi	4	2	2		
13	Ultrastructure and classification of viruses	4	2	2		
14	Introduction of genetic engineering & molecular biology	2	2	Practical exam		
15	Principles of bioinformatics	2	2	Practical exam		

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam1 written (formative exam)	Week 6	Training	-----
2	Periodical exam	Week 7	15	15%
3	Final Written Exam	Week 16 -17	50	50%
4	Final Practical Exam	Week 14-15	25	25%
5	Final Oral Exam	Week 16-17	10	10%
6	Assignments /Portfolio/ Logbook	Week13-14	---	---

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	<p>-Microbiology: An Introduction (13th Edition). Tortora, Funke and Case.2020.</p> <p>-Brock Biology of Microorganisms (14th Edition) 2020. Madigan, Martinko, Bender, Buckley</p> <p>Bruslind, Linda. "General microbiology ." (2023)</p> <p>Parker, N., Schneegurt, M., Tu, A. H. T., Lister, P., & Forster, B. M Microbiology .(2021)</p>
	Other References	Notes and Lab manual prepared by the department staff.
	Electronic Sources (Links must be added)	www.sciencedirect.com http://www.ekb.eg
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Laboratory facilities (Equipment of factory).
	Supplies	Incubator, autoclave and other lab instruments
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	<ul style="list-style-type: none"> ▪ Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

Course CLOs Matrix-Teaching and Learning Strategy and Student Assessment

Course title: general microbiology and genetics

pharm D

Course code: PM 401

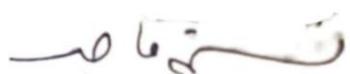
Week #	Course content	Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Introduction (eukaryotic & prokaryotic) and microbial diversity	1.1.1, 1.1.2 1.1.4 3.1.1. 3.1.3 3.1.4	Lectures, E-learning and practical training.	practical , written and oral exams
Week # 2	Characterization, classification and identification of bacteria.	1.1.2. 1.1.4. 3.1.1 3.1.2. 3.1.3. 3.1.4 3.1.5. 3.1.7. 3.1.8. 3.1.9. 3.1.10	Lectures, E-learning, practical training, and Discussion	practical , written and oral exams
Week # 3	Morphology and fine structures of prokaryotes.	1.1.1, 1.1.4 3.1.1 3.1.2 3.1.3 3.1.4 3.1.5 3.1.7	Lectures, E-learning, practical training and Virtual lab	practical , written and oral exams
Week # 4	Cell wall of bacteria	1.1.1, 1.1.4 3.1.1 3.1.2 3.1.3 3.1.4 3.1.5 3.1.7	Lectures, E-learning and practical training	practical ,final and oral exams
Week # 5	Structure internal to cell wall	1.1.1. 1.1.4 3.1.2 3.1.3. 3.1.4 3.1.7	Lectures, E-learning, practical training and virtual lab.	practical , written and oral exams
Week # 6	Transport of solutes across cell membrane	1.1.1 1.1.3 1.1.4 3.1.2 3.1.3 3.1.4 3.1.7	Lectures, E-learning and practical training.	practical , written and oral exams
Week # 7	Periodical exam			

Week # 8	Cultivation of bacteria	3.1.2 3.1.3. 3.1.4 3.1.6. 3.1.7	Lectures, E-learning, practical training, and Discussion	practical , written and oral exams
Week # 9	Bacterial physiology	1.1.1 1.1.3 1.1.4 3.1.2 3.1.3 3.1.4 3.1.7	Lectures, E-learning and practical training	Practical, written and oral exams
Week # 10	Reproduction and growth of bacteria	1.1.3 3.1.2. 3.1.3. 3.1.4 3.1.7	Lectures, E-learning and practical training	Practical, written and oral exams
Week # 11	Macromolecular biosynthesis in bacteria	1.1.3 3.1.2 3.1.3 3.1.4 3.1.7	Lectures, E-learning, practical training, and Assignment	Practical, written and oral exams
Week # 12	Structure and classification of fungi	1.1.1. 1.1.2. 1.14 3.1.2. 3.1.3. 3.1.4. 3.1.7. 3.1.9	Lectures, E-learning, practical training and presentation	practical , written and oral exams
Week # 13	Ultrastructure and classification of viruses	1.1.2 1.1.1. 1.1.4 3.1.2 3.1.3 3.1.4 3.1.9	Lectures, presentation, assignment and E-learning	Practical, written and oral exams
Week # 14	Introduction of genetic engineering & molecular biology	3.1.4 3.1.5	Lectures, assignment and E-learning	Written and oral exams
Week # 15	Principles of bioinformatics	3.1.4. 3.1.5	Lectures, Discussion and E-learning	Written and oral exams

Name and Signature

Course Coordinator

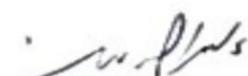
Dr.Nesma Elkemary



Name and Signature

Program Coordinator

Prof.Abdelaziz Elashmawy



Course Specification

2025

1. Basic Information

Course Title (according to the bylaw)	Immunology			
Course Code (according to the bylaw)	PM 402			
Department/s participating in delivery of the course	Microbiology and immunology department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practica 1	Other (specify)	Total
	1	0	----	1
Course Type	Compulsory			
Academic level at which the course is taught	Second level , second semester			
Academic Program	Bachelor of Pharmacy (Pharm D program)			
Faculty	Faculty of Pharmacy			
University	Kafrelsheikh University			
Name of Course Coordinator	Dr. Nesma Elkemary			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	Department Council			

2. Course Overview (Brief summary of scientific content)

The course provides students concepts of medical immunology, with an emphasis on host-parasite relationship, Non-specific and specific immunity, Mechanism of protective immunity. Molecular and cellular immunology, including antigen and antibody structure, function and reaction between them, effector mechanisms, complement, and cell mediated immunity. Active and passive immunization. Hypersensitivity and in vitro antigen antibody reactions, Immuno-deficiency disorders, Autoimmunity and auto-immune disease, organ transplantation..

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		Upon finishing this course, students will be able to integrate knowledge from basic medical immunology to understand the human immune system and different immune and auto immune disorders This competency will be developed via the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	the structure and major components of the human mammalian immune system
		1.1.2	the functions of primary and secondary lymphoid organs and immune cells
		1.1.3	Identify examples of immune dysregulation, such as hypersensitivity, immunodeficiency and autoimmunity
		1.1.4	Recognize the mechanisms of innate immunity including physical, chemical, and cellular defenses.
1.1.5	Retrieve information from fundamental sciences to solve therapeutic	1.1.5	Recall fundamental concepts of the immune system, including cells, organs, and molecules of immunity

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	problems.	1.1.6	Apply immunological principles to explain .the pathogenesis of immune-related diseases
		1.1.7	Relate laboratory immunological tests to .diagnosis and therapeutic decision-making
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	1.1.8	Identify newly emerging immunological challenges impacting the pharmaceutical industry
		1.1.9	Compare traditional and modern immune-targeted therapeutic strategies
		1.1.10	Assess the potential risks and benefits of innovative immunological treatments
		<p>Upon finishing this course, students will be able to actively share professional decisions and proper actions to save patient's life in emergency situations including immuno-responses and hypersensitivity toward various drugs or during the process of organ transplantation.</p> <p>This competency will be developed via the following key elements:</p>	
2.4.2	Demonstrate understanding of the first aid measures needed to save patient's life.	2.4.1	Describe immune-mediated emergency conditions such as anaphylaxis and severe .allergic reactions
		2.4.2	Identify early immunological warning signs of life-threatening conditions (e.g., airway .(swelling, systemic urticaria
		2.4.3	Illustrate first aid measures for immune-mediated angioedema and acute asthma exacerbations
		2.4.4	Explain immediate care steps for immunocompromised patients with acute infections
2.4.3	Take actions to solve any identified medicine-related and	2.4.5	Identify medicine-related problems in patients receiving immunomodulatory or immunosuppressive therapy

