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

Pharm-D program
Course Specification
2025/2026
Fourth Level
First Semester

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Course Specification

(2025)

1.Basic Information

Course Title (according to the bylaw)	**Medical microbiology**			
Course Code (according to the bylaw)	**PM 705**			
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**	**Practical**	**Other (specify)**	**Total**
	2	**1**	**----**	**3**
Course Type	Compulsory			
Academic level at which the course is taught	Fourth level,Semester 1			
Academic Program	Bachelor of Pharmacy (Pharm D program)			
Faculty	Faculty of Pharmacy			
University	Kafrelshiekh 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)

The course aims to educate students about the basic features of general bacteriology, virology and mycology and to familiarize students with the common infections and diseases of medical importance, their microbial causes, as well as laboratory diagnosis, treatment, prevention and control of such diseases.

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 microbiology to understand the infectious disease in human beings.** **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 knowledge of microbial pathogenesis and pharmaceutical Treatments.**
		1.1.2	**Explain social and behavioral factors affecting disease spread.**
		1.1.3	**Apply principles to manage infection prevention programs.**

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.	**1.1.4**	**Utilize scientific literature to research microbial diseases**
		1.1.5	**Collect data from laboratory tests and clinical studies**
		1.1.6	**Interpret findings to improve diagnosis and treatment**
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	**1.1.7**	**Identify emerging microbial threats affecting public health**
		1.1.8	**Evaluate challenges in treating resistant infections**
		1.1.9	**Analyze the impact of new pathogens on drug development**
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-1- COMPETENCY		**Upon finishing 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:**	
2.1.2	Adopt ethics of health care and pharmacy profession respecting patients'	**2.1.1**	**Demonstrate ethical behavior in handling microbiological specimens.**
		2.1.2	**Apply confidentiality principles when reporting patient results.**

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**
	rights and valuing people diversity	**2.1.3**	**Interpret ethical guidelines related to infectious disease management**
2-4- COMPETENCY		**Upon finishing this course, students will be able to actively share professional decisions and proper actions to save patient's life in emergency situations and controlling severe symptoms.** **This competency will be developed via the following key elements:**	
2.4.2	Demonstrate understanding of the first aid measures needed to save patient's life.	**2.4.1**	**Demonstrate correct CPR techniques for a patient experiencing septic shock caused by bacterial infection**
		2.4.2	**Perform the recovery position for a meningitis patient suffering from seizures and unconsciousness**
2.4.4	Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens.	**2.4.3**	**Assess the toxic effects of bacterial endotoxins in patient blood samples.**
		2.4.4	**Detect bacterial and chemical poisons in clinical specimens using advanced microbiological assays**
		2.4.5	**Identify microbial toxins, such as botulinum toxin, in biological specimens.**
		2.4.6	**Evaluate laboratory test results to determine the toxicity profile of fungal mycotoxins.**
2-5- COMPETENCY		**Upon finishing this course, students will be able to contribute in microbiological research studies and clinical trials needed to authorize antimicobial products.** **This competency will be developed via the following key elements:**	

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**
2.5.2	Retrieve, interpret, and critically evaluate evidence- based information needed in pharmacy profession.	**2.5.1**	**Analyze laboratory results to identify pathogenic microorganisms in patient samples.**
		2.5.2	**Apply microbiological knowledge to select appropriate antimicrobial therapy.**
		2.5.3	**Evaluate the effectiveness of infection control measures in clinical settings.**
		2.5.4	**Demonstrate proper aseptic techniques during microbiological specimen handling**
Domain 3: Pharmaceutical Care **3-1- Competency**		**Upon finishing this course, students will be able to apply the principles of medical microbiology to participate in improving health care services using evidence-based data.** **This competency will be developed via the following key elements:**	
3.1.1	Apply the principles of body function and the basis of genomics in health and disease states to manage different diseases.	**3.1.1**	**Analyze genomic sequences of pathogens to determine virulence factors.**
		3.1.2	**Apply principles of microbial physiology to explain infection mechanisms.**
		3.1.3	**Develop strategies for managing infectious diseases based on genomics**
3.1.2		**3.1.4**	**Identify pathogenic microorganisms responsible for hospital-acquired infections.**

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 public health and pharmaceutical microbiology to select and assess proper methods of infection control.	**3.1.5**	**Demonstrate proper hand hygiene techniques to prevent microbial transmission.**
		3.1.6	**Assess the efficiency of sterilization and disinfection procedures.**
3.1.3	Monitor and control microbial growth and carry out laboratory tests for identification of infections/diseases.	**3.1.7**	**Monitor microbial growth in clinical specimens to detect potential pathogens.**
		3.1.8	**Control contamination in laboratory environments through aseptic techniques.**
		3.1.9	**Interpret laboratory results to guide appropriate antimicrobial therapy**
		3.1.10	**Apply biochemical and molecular tests to identify infectious agents.**
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.	**3.1.11**	**Analyze the etiology and epidemiology of infectious diseases.**
		3.1.12	**Interpret laboratory findings to confirm microbial infections.**
		3.1.13	**Correlate clinical manifestations with pathophysiological mechanisms.**
		3.1.14	**Evaluate therapeutic options for effective disease management**
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 medicines .** **This competency will be developed via the following key elements:**	

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**
3.2.4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.	**3.2.1**	**Analyze toxic profiles of drugs and other xenobiotics to determine sources, identification methods, symptoms, and appropriate management strategies.**
		3.2.2	**Evaluate the potential risks of drug and xenobiotic exposure, focusing on their toxic effects, early warning signs, and strategies for safe handling.**
Domain 4: Personal Practice **4-1- Competency**		**Upon finishing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and team working, creativity and entrepreneurial skills.** **This competency will be developed via the following key elements:**	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.1.1**	**Demonstrate commitment to team tasks and respect for deadlines.**
		4.1.2	**Organize time effectively to achieve project goals.**
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.1.3**	**Retrieve information from reliable sources.**
		4.1.4	**Collaborate effectively within a team**
		4.1.5	**Identify problems related to diagnosis and treatment.**
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	**4.2.1**	**Use modern media tools to design professional presentations about bacteria.**

	presentation skills.	**4.2.2**	**Demonstrate presentation about bacteria skills by explaining ideas clearly**
4-3- Competency		**Upon finishing this course, students will be able to express self-awareness and be a life-long learner for continuous professional improvement.** **This competency will be developed via the following key elements:**	
4.3.1	Perform self-assessment to enhance professional and personal competencies.	**4.3.1**	**Implement self-assessment regularly to improve your skills.**
		4.3.2	**Perform evaluations to identify strengths and weaknesses.**