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	pharmaceutical care problems.	2.4.6	Recommend appropriate adjustments in immunotherapy regimens to optimize patient outcomes.
		2.4.7	Evaluate the effectiveness of interventions in resolving immune-related medication problems.
2.4.4	Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens	2.4.8	Apply immunological assays (e.g., ELISA) to detect toxins or immune biomarkers in biological specimens
		2.4.9	Analyze mechanisms by which xenobiotics modulate or suppress immune responses.
2-5- COMPETENCY		Upon finishing this course, Students will be able to contribute to immunology-related pharmaceutical research and clinical studies essential for developing and authorizing immune-based therapies and medicinal products. This competency will be developed via the following key elements:	
2.5.2	Retrieve, interpret, and critically evaluate evidence-based information needed in pharmacy profession.	2.5.1	Apply evidence-based guidelines in the selection and monitoring of immunological therapies
		2.5.2	Interpret clinical and laboratory data relevant to immunotherapy and immune disorders.
		2.5.3	Evaluate research evidence on the efficacy and safety of immune-based treatments
Domain 3: Pharmaceutical Care 3-1 - Competency		Upon finishing this course, students will be able to apply immunological principles of body functions to participate in improving health care services using evidence-based data. This competency will be developed via the following key elements:	
3.1.1		3.1.1	Explain the genetic and genomic basis of immune system development and regulation

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	Apply the principles of body function and the basis of genomics in health and disease states to manage different diseases.	3.1.2	Evaluate the role of genomics in predicting treatment outcomes and adverse immune reactions
		3.1.3	Analyze genomic variations associated with immune-related diseases (e.g., autoimmune disorders, immunodeficiencies)
3.1.2	Apply the principles of public health and pharmaceutical microbiology to select and assess proper methods of infection control.	3.1.4	Explain the role of the immune system in natural and acquired protection against pathogens
		3.1.5	Identify immune-based strategies for infection control, including vaccination and passive immunization.
		3.1.6	Interpret epidemiological data related to immune-preventable infectious disease.
3.1.3	Monitor and control microbial growth and carry out laboratory tests for identification of infections/diseases.	3.1.7	Describe immune mechanisms involved in controlling microbial growth within the host
		3.1.8	Interpret laboratory test results to confirm infectious diseases and assess immune status
		3.1.9	Integrate laboratory findings with clinical and immunological data to guide infection management
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.	3.1.10	Discuss the epidemiology and modes of transmission of immune-mediated and infectious conditions.
		3.1.11	Identify appropriate laboratory diagnostic tests for detecting immune-related and infectious diseases.
		3.1.12	Define the etiology of immune-related and infectious diseases, including causative agents
3-2- COMPETENCY		Upon finishing this course, students will be able to provide counseling and education services to patients and communities about safe and rational use of immunological therapies , vaccines and related medical devices .	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
		This competency will be developed via the following key elements:	
3.2.4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.	3.2.1	Outline the sources and categories of drugs and xenobiotics capable of inducing immunotoxicity
		3.2.2	Discuss mechanisms by which xenobiotics affect or suppress immune system function
		3.2.3	Perform appropriate immunological and biochemical tests to detect toxic agents in biological specimens.
		3.2.4	Formulate management and control strategies for immunotoxic conditions.

4. Teaching and Learning Methods

- 1- Lectures (✓)
- 2- E-learning (✓)
- 3- presentation (✓)
- 4- Assignment (✓)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/)	Training (Practical /Clinical/)	Self-learning (Tasks/Assignments/Projects/...)	Other (to be determined)
1	Host parasit relationship- structure of immune system	1	1			
2	Innate immune system	1	1			
3	Non specific immune response	1	1			
4	Aquired immune system, antigen and antibody structure	1	1			
5	Biological functions and genetics of immunoglobulin	1	1			
6	Hypersensitivity reactions (type I, II)	1	1			
7	Periodical exam	1	1			
8	Hypersensitivity reactions (type III, IV)	1	1			
9	Autoimmunity&autoimmune diseases	1	1			
10	Autoimmunity&autoimmune diseases	1	1			
11	1ry and 2ndy immunodeficiency disease	1	1			

12	1ry and 2ndy immunodeficiency disease	1	1			
13	Organ transplantation	1	1			
14	Organ transplantation	1	1			
15	Revision	1	1			

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (formative exam)	6	---	---
2	Periodical exam	7	15	15%
3	Final Written Exam	(16-17)	75	75%
4	Final Oral Exam	(16-17)	10	10%
5	Assignment	(13-14)	---	---

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Rich, Robert R., et al., eds. Clinical Immunology E-Book: Principles and Practice. Elsevier Health Sciences, 2022. - Parija, Subhash Chandra. Textbook of microbiology and immunology. Berlin, Heidelberg, Germany: Springer, 2023.
	Other References	Notes on Immunology prepared by department staff members.
	Electronic Sources (Links must be added)	www.ncbi.nlm.nih.gov/pmc/ www.ncbi.nlm.nih.gov/pmc/
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	----
	Supplies	----
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	<ul style="list-style-type: none"> ▪ Class rooms, Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

Matrix of course learning outcomes CLOs – Teaching and Learning Strategy and Student Assessment

Course title: Immunology Course code: PM 402

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Host parasit relationship-structure of immune system	1.1.1, 1.1.2, 1.1.5, 3.1.7	Lectures and E-learning,	Written and oral exams
Week # 2	Innate immune system	1.1.2, ,1.1.4, 2.4.4, 2.4.9, 3.1.4, 3.1.8, 3.1.9, 3.1.10	Lectures and E-learning,	Written and oral exams
Week # 3	Non specific immune response	1.1.5, 1.1.8, 2.4.9, 3.1.4, 3.1.8, 3.1.9, 3.1.10	Lectures and E-learning,	Written and oral exams
Week # 4	Aquired immune system, antigen and antibody structure	1.1.2, ,1.1.8, 1.1.10, 2.4.9, 3.1.4, 3.1.10, 3.1.11	Lectures and E-learning,	Written and oral exams
Week # 5	Biological functions and genetics of immunoglobulin	1.1.9, 1.1.10, 2.4.6 2.4.8, 2.5.11, 3.1.4, 3.1.10	Lectures, presentation and E-learning,	Written and oral exams
Week # 6	Hypersensitivity reactions (type I, II)	1.1.3, 1.1.6, 2.4.1, 2.4.2, 2.4.3, 2.4.9, 2.5.1, 3.1.2, 3.1.12, 3.2.4	Lectures and E-learning,	Written and oral exams
Week # 7	Periodical exam			
Week # 8	Hypersensitivity reactions (type III, IV)	1.1.3, 1.1.6, 2.4.1, 2.4.2, 2.4.3, 2.4.9, 2.5.1, 3.1.2, 3.1.12, 3.2.4	Lectures and E-learning,	Written and oral exams
Week # 9	Autoimmunity&autoimmune diseases	1.1.3, 1.1.6, 2.4.3, 2.4.4, 2.4.5, 2.4.8, 2.51, 3.1.3, 3.1.9, 3.2.3	Lectures, presentation and E-learning,	Written and oral exams
Week # 10	Autoimmunity&autoimmune diseases	1.1.3, 1.1.6, 2.4.3, 2.4.4, 2.4.5, 2.4.8, 2.51, 3.1.3, 3.1.9, 3.2.3	Lectures and E-learning,	Written and oral exams
Week # 11	1ry and 2ndy immunodeficiency disease	1.1.6, 1.1.7, 1.1.10, 2.4.4, 2.4.5, 2.5.1, 2.4.6, 2.5.2	Lectures and E-learning,	Written and oral exams