4. Teaching and Learning Methods

.1- **Lectures** **(√)**

2- **E-learning** **(√)**

3- **Practical training/ laboratory** **(√)**

4- **Class activity** **(√)**

5- **Seminars** **(√)**

6- **Case study** **(√)**

7- **Virtual lab** **(√)**

8- **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/discussio n groups/ .....)	Training (Practical/Clinical/..)	Self-learning (Tasks/ Assignments / Projects/ ...)	Other (to be determined)
1	Introduction to microbial infection	4	2	2		
2	Bacteriology- Gram positive cocci	4	2	2		
3	Gram positive cocci	4	2	2		
4	Gram positive bacilli	4	2	2		
5	Gram negative cocci	4	2	2		
6	Mycobacterium group	4	2	2		
7	**Semester works**					
8	Gram negative bacilli	4	2	2		
9	Gram negative bacilli (cont.)	4	2 2	2 2		
10	Gram negative bacilli (cont.)	4	2	2		
11	Gram negative bacilli (cont.)	4	2	2		

12	Chylamydiae &Rickettsiae	**4**	**2**	**2**		
13	Mycology	**4**	**2**	**2**		
14	Mycology	**4**	**2**	**Practical exam**		
15	Spirochetes	**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 (formative exam)	**Week 6**	**…..**	**…..**
2	Periodical exam	**Week 7**	**15**	**15%**
3	Final Written Exam	**Week 16-17**	**50**	**50%**
	Final PracticalExam	**Week 14-15**	**25**	**25%**
	Final Oral Exam	**Week 16-17**	**10**	**10%**
	Assignments / Portfolio/ Logbook	**Week 13-14**	**……**	**……**

5. 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)	Jwartez ,E.et al. Medical Microbiology22th ed . Appton & Lange. Murray et al ,Medical microbiology 4th ed ., 91- 92 Mahon, Connie R., and Donald C. Lehman. Textbook of Diagnostic Microbiology-E-Book: Textbook of Diagnostic Microbiology-E-Book. Elsevier Health Sciences, 2022.
	Other References	Notes and Lab manual prepared by the department staff.
	Electronic Sources (Links must be added)	www.pubmed.com
		www.sciencedirect.com
	Learning Platforms (Links must be added)	**https://lms3.kfs.edu.eg/pharm/login/index.php**
	Other (to be mentioned)	www.med.sc.edu www.themicrobe.com www.themicrobiologyplace.com
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Laboratory facilities.
	Supplies	microscope ,laminar flow & autoclave 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: medical microbiology Course code: Pm 705

Course Contents		Key elements	teaching and Learning methods	Student Assessment methods
Week # 1	Introduction to microbial infection	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9	Lectures, E-Learning and practical training	Written, practical and oral exams
Week # 2	Bacteriology-Gram positive cocci	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,	Lectures, E-learning, practical training and class activity	Written, practical and oral exams
Week # 3	Gram positive cocci	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,	Lectures, E-learning, practical Training and seminars	Written, practical and oral exams
Week # 4	Gram positive bacilli	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.5, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2 ,4.3.1, 4.3.2	Lectures, E-learning, practical Training and class activity	Written, practical and oral exams
Week # 5	Gram negative cocci	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,	Lectures, E-Learning and practical training	Written, practical and oral exams

Week # 6	**Mycobacterium group**	**1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4,3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,**	**Lectures, E-learning, practical Training and case study**	**Written, practical and oral exams**
Week # 7	**Periodical exam**			
Week # 8	**Gram negative bacilli**	**1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1,3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,**	**Lectures, E-learning, practical Training and class activity**	**Written, practical and oral exams**
Week # 9	**Gram negative bacilli (cont.)**	**1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3,2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4,3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,**	**Lectures, E- learning, practical training and case study**	**Written, practical and oral exams**
Week # 10	**Gram negative bacilli (cont.)**	**1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,**	**Lectures, E-Learning and practical training**	**Written, practical and oral exams**
Week # 11	**Gram negative bacilli (cont.)**	**1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4,3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,**	**Lectures, E-learning, practical training, seminars and case study**	**Written, practical and oral exams**

Week # 12	Chylamydiae &Rickettsiae	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1,3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,	Lectures, E-learning Practical Training and class activity	Written, practical and oral exams
Week # 13	Mycology	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.6, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,	Lecture, E-learning practical training , virtual lab and assignment	Written, practical and oral exams
Week # 14	Mycology	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3,2.4.1, 2.4.2, 2.4.3, 2.4.6, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4,3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2	Lectures , E- learning, virtual lab and assignment	Written and oral exams
Week # 15	Spirochetes	1.1.1,1.1.2,1.1.3,1.1.4,1.1.5,1.1.6, 1.1.7, 1.1.8 ,1.1.8, 1.1.9, 2.1.1, 2.1.2, 2.1.3, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.5.1, 2.5.2, 2.5.3, 2.5.4, 3.1.1, 3.1.2, 3.1.3, 3.1.4,3.1.5,3.1.6, 3.1.7, 3.1.8, 3.1.9, 3.1.10, 3.1.11, 3.1.12, 3.1.13, 3.1.14, 3.2.1, 3.2.2, 4.1.1, 4.1.2, 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2,	Lectures , E- learning and seminars	Written and oral exams

Name and Signature

Course Coordinator
Dr. Nesma Elkemary

Name and Signature

Program Coordinator
Prof . Abdelaziz Elashmawy

Pharmacology-III Course Specification (2025)

1. Basic Information

Course Title (according to the bylaw)	Pharmacology-III			
Course Code (according to the bylaw)	PO 704			
Department/s participating in delivery of the course	Pharmacology & Toxicology Department			
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	Fourth level, semester (7)			
Academic Program	Bachelor of Pharmacy (Pharm D.)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Dr. Samar El-sebaey Ayoub			
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 integrates pharmacological principles with foundational knowledge of physiology and the pathophysiological processes underlying diseases, focusing on drugs that act on the endocrine system as well as chemotherapeutic agents, including antimicrobial, antineoplastics, and immunosuppressants. Stem cell therapy is also covered. Students will learn to understand the pharmacological effects, mechanisms of action, and contraindications of these drug classes, assess their appropriate use and potential side effects, and integrate this knowledge to recommend optimal therapeutic choices based on individual patient criteria.

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 completion of the course, students will be able to demonstrate a comprehensive understanding of pharmacological principles, relevant physiological and pathophysiological concepts, and the therapeutic applications, mechanisms of action, and contraindications of drugs affecting the endocrine system, as well as chemotherapeutic agents including antimicrobials, antineoplastics, immunosuppressants, and stem cell therapy.**	
1-1-1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	1.1.1	Demonstrate understanding of the pharmacological interventions used in the prevention, treatment, and management of infectious and malignant diseases
1-1-4	Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.	1.1.2	Classify and explain the pharmacological properties, mechanisms of action, and therapeutic roles of drugs affecting the endocrine system, as well as chemotherapeutic agents including antimicrobials, antineoplastics, and immunosuppressants.

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	Retrieve information from fundamental sciences to solve therapeutic problems.	1.1.3	Retrieve evidence-based information to guide the pharmacological management of endocrine disorders, infectious diseases, and autoimmune conditions.
1-1-6	Utilize scientific literature and collect and interpret information to enhance professional decisions.	1.1.4	Identify and evaluate emerging therapeutic strategies, to be included in therapeutic plan that enhance professional decisions.
Domain 2 (PROFESSIONAL AND ETHICAL PRACTICE) 2-1- Competency		**Upon completion of the course, students will be able to work collaboratively within inter-professional healthcare teams to design and optimize pharmacological interventions involving endocrine drugs, chemotherapeutic agents, antimicrobials, antineoplastics, immunosuppressants, and stem cell therapies, with a commitment to improving the quality of life of individuals and communities while upholding patients' rights and ethical standards of care.**	
2-1-2	Adopt ethics of health care and pharmacy profession respecting patients' rights and valuing people diversity.	2.1.1	Apply professional judgment to identify and address pathological conditions related to cancer, immune dysfunction, and hormonal dysregulation while upholding patient rights and ethical standards.
2-2- Competency		**Upon completion of the course, students will be able to apply professional standards in the selection, formulation, and handling of endocrine, chemotherapeutic, antimicrobial, antineoplastic, immunosuppressant, and stem cell–based pharmaceutical products, ensuring quality, safety, and efficacy throughout the processes of standardization, dispensing, storage, and distribution in compliance with ethical and legal guidelines.**	
2-2-4	Adopt the principles of pharmaceutical calculations, biostatistical analysis, bioinformatics, pharmacokinetics, and biopharmaceutics and their applications in new drug delivery	2.2.1	Apply basic pharmacokinetic principles to adjust drug dosing, evaluate bioavailability, and assess therapeutic effectiveness for endocrine and chemotherapeutic agents.

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**
	systems, dose modification, bioequivalence studies, and pharmacy practice.		
2-4- Competency		**Upon completion of the course, students will be able to apply pharmacological knowledge to make timely and evidence-based professional decisions in emergency situations, including managing poisoning from endocrine, chemotherapeutic, antimicrobial, antineoplastic, immunosuppressant, and other xenobiotic agents, and to collaborate effectively in forensic investigations while adhering to ethical and legal standards.**	
2-4-3	Take actions to solve any identified medicine-related and pharmaceutical care problems.	2.4.1	Apply evidence-based guidelines to ensure the safe and effective use of hormonal drug therapies in diverse patient populations.
		2.4.2	Differentiate between pharmacological classes of anticancer and antimicrobial agents in terms of mechanisms, indications, and clinical applications.
		2.4.3	Select and justify appropriate pharmacological interventions for autoimmune diseases and hormonal disorders based on patient-specific factors.
		2.4.4	Select and justify the most appropriate drug therapy based on pharmacological properties, mechanism of action, and documented toxicity profiles.
		2.4.5	Apply pharmacological knowledge to design and adapt therapeutic interventions for patients with varying clinical conditions and needs.
2-5- Competency		Upon completion of the course, students will be able to contribute to the design, conduct, and evaluation of pharmaceutical research studies and clinical trials involving endocrine drugs, chemotherapeutic agents, antimicrobials, antineoplastics, immunosuppressants, and stem cell therapies, in accordance with regulatory requirements and ethical guidelines for the authorization of medicinal 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**
2-5-3	Contribute in planning and conducting research studies using appropriate methodologies.	2.5.1	Participate in designing and executing small-scale research projects related to pharmacological interventions, utilizing appropriate scientific methodologies and data analysis tools.
Domain 3 (PHARMACEUTICAL CARE) 3-2- Competency		**Upon completion of the course, students will be able to provide patient-centered counseling and educational services to individuals and communities on the safe, effective, and rational use of endocrine drugs, chemotherapeutic agents, antimicrobials, antineoplastics, immunosuppressants, stem cell–based therapies, and related medical devices, promoting adherence and minimizing risks.**	
3-2-1	Integrate the pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, adverse drug reactions and drug interactions.	3.2.1	Integrate pharmacological knowledge, including mechanisms of action, therapeutic uses, dosages, contraindications, adverse effects, and drug interactions, to select the most appropriate drug therapy based on patient-specific criteria.
3-2-2	Apply the principles of clinical pharmacology and pharmacovigilance for the rational use of medicines and medical devices.	3.2.2	Monitor, assess, and document the therapeutic outcomes and adverse effects of anticancer, immunosuppressant, antimicrobial, and hormonal drug therapies to ensure safe and effective patient care.
		3.2.3	Develop and implement individualized pharmaceutical care plans that optimize therapeutic outcomes, promote patient adherence, and minimize risks.
3-2-4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.	3.2.4	Identify and describe the side effects of anticancer, immunosuppressant, antimicrobial, and hormonal drugs, including their sources, clinical manifestations of toxicity, and evidence-based management strategies.
Domain 4 (PERSONAL PRACTICE) 4-2- Competency		**Upon completion of the course, students will be able to: Effectively communicate pharmacological information, therapeutic recommendations, and safety considerations regarding endocrine, chemotherapeutic, antimicrobial, antineoplastic, immunosuppressant agents, and stem cell therapies to patients, healthcare professionals, and the wider community using**	

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**
		appropriate verbal, non-verbal, and written formats.	
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills.	4.2.1	Utilize contemporary technologies and media to prepare and deliver effective presentations on pharmacological topics to diverse audiences.