Week # 12	1ry and 2ndy immunodeficiency disease	1.1.6, 1.1.7, 1.1.10, 2.4.4, 2.4.5, 2.5.1, 2.4.6, 2.5.2	Lectures and E- learning,	Written and oral exams
Week # 13	Organ transplantation	1.1.6, 1.1.7, 1.1.9, 1.1.10, 2.4.6, 2.4.7, 2.4.8, 2.5.1, 2.5.3, 3.1.1, 3.1.2, 3.1.5, 3.2.1, 3.2.3	Lectures, Assignment and E-learning	Written and oral exams
Week # 14	Organ transplantation	1.1.6, 1.1.7, 1.1.9, 1.1.10, 2.4.6, 2.4.7, 2.4.8, 2.5.1, 2.5.3, 3.1.1, 3.1.2, 3.1.5, 3.2.1, 3.2.3	Lectures, Assignment and E-learning	Written and oral exams
Week # 15	Revision	1.1.3, 1.1.6, 1.1.9, 2.4.1, 2.4.7, 2.5.1, 3.1.2, 3.1.7, 3.2.4	Lectures and E- learning	Written and oral exams

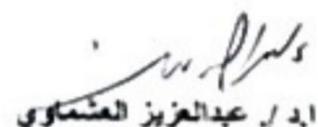
**Name and Signature
Course Coordinator**

Dr. Nesma Elkemary



**Name and Signature
Program Coordinator**

Prof. Dr. Abdel Aziz El-Ashmawy





Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Instrumental Analysis			
Course Code (according to the bylaw)	PA 404			
Department/s participating in delivery of the course	Pharmaceutical Analytical Chemistry department			
Number of credit hours/points of the course (according to the bylaw)	Theoretica 1 2	Practical 1	Other (specify) ----	Total 3
Course Type	Compulsory			
Academic level at which the course is taught	Second Level, Second semester			
Academic Program	Bachelor in pharmacy (Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof.Dr. Fathalla Belal			
Course Specification Approval Date	1/9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	Department council			

2. Course Overview (Brief summary of scientific content)

This course covers the composition and mechanism of each studied instrument, the theory and application of spectrophotometry, spectroflourometry and chromatography, the studied quantitative methods for determination of different pharmaceutical compounds, and the usage of most appropriate standardization method and interpretation of data obtained from analytical procedures.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- Competency		Upon finishing this course, students will be able to integrate knowledge from basic analytical chemical techniques to identify as well as quantify different active pharmaceutical ingredients either authentic or in different pharmaceutical formulations in addition to biological samples. This competency will be developed through understanding the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Discuss Principles of basic analytical chemistry techniques and their applications.
		1.1.2	Demonstrate different analytical techniques under good laboratory practice to validate and assure quality of pharmaceutical material and products.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
1.1.3	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.	1.1.3	Integrate information from different scientific resources on recent technologies that contribute to pharmaceutical analytical chemistry in quality control labs.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-2- Competency		<p>Upon finishing this course, students will be able to determine pharmaceutical active ingredients and their stability in formulations as well as inspection of their shelf lives in addition to calibration of instrumentations.</p> <p>This competency will be developed via the following key elements:</p>	
2.2.1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/natural pharmaceutical materials.	2.2.1	Employ international guidelines concerning QC and QA in sampling, stability indicating assays on storage and incompatibility problems.
		2.2.2	Apply the basic chemical knowledge to suggest new synthesized active molecules, purification of active pharmaceutical ingredients of adulterants and impurities in addition to qualitative and quantitative of pharmaceutical compounds including the required technical skills at all aspects of chemistry like physical, analytical and organic ones.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
2.2.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	2.2.3	Select and develop analytical methodologies to ensure that the results obtained comply with the pharmacopeial international specifications of both synthetic or natural authentic samples in addition to pharmaceuticals.
2.2.3	Recognize the principles of various tools and instruments and select the proper techniques for synthesis and analysis of different materials and production of pharmaceuticals.	2.2.4	Apply the theories of different analytical techniques and the operational basis of different instrumentations.
2-3- Competency		<p>Upon finishing this course, students will be able to Proper dealing with samples containing active pharmaceutical ingredients either biological, pharmaceutical product or even authentic without deterioration in a manner keeping their physical and chemical characteristics in accordance to national and international regulations.</p> <p>This competency will be developed via the following key elements:</p>	
2.3.1	Handle, identify, and dispose biologicals, synthetic/natural materials, biotechnology-based and radio-labeled products, and other materials/products used in pharmaceutical fields.	2.3.1	Identify the Proper treatment of different samples of pharmaceutical interest like those are natural, authentic, nano-formulated, radioactive and pharmaceutical products as well as their characterization.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products.	2.3.2	Recognize the regulations for safe dealing with active pharmaceutical ingredients
		2.3.3	Apply standard operating procedures (SOPs) to ensure compliance with GMP and GLP during handling.
2-5- Competency		<p>Upon finishing this course, students will be able to</p> <p>Participate in optimizing as well as validation of newly developed analytical methods for accurate determination of pharmaceutical products.</p> <p>This competency will be developed via the following key elements</p>	
2.5.1	Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements.	2.5.1	Perform analytical identification of analytes as raw materials, in dosage forms or in biological fluids as well as determination of their concentration in accordance to ethical research regulations
2.5.3	Contribute in planning and conducting research studies using appropriate methodologies.	2.5.2	Apply relevant guidelines (ICH, WHO, and FDA) in quality control process
<p>Domain 4: Personal Practice</p> <p>4-3- Competency</p>		<p>Upon finishing this course, students will be able to</p> <p>Express self-motivation and continuous learning in order to attain high professional level at the analytical chemistry as an area of expertise as a lecturer as well as a researcher.</p> <p>This competency will be developed via the following key elements:</p>	
4.3.1	Perform self-assessment to enhance professional and personal competencies.	4.3.1	Perform self-improvements on both academic and research professional levels at all aspects of pharmaceutical analytical chemistry.

4. Teaching and Learning Methods

- 1- Lectures
- 2- E-learning
- 3- Practical training/ laboratory
- 4- presentation
- 5- Discussion
- 6- Brain storming
- 7- Assignments
- 8- Case study

Course Schedule						
Number of the Week	Scientific content of the course (Course Topics)	Total week hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/)	Training (Practical/Clinical/)	Self-learning (Tasks/Assignments/Projects/ ...)	Other (to be determined)
1	Spectroscopy Electromagnetic Radiation, Light as energy, types of shift, Effect of pH on absorption spectra	4	2	2		
2	Spectrophotometry Instrumentation, Colorimetry, General requirements of the colored product, General requirement of an ideal chromogen	4	2	2		
3	Spectrophotometer, Light sources, Monochromators, Sample compartment, Types of detectors, Signal processor (meter or recorder)	4	2	2		
4	Application of UV-Visible-spectrophotometry	4	2	2		
5	Luminescence, molecular emission, theory of fluorescence and phosphorescence, fluorescence spectra, instrumentation	4	2	2		
6	Advantage of spectroflurometry factors affecting fluoresce intensity, application of spectroflurometry.	4	2	2		
7	Periodical exam					
8	Atomic absorption	4	2	2		

9	Flame emission	4	2	2		
10	Chromatography ▪ Introduction, comparison between the classical and modern L.C	4	2	2		
11	Chromatography ▪ Theoretical aspects , principles, parameters and techniques of chromatography	4	2	2		
12	Chromatography Factors governing the retention compounds, HPLC detectors	4	2	2		
13	Column chromatography and TLC	4	2	2		
14	Gas chromatography	2	2	Practical exam		
15	Capillary electrophoresis; types, detectors	2	2	Practical exam		

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Periodical exam	Week 7	15	15%
2	Final Written Exam	Week 16,17	50	50%
3	Final Practical/Clinical/... Exam	Week 14,15	20	20%
4	Final Oral Exam	Week 16,17	10	10%
5	Assignments / Project /Portfolio/ Logbook	Week 9	5	5%

6. Learning Resources and Supportive Facilities

Learning resources (books,	The main (essential) reference for the course (must be written in full according to the scientific documentation)	1. D.A.skoog,D.M.west ,F.J holler and S.R. crouch , "fundamentals of analytical chemistry", latest edition, book/cole-thomson learning, inc.
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scientific references, etc.)	method)	2. G. D. Christian and J. E. O'reilly, "instrumental analysis", latest edition, Allyn and Bacon, inc.
	Other References	<ul style="list-style-type: none"> - Notes on instrumental analysis for second year pharmacy students, prepared and distributed by Dept. of Pharmaceutical Analytical Chemistry. - Lab manual of instrumental analysis for second year pharmacy students, prepared and distributed by Dept. of Pharmaceutical Analytical Chemistry.
	Electronic Sources (Links must be added)	http://ull.chemistry.uakron.edu/analytical/
	Learning Platforms (Links must be added)	<u>https://lms3.kfs.edu.eg/pharm/login/index.php</u>
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning	Devices/Instruments	Laboratory facilities like pH meters, UV-VIS spectrophotometer, and HPLC
	Supplies	Chemicals and analytical tools
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	<ul style="list-style-type: none"> ▪ Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

Matrix of course learning outcomes CLOs – Teaching and Learning Strategy and Student Assessment

Course title: Instrumental Analysis

Course code: PA 404

Week	Topic	Key elements	Teaching and Learning Methods	Student Assessment Methods
1	Spectroscopy Electromagnetic Radiation, Light as energy, types of shift, Effect of pH on absorption spectra	1.1.1,1.1.2,1.1 .3,2.2.4,2.5.1, 2.5.2,4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
2	Spectrophotometry Instrumentation, Colorimetry, General requirements of the colored product, General requirement of an ideal chromogen	1.1.1,1.1.2,1.1 .3,2.2.4,2.3.3, 2.5.1, 2.5.2	Lectures, practical training, E-learning and class activity	Written, practical and oral exams
3	Spectrophotometer, Light sources, Monochromators, Sample compartment, Types of detectors, Signal processor (meter or recorder)	1.1.1,1.1.2,1.1 .3,2.2.3,2.2.4, 2.3.3,2.5.1, 2.5.2	Lectures, practical training, E-learning and class activity	Written, practical and oral exams
4	Application of UV-Visible-spectrophotometry	1.1.1,1.1.2,1.1 .3,2.2.1,2.2.2, 2.2.4,2.3.3,2.5 .1,2.5.2	Lectures, practical training, E-learning and class activity	Written, practical and oral exams
5	Luminescence, molecular emission, theory of fluorescence and phosphorescence, fluorescence spectra, instrumentation	1.1.1,1.1.2, 1.1.3, 2.2.4, 2.5.1, 2.5.2,4.3.1	Lectures, practical training, E-learning and class activity	Written, practical and oral exams
6	Advantage of spectroflurometry factors affecting fluoresce intensity, application of spectroflurometry.	1.1.1, 4.3.1	Lectures, practical training, E-learning and class activity	Written, practical and oral exams

7	Periodical exam			
8	Atomic absorption	1.1.1,1.1.2,1.1 .3,2.2.4,2.3.2, 2.5.1,2.5.2,4.3 .1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
9	Flame emission	1.1.1,1.1.2,1.1 .3,2.2.4,2.3.2, 2.3.3,2.5.1,2.5 .2,4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
10	Chromatography ▪ Introduction, comparison between the classical and modern L.C	1.1.1, 4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
11	Chromatography ▪ Theoretical aspects, principles, parameters and techniques of chromatography	1.1.1,2.2.4,2.3 .2,2.3.3,2.5.1, 2.5.2,4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
12	Chromatography Factors governing the retention compounds, HPLC detectors	1.1.1, 4.3.1	Lectures, class activity, E-learning and brain storming	Written and oral exams
13	Column chromatography and TLC	1.1.1,2.2.3, 2.2.4, 2.3.1, 2.3.2, 4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
14	Gas chromatography	1.1.1,2.2.3,2.2 .4,2.3.1, 2.3.2, 4.3.1	Lectures, class activity, E-learning and brain storming	Written and oral exams
15	Capillary electrophoresis; types, detectors	1.1.1,2.2.3, 2.2.4, 2.3.1,2.3.2, 4.3.1	Lectures, class activity, E-learning and brain storming	Written and oral exams

Name and Signature
Course Coordinator
Prof.Dr. Fathalla Belal



Name and Signature
Program Coordinator
Prof.Dr. Abd El-Aziz Elashmawy



Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Pathology and pathophysiology			
Course Code (according to the bylaw)	MD 406			
Department/s participating in delivery of the course	Pathology department, Faculty of Medicine			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	2	---	----	2
Course Type	compulsory			
Academic level at which the course is taught	Second Level, Semester (2)			
Academic Program	Bachelor of pharmacy (PharmD)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof. Eman Said Prof. Hany Borg			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	Department council			

2. Course Overview (Brief summary of scientific content)

This course provides the students with knowledge and skills for common diseases affecting body organs and system. It helps the student to understand the causes (etiology) of disease, the mechanisms of its development (pathogenesis) and the associated alterations of structure (morphological changes) and function (clinical manifestations and complications) to be able to determine the most likely diagnosis of the disease. Pathophysiology Introduction to pathophysiology, cell injury, inflammation and immune response, autonomic nervous system in health and disease, endocrine disorders, pancreatic disorders, fluid and electrolyte imbalance, vascular and hematological disorders, disease of urinary, pulmonary and digestive systems.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		On successful completion of the course, the student should be able to efficiently demonstrate the essential knowledge and understanding of pathogenesis and the associated morphological changes. This competency will be developed via the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Demonstrate the different disease processes encountered, their causes (etiology), and how the disease develops in response to the etiologic agents (pathogenesis).
		1.1.2	Demonstrate the characteristic gross and microscopic pictures of different pathologic lesions within specific organ system and the associated functional disturbances .
		1.1.3	Identify the fate and complications of different disease processes.
1.1.2	Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	1.1.4	Utilize the proper medical terms and abbreviations for common diseases affecting body organs and systems.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 3: Pharmaceutical Care 3-1- COMPETENCY		<p>Apply the principles of body functions to participate in improving health care services using evidence-based data.</p> <p>This competency will be developed via the following key elements:</p>	
3.1.1	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	3.1.1	Measure of body functions by different laboratory techniques
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.	3.1.2	Apply effectively different diagnostic pathological tools.
		3.1.3	Apply effectively the pathologic pictures of different disorders based on gross and microscopic pictures aiming at reaching a correct diagnosis.
		3.1.4	Monitor and assess the different laboratory techniques for handling pathological samples.

4. Teaching and Learning Methods

- 1- Lectures (✓)
- 2- E-learning (✓)
- 3- Practical training/ laboratory (X)
- 4- Class activity (✓)

Course Schedule						
Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/.....)	Training (Practical /Clinical/.....)	Self-learning (Tasks/Assignments / Projects/...)	Other (to be determined)
1	Introduction & inflammation	2	2	-----	-----	-----
2	Inflammation & repair	2	2	-----	-----	-----
3	Degeneration	2	2	-----	-----	-----
4	Disturbance of pigment ,necrosis & apoptosis	2	2	-----	-----	-----
5	Circulatory disturbances	2	2	-----	-----	-----
6	Circulatory disturbances& gangrene	2	2	-----	-----	-----
7	Periodical exam					
8	Granulomas	2	2	-----	-----	-----
9	Granulomas &mycotic infections	2	2	-----	-----	-----
10	Viral & Protozoal diseases	2	2	-----	-----	-----
11	Genetic disorders & ionizing radiation	2	2	-----	-----	-----
12	Growth disturbances	2	2	-----	-----	-----
13	Neoplasia	2	2	-----	-----	-----
14	Cardiovascular & respiratory systems	2	2	-----	-----	-----
15	Gastrointestinal & Urinary systems	2	2	-----	-----	-----

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Periodical exam	7	15	15%
2	Final Written Exam	16,17	75	75%
3	Final Oral Exam	16,17	10	10%
4	Total		100	100%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Robbins & Cortan pathologic basis of disease 10 th edition (2020) Crash course pathology by Olivia and Isabel Woodman 5 th edition (2019).
	Other References	Notes manual prepared by the department staff.
	Electronic Sources (Links must be added)	http://www.PATHMAX.com www.cms.nelc.educ.eg
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
	Other (to be mentioned)	Walter & Israel General pathology 6 th edition . BRS pathology by Schneider and Szanto 5th edition
Supportive facilities & equipment for teaching and learning	Devices/Instruments	----
	Supplies	----
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	Classrooms. Projectors (Overhead, video projector) Computers, Internet and Library.