4. Teaching and Learning Methods

1. Lectures
2. Practical
3. E learning.
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	Pharmacological actions of Anticancer drugs	**4**	**2**	**2**		
2	Pharmacological actions of Anticancer drugs (cont.)	**4**	**2**	**2**		
3	Pharmacological actions of Anticancer drugs (cont.)	**4**	**2**	**2**		
4	Pharmacological actions of Anticancer drugs (cont.)	**4**	**2**	**2**		
5	Pharmacological actions of Anticancer drugs (cont.)	**4**	**2**	**2**		
6	Immunosuppressant drugs	**4**	**2**	**2**		
7	**Semester work**					
8	Antimicrobials and stem cell therapy	**4**	**2**	**2**		
9	Pharmacological actions of drugs acting on endocrine systems	**4**	**2**	**2**		
10	Pharmacological actions of drugs acting on endocrine systems (cont.)	**4**	**2**	**2**		
11	Pharmacological actions of drugs acting on endocrine systems (cont.)	**4**	**2**	**2**		
12	Pharmacological actions of drugs acting on endocrine systems (cont.)	**4**	**2**	**2**		
13	Pharmacological actions of drugs acting on endocrine systems (cont.)	**4**	**2**	**Revision**		
14	Pharmacological actions of drugs acting on endocrine systems (cont.)	**2**	**2**	Practical exam		
15	**Revision**	**2**	**2**	Practical exam		

9. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Formative exam	4	5	5%
2	Periodic exam written (Semester work)	7	10	10%
3	Final Practical/Clinical/… Exam	14,15	25	25%
4	Final Written Exam	16,17	50	50%
5	Final Oral Exam	16,17	10	10%

10. 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)	The Pharmacological Basis of Therapeutics (2008).Goodman & Gilman's. 12 th edition. The McGraw-Hill Companies
	Other References	-Basic & Clinical Pharmacology (2003). G. Katzung.9th ed.Lavoisier S.A.S. -Pharmacology (2007). Rang H.P.& Dale M. 7th Edition. Churchill Livingston London -Lippincott Modern Pharmacology (2019). C. Champe, A. Harvey and Denise R. (illustrated pharmacology Review). South Asian Edition. Lippincott Williams & Wilkins
	Electronic Sources (Links must be added)	-www.biomedcentral.com -www.Pubmed.com -www.medscape.com
	Learning Platforms (Links must be added)	**https://lms3.kfs.edu.eg/pharm/login/index.php**
	Other (to be mentioned)	
Supportive facilities & equipment for teaching	**Devices/Instruments**	- Data show - Computers. – Internet.
	Supplies	--------

and learning *	**Electronic Programs**	--------
	Skill Labs/ Simulators	--------
	Virtual Labs	--------
	Other (to be mentioned)	- Class rooms. - Library.

Course Plan

Course Contents		Key Elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Pharmacological actions of Anticancer drugs	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training	Written, practical and oral exams
Week # 2	Pharmacological actions of Anticancer drugs (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, discussion	Written, practical and oral exams
Week # 3	Pharmacological actions of Anticancer drugs (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training	Written, practical and oral exams

Week # 4	Pharmacological actions of Anticancer drugs (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, discussion	Written, practical and oral exams
Week # 5	Pharmacological actions of Anticancer drugs (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training	Written, practical and oral exams
Week # 6	Immunosuppressant drugs	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, e-learning, discussion	Written, practical and oral exams
Week # 7	**Semester work**			
Week # 8	Antimicrobials and stem cell therapy	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, e-learning, case study	Written, practical and oral exams
Week # 9	Pharmacological actions of drugs acting on	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1	Lectures and practical training,	Written, practical

	endocrine systems	2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	brain storming	and oral exams
Week # 10	Pharmacological actions of drugs acting on endocrine systems (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, case study, brain storming	Written, practical and oral exams
Week # 11	Pharmacological actions of drugs acting on endocrine systems (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, case study, brain storming	Written, practical and oral exams
Week # 12	Pharmacological actions of drugs acting on endocrine systems (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures and practical training, case study	Written, practical and oral exams
Week # 13	Pharmacological actions of drugs acting on endocrine systems (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1	Lectures and practical training, case study	Written, practical and oral exams

		3.2.1,3.2.2,3.2.3,3.2.4 4.2.1		
Week # 14	Pharmacological actions of drugs acting on endocrine systems (cont.)	1.1.1,1.1.2,1.1.3,1.1.4 2.1.1 2.2.1 2.4.1,2.4.2,2.4.3,2.4.4,2.4.5 2.5.1 3.2.1,3.2.2,3.2.3,3.2.4 4.2.1	Lectures, brain storming , case study	Written and oral exams
Week # 15	**Revision**		Lectures, discussion and brain storming	Written and oral exams

Name and Signature
Course Coordinator

Dr. Samar El-sebaey Ayoub

Name and Signature
Program Coordinator

Prof. Dr. Abdel Aziz El-Ashmawy

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Applied& forensic Pharmacognosy			
Course Code (according to the bylaw)	PG 706			
Department/s participating in delivery of the course	Pharmacognosy			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1	1		2
Course Type	compulsory			
Prerequisite	Registration			
Academic level at which the course is taught	Fourth level, semester 1			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Ass. Prof. Dr. Mai H. Elnaggar			
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 quality control of medicinal plants and the structure elucidation of various classes of natural products using spectroscopic techniques, including UV, IR, NMR, and MS. It explores tumor inhibitors derived from medicinal plants and advanced chromatographic methods such as GC, HPLC, and ion-exchange chromatography. The course also addresses forensic analysis of poisonous and misused drugs in recovered samples and biological fluids, alongside plant tissue culture techniques and biotechnological tools applied in pharmacognosy.