Course Plan

Matrix of course learning outcomes CLOs – Teaching and Learning Strategy and Student Assessment

Course title: Pathology and pathophysiology

Course code: MD 406

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Introduction & inflammation	1.1.1, 1.1.4	Lectures and brainstorming	Written and oral exams
Week # 2	Inflammation & repair	1.1.1, 3.1.1, 3.1.2	Lectures and brainstorming	Written and oral exams
Week # 3	Degeneration	1.1.1, 1.1.2, 1.1.4, 3.1.1, 3.1.2,	Lectures and brainstorming	Written and oral exams
Week # 4	Disturbance of pigment, necrosis & apoptosis	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2	Lectures and brainstorming	Written and oral exams
Week # 5	Circulatory disturbances	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2	Lectures and brainstorming	Written and oral exams
Week # 6	Circulatory disturbances& gangrene	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2	Lectures and brainstorming	Written and oral exams
Week # 7	Periodical exam			
Week # 8	Granulomas	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2	Lectures and brainstorming	Written and oral exams
Week # 9	Granulomas & mycotic infections	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2	Lectures and brainstorming	Written and oral exams
Week # 10	Viral & Protozoal diseases	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2 3.1.3	Lectures and brainstorming	Written and oral exams

Week # 11	Genetic disorders & ionizing radiation	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2 3.1.3	Lectures and brainstorming	Written and oral exams
Week # 12	Growth disturbances	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2 3.1.3	Lectures and brainstorming	Written and oral exams
Week # 13	Neoplasia	1.1.1, 1.1.2, 1.1.3, 3.1.1, 3.1.2 3.1.3, 3.1.4	Lectures and brainstorming	Written and oral exams
Week # 14	Cardiovascular & respiratory systems	1.1.1, 1.1.3, 3.1.1, 3.1.2 3.1.3	Lectures and brainstorming	Written and oral exams
Week # 15	Gastrointestinal & Urinary systems	1.1.1, 1.1.3, 3.1.1, 3.1.2 3.1.3, 3.1.4	Lectures and brainstorming	Written and oral exams

**Name and Signature
Course Coordinator**

Prof. Eman Said
Prof. Hany Borg

**Name and Signature
Program Coordinator**

Prof. Abd El -aziz El-said



Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutics- II			
Course Code (according to the bylaw)	PT 404			
Department/s participating in delivery of the course	Pharmaceutics and Pharmaceutical Technology			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	2	1	----	3
Course Type	compulsory			
Academic level at which the course is taught	Second level, semester (2)			
Academic Program	Bachelor of Pharmacy (Pharm D.)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof. Abd El-Aziz El-Said Lecturer. Walid Anwar			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	Department council			

2. Course Overview (Brief summary of scientific content)

This course covers the structure and function of the skin, target area of treatment after topical application to skin, basic principles of diffusion through membranes and factors affecting percutaneous absorption, enhancement of skin penetration, transdermal drug delivery systems (TDDS). It also describes the principles and techniques involved in the formulation and manufacturing of traditional dermatological semisolid dosage forms (creams, ointments, gels and pastes) and cosmetic products.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		Upon finishing this course, students will be able to integrate knowledge from basic pharmaceutical science to formulate different classes of semisolid dosage forms as a preliminary step in the manufacture of therapeutic and cosmetic products. This competency will be developed via the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Discuss the factors affecting percutaneous absorption of drugs
		1.1.2	Recognize different methods of enhancing percutaneous absorption of drgs.
		1.1.3	Describe the transdermal therapeutic systems.
		1.1.4	Classify different bases used in formulation of ointments, creams and cosmetic formulation
1.1.3	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of	1.1.5	Express knowledge of methods of preparation of ointment, creams and cosmetic products.
		1.1.6	Review the role of formulation design and additives in modifying elegancy and appearance of cosmetic preparation.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	synthetic/natural pharmaceutical materials/products.	1.1.7	List the specifications of semisolid products.
		1.1.8	Discuss the factors affecting stability of semisolid dosage forms.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-2- COMPETENCY		<p>Upon finishing this course, students will be able to formulate and manufacture different semisolid dosage forms and participate in systems for dispensing, storage, and distribution of all semisolid dosage forms.</p> <p>This competency will be developed via the following key elements:</p>	
2.2.1	Isolate, design, identify, synthesize, purify, analyze and standardize synthetic/natural pharmaceutical materials.	2.2.1	Formulate and prepare creams and ointment according to good pharmaceutical practices.
		2.2.2	Design and adjust formulations considering patient needs and therapeutic requirements
2.2.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	2.2.3	Apply the rules of manufacturing, storage and transportation of semisolid dosage forms.
		2.2.4	Formulate topical formulations for local and transdermal effects based on pharmaceutical knowledge.
		2.2.5	Understand the fundamental aspects of semisolid cosmetic formulations, which include all formulations intended for cleansing and/or beautifying the human body.
		2.2.6	Select the best enhancer for a given transdermal therapeutic system.
		2.2.7	Select the best topical formulation based on the disease state of the patient and the required effect.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
		2.2.8	Recognize factors affecting stability of ointment, creams and other cosmetic formulations.
2.2.3	Recognize the principles of various tools and instruments and select the proper techniques for synthesis and analysis of different materials and production of pharmaceuticals.	2.2.9	Recognize different methods for preparation of semisolid dosage forms
		2.2.10	Predict drug interaction with different bases.
		2.2.11	Select suitable method for characterization of semisolid dosage forms, active ingredient and excipients.
		2.2.12	Assess the quality of topical and cosmetic products.
2.2.4	Adopt the principles of pharmaceutical calculations, biostatistical analysis, bioinformatics, pharmacokinetics, and biopharmaceutics and their applications in new drug delivery systems, dose modification, bioequivalence studies, and pharmacy practice.	2.2.13	Recognize principles of pharmaceutical calculation for preparation of semisolid dosage forms including ointment and creams
		2.2.14	Recognize recent knowledge in pharmaceutical technology to design new transdermal drug delivery systems.
2-3- COMPETENCY		<p>Upon finishing this course, students will be able to handle and dispose synthetic/natural pharmaceutical Materials used in preparation of semisolid pharmaceutical products effectively and safely with respect to relevant laws and legislations.</p> <p>This competency will be developed via the following key elements:</p>	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
2.3.1	Handle, identify, and dispose biologicals, synthetic/natural materials, biotechnology-based and radio-labeled products, and other materials/products used in pharmaceutical fields.	2.3.1	Safely handle different chemicals to avoid harm to the students.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biological, and pharmaceutical materials/products.	2.3.2	Recognize and adopt MSDS safety guidelines for safe and appropriate handling and disposal of pharmaceutical chemical materials.
		2.3.3	Demonstrate the safe use and storage of the ointment, creams and other topical products to the patient.
Domain 4: Personal Practice 4-2- Competency		Upon finishing this course, students will be able to Effectively communicate verbally, non-verbally and in writing with individuals and communities. This competency will be developed via the following key elements:	
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	4.2.1	Perform presentation on the advanced topical drug delivery systems and their benefits.
		4.2.2	Acquire effective presentation skills in modern technology and media to create engaging and memorable experiences. This includes using interactive slides, incorporating multimedia (videos, images, audio), and employing tools for real-time feedback and collaboration. By integrating these elements, student can enhance audience engagement, clarify complex information, and leave a lasting impact.