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 medicinal plant sciences to identify, validate and authenticate natural 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	Explain the role of pharmacognosy in connecting pharmaceutical sciences with biomedical, social, and clinical applications.
		1.1.2	Describe the morphological and histological characteristics of selected medicinal plants and its application in their quality control.
		1.1.3	Discuss the pharmacological and toxicological importance of natural products in healthcare.
1.1.3	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare,	1.1.4	Apply morphological, microscopic, and organoleptic methods to identify medicinal plants and herbal drugs.

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**
	analyze, and assure quality of synthetic/natural pharmaceutical materials/products.		
		1.1.5	Classify methods of isolation and purification of natural products using modern chromatographic techniques.
		1.1.6	Evaluate the advantages and limitations of modern analytical techniques in qualitative and quantitative analysis of plant-derived products.
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care	1.1.7	Discuss methods of quality control for medicinal plants and detection of adulteration in herbal drugs.
		1.1.8	Analyze the sources, identification, and impact of natural drugs of abuse on patient health.
		1.1.9	Examine tissue culture techniques and their applications in producing medicinally important natural products.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE **2-2- COMPETENCY**		**Upon finishing this course, students will be able to will be able to standardize pharmaceuticalmaterials.** **This competency will be developed via the following key elements:**	
2.2.1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/natural pharmaceutical materials.	2.2.1	Apply quality control guidelines to authenticate crude drugs, standardized extracts, and isolated natural products.
		2.2.2	Utilize the basis of plant tissue culture techniques to improve the production of secondary metabolites of pharmaceutical and medicinal importance.

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**
		2.2.3	Choose the suitable chromatographic method for isolation of compounds depending on their polarity and chemical nature.
2.2.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities	2.2.4	Apply quality control guidelines to authenticate crude drugs, standardized extracts, and isolated natural products.
		2.2.5	Implement standard operating procedures (SOPs) to ensure the stability and safety of natural pharmaceutical products.
		2.2.6	Assess potential incompatibilities during storage and handling of herbal 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.	2.2.7	Choose the suitable modern chromatographic method for analysis of compounds depending on their polarity and nature.
		2.2.8	Identify the operating principles of chromatographic and spectroscopic instruments used in natural product analysis.
		2.2.9	Demonstrate safe and accurate handling of instruments for extraction, purification, and analysis in pharmacognosy labs.
2.2.4	Adopt the principles of pharmaceutical calculations, biostatistical analysis, bioinformatics, pharmacokinetics, and bio-pharmaceutics and their applications in new drug delivery systems, dose modification, bioequivalence studies, and pharmacy practice	2.2.10	Utilize the basis of plant tissue culture techniques to improve production of secondary metabolites of pharmaceutical and medicinal importance.
		2.2.11	Apply biostatistical tools to evaluate experimental data from pharmacognosy research.
2-3- COMPETENCY		**Upon finishing this course, students will be able to handle and dispose biologicals and synthetic/natural pharmaceutical**	

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**
		materials/products effectively and safely with respect torelevant laws and legislations. 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 field.	2.3.1	Handle and process biologicals safely and effectively in compliance with national and international safety regulations in tissue culture practice.
		2.3.2	Dispose of biological and synthetic/natural materials in tissue culture practice in accordance with ethical, legal, and environmental safety standards.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products.	2.3.4	Apply ethical and legal principles related to hybridization and cloning techniques in tissue culture practice and forensic settings
		2.3.5	Follow safety protocols for storage, transportation, and disposal of biologicals techniques in tissue culture practice and forensic settings.
		2.3.6	Use suitable methods to identify drugs of abuse, toxins, and poisons derived from natural resources, ensuring adherence to legal and ethical guidelines.
2-4- COMPETENCY		**Upon finishing this course, students will be able to actively handle emergency situations suchas poisoning with various xenobiotics related to plant origin, and effectively work in forensicfields.**	
2.4.1	Ensure safe handling/use of poisons to avoid their harm to individuals and communities.	2.4.1	Identify toxicity profiles of drugs, gases, heavy metals, and plant-derived poisons to ensure safe handling for individuals and communities.
		2.4.2	Implement safety protocols for storage, labeling, and use of hazardous and poisonous substances in pharmaceutical practice.

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**
		2.4.3	Educate community members on preventive measures to minimize exposure to and harm from toxic agents.
2.4.2	Demonstrate understanding of the first aid measures needed to save patient's life	2.4.4	Apply appropriate first aid measures for different types of poisoning until specialized medical care is available.
		2.4.5	Demonstrate correct emergency procedures for airway management, decontamination, and antidote administration.
		2.4.6	Assess the urgency of poisoning cases and prioritize interventions based on patient condition and toxicological risk.
2.4.4	Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens	2.4.7	Analyze and evaluate poisons using laboratory investigations such as chemical, chromatographic, and spectroscopic techniques.
		2.4.8	Interpret toxicological data from biological specimens to support diagnosis of poisoning cases.
		2.4.9	Contribute professionally to forensic toxicology teams by providing expert analysis and documentation.
2-5- COMPETENCY		**Upon finishing this course, students will be able to contribute to pharmaceutical research studies and clinical trials needed to authorize medicinal products.** **This competency will be developed via the following key elements:**	
2.5.1	Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements.	2.5.1	Assess regulatory guidelines to obtain marketing authorization for natural product–based dosage forms in compliance with quality, safety, and efficacy standards.

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**
		2.5.2	Interpret documentation requirements for submission to regulatory authorities for herbal and natural medicines.
		2.5.3	Apply quality assurance principles during the development process to meet national and international regulatory standards.
2.5.3	Contribute in planning and conducting research studies using appropriate methodologies.	2.5.4	Work effectively in a research team to carry out experimental and clinical studies related to natural medicinal products.
		2.5.6	Analyze and present research findings in compliance with scientific and ethical standards.
DOMAIN 3: PHARMACEUTICAL CARE **3-2- COMPETENCY**		**Upon finishing this course, students will be able to provide counseling and education services about safe use of natural medicinal products.** **This competency will be developed via the following key elements:**	
3.2.3	Provide evidence-based information about safe use of complementary medicine including phytotherapy, aromatherapy, and nutraceuticals.	3.2.1	Explain the principles of safe use of phytotherapy, aromatherapy, and nutraceuticals based on current scientific evidence.
		3.2.2	Evaluate patient cases to determine the suitability and potential risks of complementary medicine products.
		3.2.3	Recommend appropriate complementary medicine regimens while considering safety, efficacy, and possible interactions with conventional drugs.

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**
3.2.4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.	3.2.4	Identify sources and toxicological characteristics of drugs, natural toxins, and xenobiotics.
		3.2.5	Differentiate toxicity symptoms of various pharmaceutical and natural agents to aid in diagnosis and management.
		3.2.6	Propose suitable management and control measures for poisoning cases based on toxicity profiles.
3.2.6	Maintain public awareness on social health hazards of drug misuse and abuse.	3.2.7	Educate the public on the risks and social consequences of drug misuse and abuse.
		3.2.8	Design awareness campaigns and educational materials addressing prevention of drug abuse.
		3.2.9	Collaborate with community health teams to implement strategies that reduce misuse and promote safe medication practices.
DOMAIN 4: PERSONAL PRACTICE **4-1- Competency**		**Upon finishing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and team working, creativity and entrepreneurial skills.**	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	4.1.1	Apply effective time management techniques to plan and deliver assigned tasks within team projects.
		4.1.2	Evaluate the performance of peers objectively using agreed criteria and constructive feedback methods.

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**
		4.1.3	Demonstrate responsibility and accountability in fulfilling individual and group roles to ensure optimal team performance.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	4.1.4	Retrieve relevant scientific information from various credible sources to support problem-solving in pharmacognosy.
		4.1.5	Analyze complex problems related to spectral analysis and biosynthesis of natural products, and propose suitable solutions.
		4.1.6	Work independently and collaboratively to achieve project goals while maintaining effective communication within the team.
4-2- Competency		**Upon finishing this course, students will be able to effectively communicate verbally, non-verbally and in writing with individuals and communities.**	
4.2.2	Use contemporary technologies and media to demonip9-strate effective presentation skills.	4.2.1	Design and structure professional presentations using contemporary digital tools and media formats.
		4.2.2	Deliver oral presentations clearly and confidently, adapting content and style to suit the audience and purpose.
		4.2.3	Integrate multimedia resources and modern technology effectively to enhance the quality and impact of presentations.
4-3- Competency		**Upon finishing this course, students will be able to express self-awareness and be a life-long learner for continuous professional improvement**.	

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**
4.3.1	Perform self-assessment to enhance professional and personal competencies	4.3.1	Retrieve and evaluate information from credible sources to support continuous professional and personal development.
		4.3.2	Reflect on personal strengths and weaknesses to create an action plan for skill enhancement.
		4.3.3	Apply feedback from peers, mentors, and self-evaluation to improve performance in academic and professional tasks.

4. Teaching and Learning Methods

1-Lectures
2-Practical training / laboratory
3-Seminar / Workshop
4-Class Activity
5- E-learning

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	Quality control of herbal drugs	3	1	2		
2	Advanced techniques in the quality control of Herbal products-1	3	1	2		
3	Advanced techniques in the quality control of Herbal products-2	3	1	2		
4	Forensic pharmacognosy, and systematic procedure to identify toxic substances-1	3	1	2		
5	Forensic pharmacognosy, and systematic procedure to identify toxic substances-2	3	1	2		
6	Plant tissue culture-1	3	1	2		
7	**Mid-term exam**					
8	Plant tissue culture-2	3	1	2		
9	Plant tissue culture applications	3	1	2		
10	Gas chromatography-1	3	1	2		
11	Gas chromatography-2	3	1	2		
12	Applications of gas chromatography	3	1	2		
13	System Pharmacology in pharmacognosy	3	1	2		
14	System Pharmacology in pharmacognosy	1	1	**Practical exam**		
15	Herbal products registration in Egypt	1	1	**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	50	50%
3	Final Practical/Clinical/… Exam	Week 14,15	15	15%
4	Final Oral Exam	Week 16	10	10%
5	Assignments / Project /Portfolio/ Logbook	Week 14	10	10%

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)	Mukherjee, P. K. (2022). Quality control and evaluation of herbal drugs: Ensuring safety and efficacy. Elsevier. Husen, A. (2023). Medicinal plants: Quality control, phytochemistry, and pharmacology. CRC Press. Park, S. (2021). Plant tissue culture: Techniques and experiments (4th ed.). Academic Press. Hameed, Z., & Hakeem, K. R. (2022). Plant tissue culture: Current status and opportunities in a changing environment. CRC Press. Nabavi, S. M., & Silva, A. S. (2020). Recent advances in natural products analysis. Elsevier. Havlíček, V., & Spí?ek, J. (2021). Natural products analysis: Instrumentation, methods, and applications. Wiley. Bell, S. (2024). Forensic chemistry (3rd ed.). CRC Press. Shaw, I., & Sandiford, A. (2024). Forensic science: The science behind the truth. Routledge. .
	Other References	de la Forêt, R. (2021). Alchemy of herbs: Transform everyday ingredients into foods and remedies that heal. Hay House. Gemma, M., & Blankespoor, J. (2024). Advanced herbal medicine: Clinical applications and formulations. Chestnut School of Herbal Medicine
	Electronic Sources (Links must be added)	www.biomedcentral.com www.medscape.com http://www.sciencedirect.com/ http://www.ncbi.nlm.nih.gov/

	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**	-Microscopes -Uv lamp - flames
	Supplies	-Data show - Computers
	Electronic Programs	
	Skill Labs/ Simulators	- e- learning smart board