4. Teaching and Learning Methods

1- Lectures	(✓)
2- E-learning	(✓)
3- Practical training/ laboratory	(✓)
4- Discussion	(✓)
5- Brain - storming	(✓)
6- Assignment	(✓)
7- Presentation	(✓)
8- Case study	(✓)

Course Schedule						
Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/.....)	Training (Practical /Clinical/.....)	Self-learning (Tasks/Assignments / Projects/...)	Other (to be determined)
1	Introduction – Structure and function of the skin- Target area of treatment after topical application to skin	4	2	2	-----	-----
2	Basic principles of diffusion through membranes and factors affecting percutaneous absorption	4	2	2	-----	-----
3	Enhancement of skin penetration	4	2	2	-----	-----
4	Rate controlling transdermal therapeutic system	4	2	2	-----	-----
5	Transdermal Drug Delivery Systems (TDDS)	4	2	2	-----	-----
6	Traditional dermatological formulations- classification of ointment bases (physical classification)	4	2	2	-----	-----
7	Periodical exam					
8	Classification of ointment bases (chemical classification)	4	2	2	-----	-----
9	Preparation of ointment including ophthalmic ointments	4	2	2	-----	-----
10	Creams - types and methods of preparation	4	2	2	-----	-----

11	Cosmetic - Vanishing or day cream - Shaving cream.	4	2	2	-----	-----
12	Cosmetic - Cleansing cream. - Sunscreen cream.	4	2	2	-----	-----
13	Cosmetic - Gels	4	2	2	-----	-----
14	Cosmetic -Pastes	4	2	Practical exam	-----	-----
15	Quality control tests for semisolid dosage forms.	4	2	Practical exam	-----	-----

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Periodical exam	7	15	15%
2	Final Practical Exam including practical exam, Assignments and rubric evaluation	14, 15	25	25%
3	Final Written Exam	16, 17	50	50%
4	Final Oral Exam	16, 17	10	10%
	Total		100	100%

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.)	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Vipul A. Sansare, Abhijeet M. Kanavaje, Rehan Uddin, Textbook of Pharmaceutics II (For Second Year Diploma in Pharmacy). 1st Edition, 2021. Kevin Taylor, Michael Aulton, Aulton's Pharmaceutics: The Design and Manufacture of Medicines 6th Edition, 2022. R. M. Mehta, Pharmaceutics II. 4th Edition, 2024.
	Other References	Notes and Lab manual prepared by the department staff.
	Electronic Sources (Links must be added)	www.ncbi.nlm.nih.gov/pmc/ www.sciencedirect.com

	Learning Platforms (Links must be added)	<u>https://lms3.kfs.edu.eg/pharm/login/index.php</u>
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning	Devices/Instruments	Laboratory facilities (Equipment of factory).
	Supplies	Water bath, digital balances and other lab instruments
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

Matrix of course learning outcomes CLOs – Teaching and Learning Strategy and Student Assessment

Course title: Pharmaceutics II

Course code: PT 404

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Introduction – Structure and function of the skin- Target area of treatment after topical application to skin	1.1.3, 1.1.5, 2.2.12.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 2	Basic principles of diffusion through membranes and factors affecting percutaneous absorption	1.1.1, 1.1.3, 2.2.12, 2.2.1	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 3	Enhancement of skin penetration	1.1.1, 1.1.2, 1.1.3, 2.2.2, 2.2.3, 2.2.4, 2.2.12	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 4	Rate controlling transdermal therapeutic system	1.1.2, 1.1.3, 1.1.5, 2.2.1, 2.2.2 2.2.3, 2.2.12.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 5	Transdermal Drug Delivery Systems (TDDS)	1.1.1, 1.1.2, 1.1.3, 1.1.5, 2.2.1, 2.2.2, 2.2.3, 2.2.6, 2.2..12	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 6	Traditional dermatological formulations- classification of ointment bases (physical classification)	1.1.4, 1.1.5, 1.1.6, 2.2.1, 2.2.4, 2.2.5, 2.2.8.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 7	Periodical exam			
Week # 8	classification of ointment bases (chemical classification)	1.1.4, 1.1.5, 1.1.6, 2.2.1, 2.2.4, 2.2.5, 2.2.8.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams

Week # 9	Preparation of ointment including ophthalmic ointments	1.1.5, 1.1.6, , 2.2.1, 2.2.5, 2.2.8, 2.3.1, 2.3.2, 2.3.3. 2.2.11, 2.2.12	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 10	Creams - types and methods of preparation	1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.2.1, 2.2.2, 2.2.3, 2.2.7, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 11	Cosmetic -Vanishing or day cream. -Shaving cream.	1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.8, 2.2.2, 2.2.5, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training, seminars and class activities	Written, practical and oral exams
Week # 12	Cosmetic -Cleansing cream. -Sunscreen cream.	1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.8, 2.2.2, 2.2.5 2.2.9 2.2.10, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, seminars and practical training	Written, practical and oral exams
Week # 13	Cosmetic -Gels	1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.8, 2.2.2, 2.2.5, 2.2.8, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3.	Lectures and E-learning	Written, practical and oral exams
Week # 14	Cosmetic -Pastes	1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.8, 2.2.2, 2.2.5, 2.2.8 2.2.9, 2.2.10, 2.3.1, 2.3.3.	Lectures and E-learning	Written and oral exams
Week # 15	Quality control tests for semisolid dosage forms.	1.1.6, 1.1.7, 1.1.8, 2.2.5, 2.2.9, 2.2.10, 2.3.1, 2.3.2.	Lectures and E-learning	Written and oral exams

Name and Signature

Course Coordinator

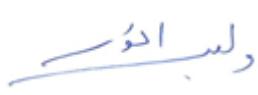
Prof. Abd El-Aziz El-Said

Lecturer. Walid Anwar

Name and Signature

Program Coordinator

Prof. Abd El-Aziz El-Said



Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Communication Skills			
Course Code (according to the bylaw)	NP 403			
Department/s participating in delivery of the course	Pharmaceutical Chemistry Department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1	----	-----	1
Course Type	Compulsory			
Academic level at which the course is taught	Second level, Semester (2)			
Academic Program	Bachelor of Pharmacy (PharmD)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Associate. Prof. Wagdy Mohamed Eldehna			
Course Specification Approval Date	9/2025			
Course Specification Approval	Department Council			