Name and Signature
Course Coordinator

Ass. Prof. Mai H. Elnagar

Dr. Abdullah A. Elgazar

Name and Signature
Program Coordinator

Prof. Dr. Abdel Aziz El-Ashmawy

Course Specification (2025)

1. Basic Information

Course Title (according to the bylaw)	Medicinal Chemistry III			
Course Code (according to the bylaw)	PC 706			
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
	2	…	----	2
Course Type	compulsory			
Academic level at which the course is taught	Fourth level, semester (1)			
Academic Program	Bachelor of Pharmacy (PharmD)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Associate Prof. Rofida Salem			
Course Specification Approval Date	9/2025			
Course Specification Approval	Department Council			

2. Course Overview (Brief summary of scientific content)

Upon successful completion of this course, students will acquire an in-depth understanding of the medicinal chemistry of different classes of chemotherapeutic and anti-infective agents. The course emphasizes the chemical structures, physicochemical properties, mechanisms of action, structure–activity relationships (SAR), pharmacokinetics, and therapeutic applications of these agents. The scientific content covers major drug classes including, antiviral drugs, anti-tuberculosis medications, antifungal compounds, antimalarial drugs, anti-amoebic agents, and other anti-infective drugs.

Students will also develop competencies in correlating chemical modifications with biological activities, predicting therapeutic outcomes, and appreciating the rational design of novel agents. Through this integrated approach, the course aims to strengthen students' ability to apply medicinal chemistry principles in pharmaceutical practice, clinical applications, and drug development.

Students will also be able to relate the chemical structure to biological activity and the general structural features required for the drug action. the effect of molecular modifications on the absorption, distribution, metabolism, and target binding of drugs.

Students will also be able to make Quantitatively drugs in different dosage forms using pharmacopeial methods of assay.

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:**	

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.1.1**	Demonstrate understanding of the pharmaceutical and biomedical basis of chemotherapeutic and anti-infective agents, including their chemical structures, mechanisms of action, and structure–activity relationships (SAR).
		1.1.2	Apply knowledge of pharmaceutical sciences to perform and interpret quantitative measurements of selected drugs, linking results to their quality control and therapeutic effectiveness.
		1.1.3	Recognize and relate the clinical, social, and public health aspects of chemotherapy and anti-infective therapy to promote rational and evidence-based use of medicines in patient care.
1.1.3	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.	**1.1.4**	Identify and classify synthetic and natural chemotherapeutic and anti-infective agents based on their chemical and physicochemical characteristics.
		1.1.5	Apply appropriate laboratory techniques to extract, quantify, and analyze pharmaceutical drugs used in chemotherapy and anti-infective therapy.
		1.1.6	Evaluate the quality and purity of selected pharmaceutical products through integrating knowledge of fundamental sciences with analytical and medicinal chemistry methods.
1.1.4	Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.	**1.1.7**	Explain and interpret the mechanisms of action, therapeutic effectiveness, and safety profiles of chemotherapeutic and anti-infective agents at both individual and population levels.
		1.1.8	Evaluate and justify the appropriateness of different drug regimens by integrating medicinal chemistry knowledge with clinical and public health perspectives.
1.1.5	Retrieve information from fundamental sciences to solve therapeutic problems.	**1.1.9**	Retrieve and analyze scientific information from medicinal chemistry and related sciences to explain therapeutic problems involving chemotherapeutic and anti-infective agents.

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**
		1.1.10	Apply knowledge of drug structures, mechanisms, and SAR to propose appropriate solutions for challenges related to drug selection, resistance, or adverse effects.
		1.1.11	Integrate and evaluate evidence from pharmaceutical and biomedical sciences to support rational decision-making in chemotherapy and anti-infective therapy.
1.1.6	Utilize scientific literature and collect and interpret information to enhance professional decision.	**1.1.12**	Retrieve and interpret scientific literature related to chemotherapeutic and anti-infective agents to support evidence-based professional decisions.
		1.1.13	Critically evaluate collected data from research and laboratory findings to justify rational choices in drug selection, design, and therapeutic use.
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care	**1.1.14**	Identify and discuss newly emerging issues related to chemotherapy and anti-infective agents that impact the pharmaceutical industry and patient health care.
		1.1.15	Critically analyze and evaluate current challenges such as drug resistance, safety concerns, and innovation in drug development to propose rational solutions for improving therapeutic outcomes.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-2- COMPETENCY		**Upon completing this course, students will be able to standardize pharmaceutical materials, formulate and manufacture pharmaceutical products, and participate in systems for dispensing, storage, and distribution of medicines.** **This competency will be developed via the following key elements:**	
2.2.1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/natural pharmaceutical materials.	**2.2.1**	Demonstrate the ability to isolate, identify, and analyze synthetic and natural chemotherapeutic and anti-infective agents using appropriate laboratory techniques.
		2.2.2	Apply principles of medicinal chemistry to design, synthesize, and purify selected pharmaceutical compounds relevant to chemotherapy and anti-infective 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**
		2.2.3	Evaluate and standardize the quality and purity of pharmaceutical materials through integrating fundamental sciences with practical analytical methods.
2.2.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	**2.2.4**	Apply and demonstrate the principles of quality management systems in analyzing and evaluating chemotherapeutic and anti-infective pharmaceutical products, with consideration of drug–drug and drug–excipient incompatibilities.
		2.2.5	Assess and justify the role of quality management in the development, storage, and distribution of pharmaceutical materials to ensure safety, stability, and therapeutic effectiveness.
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.	**2.2.6**	Recognize and explain the principles of analytical and synthetic tools commonly used in the synthesis and evaluation of chemotherapeutic and anti-infective agents.
		2.2.7	Apply spectroscopic, chromatographic, and other instrumental techniques for qualitative and quantitative drug analysis. Interpret and evaluate experimental data obtained from instrumental analysis to ensure the quality, safety, and effectiveness of pharmaceutical products.
		2.2.8	Select and apply appropriate laboratory instruments and techniques for the synthesis, purification, and quantitative analysis of pharmaceutical materials. Evaluate the suitability and limitations of different analytical tools for specific pharmaceutical applications.
2-3- COMPETENCY		**Upon completing this course, students will be able to handle and dispose of biological and synthetic/natural pharmaceutical materials/products effectively and safely with respect to relevant laws and legislations.** **This competency will be developed via the following key elements:**	