2. Course Overview (Brief summary of scientific content)

This course covers written and oral communication, presentation skills, negotiation skills, interviewing skills, personality types, persuasion skills and importance of teamwork in health care settings.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (Fundamental Knowledge) 1-1-COMPETENCY		Upon completing this course, students will be able to integrate knowledge from basic and applied pharmaceutical and clinical sciences to standardize materials, formulate and manufacture products, and deliver population and patient-centered care. This competency will be developed via the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Explain the role of communication in patient-centered care and interdisciplinary teamwork.
		1.1.2	Recognize how social and behavioral sciences shape health communication strategies.
		1.1.3	Relate communication models to clinical and administrative decision-making.
		1.1.4	Identify barriers to communication in healthcare settings and methods to overcome them.
1.1.5	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.	1.1.5	Apply scientific communication in presenting pharmaceutical information to specialists and non-specialists.
		1.1.6	Use correct terminology and scientific language in oral and written reports.
		1.1.7	Develop skills to simplify complex pharmaceutical concepts for patients and communities.
		1.1.8	Practice reading and summarizing research articles effectively.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
1.1.6	Utilize scientific literature and collect and interpret information to enhance professional decisions.	1.1.9	Develop skills in writing professional reports, abstracts, and summaries.
		1.1.10	Communicate evidence-based information clearly to patients and healthcare teams.
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	1.1.11	Debate and present current healthcare and pharmaceutical issues in professional discussions.
		1.1.12	Communicate ethical concerns regarding new trends to diverse audiences.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-1- COMPETENCY		Upon completing this course, students will be able to work collaboratively as a member of an inter-professional health care team to improve the quality of life of individuals and communities and respect patients' rights. This competency will be developed via the following key elements:	
2.1.1	Perform responsibilities and authorities in compliance with the legal and professional structure and role of all members of the health care professional team.	2.1.1	Demonstrate professional communication etiquette within healthcare teams.
		2.1.2	Apply effective negotiation and conflict resolution skills in team interactions.
		2.1.3	Communicate legal and ethical responsibilities clearly to peers and patients.
		2.1.4	Respect professional roles through appropriate verbal and non-verbal.
2.1.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/products considering various incompatibilities.	2.1.5	Communicate quality-related information effectively across teams.
		2.1.6	Use standardized documentation practices in reporting quality measures.
2.1.3	Recognize the principles of various tools and instruments and select the	2.1.7	Communicating laboratory results effectively through written reports and oral presentations.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	proper techniques for synthesis and analysis of different materials and production of pharmaceuticals.	2.1.8	Use clear language to explain technical processes to non-experts.
		2.1.9	Document laboratory findings in compliance with professional standards.
2-6- COMPETENCY		<p>Upon completing this course, students will be able to perform pharmacoconomic analysis and develop promotion, sales, marketing, and business administration skills.</p> <p>This competency will be developed via the following key elements:</p>	
2.6.2	Contribute to planning and conducting research studies using appropriate methodologies.	2.6.1	Write research reports using academic communication standards.
		2.6.2	Present research findings effectively to professional and lay audiences.
		2.6.3	Collaborate with research teams using effective interpersonal communication.
DOMAIN 3: Pharmaceutical care 3-2- COMPETENCY		<p>Upon completing this course, students will be able to provide counseling and education services to patients and communities about safe and rational use of medicines and medical devices.</p> <p>This competency will be developed via the following key elements:</p>	
3.2.5	Educate and counsel patients, other health care professionals, and communities about safe and proper use of medicines including OTC preparations and medical devices.	3.2.1	Counsel patients using simple, patient-centered communication.
		3.2.2	Demonstrate active listening and empathy during patient education.
		3.2.3	Use visual aids and simplified language for community drug education.
		3.2.4	Collaborate with healthcare professionals to ensure consistent patient messaging.
3.2.6		3.2.5	Develop and deliver public awareness campaigns using effective communication.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	Maintain public awareness on social health hazards of drug misuse and abuse.	3.2.6	Write educational materials (posters, brochures, digital content) addressing misuse/abuse.
		3.2.7	Use persuasive communication to influence behavioral change.
DOMAIN 4: Personal Practice 4-1- COMPETENCY		<p>Upon completing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and teamwork, creativity and entrepreneurial skills.</p> <p>This competency will be developed via the following key elements:</p>	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	4.1.1	Provide constructive feedback using professional communication.
		4.1.2	Facilitate effective group discussions and meetings.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	4.1.3	Communicate solutions clearly in team problem-solving discussions.
		4.1.4	Present evidence-based arguments during group decision-making.
		4.1.5	Adapt communication styles to team dynamics.
4.1.3	Demonstrate creativity and apply entrepreneurial skills within a simulated entrepreneurial activity.	4.1.6	Pitch innovative healthcare communication projects effectively.
		4.1.7	Use persuasive techniques in presenting entrepreneurial ideas.
		4.1.8	Develop promotional communication for pharmaceutical products.
4-2- COMPETENCY		<p>Upon completing this course, students will be able to effectively communicate verbally, non-verbally and in writing with individuals and communities.</p> <p>This competency will be developed via the following key elements:</p>	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
4.2.1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care team, patients, and communities.	4.2.1	Apply clear and empathetic verbal communication with patients.
		4.2.2	Demonstrate professional non-verbal skills (body language, eye contact).
		4.2.3	Write concise and accurate professional documents.
		4.2.4	Adapt communication style to healthcare teams vs. public audiences
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	4.2.5	Develop digital presentations using modern tools (PowerPoint, Prezi, Canva).
		4.2.6	Deliver presentations with confidence using multimedia aids.
		4.2.7	Use social media and digital platforms for professional communication.
		4.2.8	Record and evaluate self-presentations for improvement.
4-3- COMPETENCY		<p>Upon completing this course, students will be able to express self-awareness and be a life-long learner for continuous professional improvement.</p> <p>This competency will be developed via the following key elements:</p>	
4.3.1	Perform self-assessment to enhance professional and personal competencies.	4.3.1	Reflect on personal communication strengths and weaknesses.
		4.3.2	Set goals for improving communication skills in professional contexts.
		4.3.3	Seek and respond to feedback from peers and instructors.

4. Teaching and Learning Methods

- 1- Lectures (✓)
- 2- E-learning (✓)

3- Practical training/ laboratory (X)

4- Discussion (✓)

5- Brainstorming (✓)

6- Assignments (✓)

7- Case study (✓)

8- Seminars (✓)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/ discussion groups/)	Training (Practical/ Clinical/)	Self-learning (Tasks/ Assignments/ Projects/ ...)	Other (to be determined)
1	Principles of Effective Oral and Written Communication Skills	1	1	---	---	---
2	Principles of Effective Oral and Written Communication Skills	1	1	---	---	---
3	Presentation Skills	1	1	---	---	---
4	Presentation Skills	1	1	---	---	---
5	Negotiation Skills	1	1	---	---	---
6	Negotiation Skills	1	1	---	---	---
7	Mid-term exam					
8	Interviewing Skills	1	1	---	---	---
9	Interviewing Skills	1	1	---	---	---
10	Personality Types	1	1	---	---	---
11	Personality Types	1	1	---	---	---
12	Persuasion skills	1	1	---	---	---
13	Persuasion skills	1	1	---	---	---
14	Importance of Teamwork in Health Care Settings	1	1	---		
15	Revision	1	1	---		

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Class activity-mid term	Week 7	15 marks	15%
2	Final Written Exam	Week 16,17	85 marks	85%
	Total		100	100%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	The main (essential) reference for the course	Notes on communication skills
	Other References	The Art of Communication in Nursing and Health Care: An Interdisciplinary Approach" by Theresa Raphael-Grimm Scientific writing and communication: papers, proposals and presentations. "Writing, Speaking, and Communication Skills for Health Professionals" by Stephanie Barnard clinical skills, guide for pharmacist, 3rd edition
Supportive facilities & equipment for teaching and learning	Devices/Instruments	- Data show. - Computers. - Library. - Internet. - Interactive boards and distant learning unit
	Supplies	- Classrooms.

Course Plan

Matrix of course learning outcomes CLOs – Teaching and Learning Strategy and Student Assessment

Course title: Communication Skills

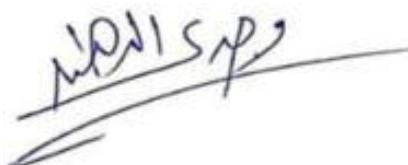
Course code: NP 403

Week	Course Content	Key elements	Teaching and Learning Methods	Student Assessment Methods
1	Principles of Effective Oral and Written Communication Skills	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 2.1.1, 2.1.2, 2.6.1, 3.2.1, 3.2.3, 4.1.1, 4.1.2, 4.1.3, 4.2.8, 4.3.1	Lectures, E-learning, Discussion	Written exams
2	Principles of Effective Oral and Written Communication Skills	1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.11, 1.1.12, 2.1.3, 2.1.5, 2.6.2, 3.2.2, 4.1.1, 4.1.4, 4.1.5, 4.1.6, 4.2.2, 4.3.2	Lectures, E-learning, Discussion	Written exams
3	Presentation Skills	1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.1.10, 1.1.11, 1.1.12, 2.1.1, 2.6.1, 3.2.4, 4.1.1, 4.1.6, 4.1.7, 4.2.3, 4.2.4, 4.3.3	Lectures, E-learning, Discussion	Written exams
4	Presentation Skills	1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.1.2, 2.1.5, 2.6.2, 3.2.1, 4.1.8, 4.2.1, 4.3.1	Lectures, E-learning, Discussion	Written exams
5	Negotiation Skills	1.1.4, 1.1.5, 1.1.7, 1.1.8, 1.1.12, 2.1.6, 2.1.7, 3.2.5, 4.1.1, 4.1.2, 4.2.4, 4.2.5	Lectures, E-learning, Brainstorming,	Written exams
6	Negotiation Skills	1.1.5, 1.1.7, 1.1.8, 1.1.9, 2.1.1, 2.1.3, 2.1.4, 2.1.5, 2.6.3, 3.2.5, 3.2.6, 4.1.3, 4.1.4, 4.1.5, 4.2.2, 4.2.3	Lectures, E-learning, Discussion, Brainstorming	Written exams
7	Mid-term exam			
8	Interviewing Skills	1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.1.7, 1.1.8, 1.1.10, 2.1.3, 2.6.1, 3.2.3, 4.1.6, 4.1.7, 4.2.8	Lectures, E-learning, Brainstorming,	Written exams
9	Interviewing Skills	1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.1.7, 1.1.8, 1.1.11, 2.1.4, 2.1.6,	Lectures, E-learning	Written exams

		2.6.3, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.3, 4.2.7, 4.3.2		
10	Personality Types	1.1.3, 1.1.4, 1.1.5, 1.1.7, 1.1.8, 1.1.12, 2.1.7, 3.2.1, 3.2.7, 4.1.4, 4.1.5, 4.1.8, 4.2.6, 4.3.3	Lectures, E-learning, Discussion	Written exams
11	Personality Types	1.1.6, 1.1.7, 1.1.8, 1.1.9, 1.1.10, 1.1.11, 1.1.12, 2.1.2, 2.1.3, 2.1.4, 3.2.6	Lectures, E-learning, Discussion	Written exams
12	Persuasion skills	1.1.1, 1.1.3, 1.1.4, 2.1.6, 2.6.1, 3.2.5, 4.1.1, 4.1.2, 4.2.4, 4.2.5	Lectures, E-learning, Discussion	Written exams
13	Persuasion skills	1.1.1, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.1.9, 3.2.4, 4.1.3, 4.1.4, 4.2.4, 4.3.1, 4.3.2.	Lectures, E-learning, Brainstorming,	Written exams
14	Importance of Teamwork in Health Care Settings	1.1.1, 1.1.3, 1.1.4, 2.1.1, 2.1.2, 2.1.3, 2.1.4, 3.2.1, 3.2.2, 3.2.3, 4.1.8, 4.2.2, 4.2.3	Lectures, E-learning, Discussion, Brainstorming,	Written exams
15	Revision	1.1.1, 1.1.3, 1.1.4, 1.1.5, 2.1.5, 2.1.9, 3.2.6, 3.2.7, 4.1.7, 4.2.1	Lectures, E-learning	Written exams

**Name and Signature
Course Coordinator**

Associate. Prof. Wagdy Mohamed
Eldehna



**Name and Signature
Program Coordinator**

Prof. Abdelaziz Elsayed





Course Specification (2025)

1. Basic Information

Course Title (according to the bylaw)	Physiology II			
Course Code (according to the bylaw)	MD405			
Department/s participating in delivery of the course	Biochemistry department (Physiology department, faculty of medicine)			
Number of credit hours/points of the course (according to the bylaw)	Theoretica 1	Practical	Other (specify)	Total
	2	0		2
Course Type	Compulsory			
Academic level at which the course is taught	Level (2), semester 4			
Academic Program	BSc in Pharmacy (Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh university			
Name of Course Coordinator	Dr. Sanad Elkholy			
Course Specification Approval Date	9-2025			

Course Specification Approval (Attach the decision/minutes of the department /committee/council)

Department council

2. Course Overview (Brief summary of scientific content)

Upon successful completion of this course, the students should be able to:

Study the normal physiological aspects of cardiovascular system, central nervous system and endocrine system. Study the abnormal pathophysiological conditions affecting cardiovascular system, central nervous system and endocrine system. Practically identify some of physiological parameters such as BP, HR,...etc.

3. Course Learning Outcomes CLOs

Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		Upon finishing this course, students will be able to integrate knowledge from basic physiological knowledge to identify the abnormality in body function via the following key elements This competency will be developed via the following key elements:	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Articulate knowledge The normal physiological aspects
Domain 3: Pharmaceutical Care 3-1-COPETENCY		Upon finishing this course, students will be able to apply the principles of body functions This competency will be developed via the following key elements:	
		3-1-1	relate the difference between physiology of the body systems studied.
Domain 4: Personal Practice 4-2- Competency		Upon finishing this course, students will be able to effectively communicate verbally, non-verbally and in	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
		writing with individuals and communities This competency will be developed via the following key elements:	
		4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills

4. Teaching and Learning Methods

- 1- Lectures (✓)
- 2- E-learning (✓)
- 3- Class activity (✓)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/.....)	Training (Practical /Clinical/.....)	Self-learning (Tasks/Assignments/Projects/...)	Other (to be determined)
1	Introduction to Human Physiology and Homeostasis	2	2	0		
2	Cardiovascular System: Structure and Function	2	2	0		
3	Cardiovascular Pathophysiology	2	2	0		
4	Cardiovascular Physiology Measurements	2	2	0		

5	Cardiovascular System, clinical correlations and case discussions	2	2	0		
6	Central Nervous System: Structure and Function	2	2	0		
7	Mid-term exam	2		0		
8	Central Nervous System Pathophysiology	2	2	0		
9	Nervous System Physiology	2	2	0		
10	Nervous System, clinical correlations and case discussions	2	2	0		
11	Endocrine System: Structure and Function	2	2	0		
12	Endocrine Pathophysiology	2	2	0		
13	Endocrine Physiology and Biochemical Parameters	2	2	0		
14	Integration of Systems: Neuroendocrine and Cardiovascular Interactions	2	2	0		
15	Endocrine System, clinical correlations and case discussions	2	2	0		

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1 written (Semester work)	7	10	%10
2	Final Written Exam	17-16	75	%75
3	Final Practical/Clinical/... Exam			
4	Final Oral Exam	17-16	10	%10
5	Assignments / Project /Portfolio/ Logbook	9,6,3	5	%5

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Textbook in Medical Physiology and Pathophysiology(2005). Poul-Erik Paulev. 2 nd edition . Copenhagen Medical Publishers
	Other References	
	Electronic Sources (Links must be added)	http://physiologyonline.physiology.org/ http://arjournals.annualreviews.org/loi/physiol
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
	Other (to be mentioned)	--
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	
	Supplies	Class rooms. - Library - Data show - Computers. - Internet. - Smart board
	Electronic Programs	---
	Skill Labs/ Simulators	---
	Virtual Labs	
	Other (to be mentioned)	

Course Plan

Course Contents	ILOs	Teaching and Learning Methods	Student Assessment Methods	
Week # 1	Introduction to Human Physiology and Homeostasis	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 2	Cardiovascular System: Structure and Function	1.1.1, 3.1.1, 4.2.2.	Lectures	Written, and oral exams

Week # 3	Cardiovascular Pathophysiology	1.1.1, 3.1.1, 4.2.2.	Lectures	Written, and oral exams
Week # 4	Cardiovascular Physiology Measurements	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 5	Cardiovascular System, clinical correlations and case discussions	1.1.1, 3.1.1, 4.2.2.	Lectures	Written, and oral exams
Week # 6	Central Nervous System: Structure and Function	1.1.1, 3.1.1, 4.2.2.	Lectures	Written, and oral exams
Week # 7	Mid-term exam			
Week # 8	Central Nervous System Pathophysiology	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 9	Nervous System Physiology	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 10	Nervous System, clinical correlations and case discussions	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 11	Endocrine System: Structure and Function	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 12	Endocrine Pathophysiology	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 13	Endocrine Physiology and Biochemical Parameters	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 14	Integration of Systems: Neuroendocrine and Cardiovascular Interactions	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams
Week # 15	Endocrine System, clinical correlations and case discussions	1.1.1, 3.1.1, 4.2.2.	Lectures	Written and oral exams

Name and Signature

Name and Signature

Course Coordinator

Dr. Sanad Elkholy

Program Coordinator

ساند الخولي

د. عبد العزيز المنشاوي