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**	Identify biological, synthetic, natural, and radio-labeled compounds through physicochemical, spectroscopic, and chromatographic methods.
		2.3.2	Safe handling techniques for chemicals, biologics, and radiolabeled substances in laboratory and production settings, including contamination control and personal protective equipment (PPE) protocols.
		2.3.3	Apply safe procedures for the disposal of hazardous and radio-labeled pharmaceutical materials in compliance with professional standards and relevant legislations.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biological, and pharmaceutical materials/products.	**2.3.4**	Understand frameworks governing the use, storage, and disposal of pharmaceutical chemicals, biologicals, and radioactive substances.
		2.3.5	Adhere to ethical principles in laboratory practice, including data integrity, environmental responsibility, and human/animal welfare considerations.
2-4- COMPETENCY		**Upon completing this course, students will be able to actively share professional decisions and proper actions to save patient's life in emergency situations including poisoning with various xenobiotics and effectively work in forensic fields.** **This competency will be developed via the following key elements:**	
2.4.4	Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens.	**2.4.1**	Evaluate the chemical and pharmacokinetic basis of xenobiotic toxicity.
		2.4.2	Relate molecular structure to toxicological properties.
		2.4.3	Interpret dose–response relationships and identify toxic thresholds.
		2.4.4	Assess the toxicity profiles of chemotherapeutic and anti-infective agents.

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**
		2.4.5	Apply appropriate methods to detect and evaluate poisons in biological specimens within professional and ethical standards.
2-5- COMPETENCY		**Upon completing this course, students will be able to contribute to pharmaceutical research studies and clinical trials needed to authorize medicinal products. This competency will be developed via the following key elements:**	
2.5.1	Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements.	**2.5.1**	Interpret stability testing data to ensure chemical safety and compliance with regulatory shelf-life requirements.
		2.5.2	Recognize and apply the regulatory requirements related to quality, safety, and efficacy in the authorization of pharmaceutical products.
		2.5.3	Evaluate and justify pharmaceutical data and research findings to ensure compliance with legal and professional standards for drug approval and patient safety.
		2.5.4	Correlate chemical structure and physicochemical properties of drug molecules with their pharmacological efficacy and safety profile for registration purposes.
2.5.3	Contribute in planning and conducting research studies using appropriate methodologies.	**2.5.5**	Design analytical and synthetic research plans for the development and characterization of new chemical entities
		2.5.6	Select and apply suitable analytical techniques (e.g., HPLC, UV-Vis, NMR, IR) for qualitative and quantitative assessment of pharmaceutical compounds.
Domain 3: Pharmaceutical Care 3-2-Competency		**Upon completing this course, students will be able to Provide counselling and education services to patients and communities about safe and rational use of medicines and 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:	
3.2.1	Integrate the pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, adverse drug reactions and drug interactions.	**3.2.1**	Correlate chemical structure with pharmacological activity.
		3.2.2	Relate functional groups, stereochemistry, and physicochemical properties to the mechanism of drug action and potency.
		3.2.3	Explain the relationship between chemical structure and therapeutic applications.
		3.2.4	Link structural features to the spectrum of activity, therapeutic indications, and dosage considerations.
		3.2.5	Analyze how structural modifications influence safety and drug interactions
		3.2.6	Evaluate how chemical changes affect toxicity, adverse drug reactions, contraindications, and potential for drug–drug interactions.
Domain 4: Personal Practice **4-2- Competency**		**Upon completing this course, students will be able to effectively communicate scientific and professional information regarding pharmaceutical agents, using verbal, non-verbal, and written skills to educate patients, healthcare professionals, 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**	Utilize pharmaceutical chemistry–related software (e.g., ChemDraw, MarvinSketch, molecular modeling tools) to create clear, accurate, and professional chemical structure diagrams for presentations.
		4.2.2	Integrate analytical data visualization tools (e.g., HPLC/UV-Vis spectra plotting software, Excel, Origin) to effectively present experimental results and drug analysis findings.

4. Teaching and Learning Methods

.1.- Lectures (√)

2- E-learning (√)

3- Practical training/ laboratory (X)

4- Discussion (√)

5- Seminars (√)

6- Assignments (√)

7- 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	Antibacterial Antibiotics	**2**	**2**	-----	-----	-----
2	Antibacterial Antibiotics (cont.)	**2**	**2**	-----	-----	-----
3	Antibacterial Antibiotics (cont.)	**2**	**2**	-----	-----	-----
4	Synthetic Antibacterial agents (cont.)	**2**	**2**	-----	-----	-----
5	Antiviral drugs	**2**	**2**	-----	-----	-----
6	Antiviral drugs (cont.)	**2**	**2**	-----	-----	-----
7	**Midterm Exam**					
8	Antifungal drugs	**2**	**2**	-----	-----	-----
9	Antifungal drugs (cont.)	**2**	**2**	-----	-----	-----
10	Anti-TB drugs	**2**	**2**	-----	-----	-----
11	Antiprotozoal agents	**2**	**2**	-----	-----	-----
12	Antimalarial drugs	**2**	**2**	-----	-----	-----
13	Anthelmintics	**2**	**2**	-----	-----	-----
14	Anti-infective agents	**2**	**2**	-----	-----	-----
15	Revision	**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%
	Total		100	100%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	**The main (essential) reference for the course**	1)Wilson and Gisvold's " Textbook of Organic and Pharmaceutical Chemistry", 12th Ed., Jaime N. Delgado, J.B. Lippincot Co., 2010. 2) William O Foye, " Principle of Medicinal Chemistry" 8th edition (2019), Williams & Wilkins, London. 3) M.E.Wolff Burger's " Medicinal Chemistry and Drug Discovery ", 7th edition (2010), Wiley-interscience Publication, New York, USA. 4) Loyd V. Allen Jr (Editor), " Remington's Pharmaceutical Sciences ", 23rd edition (2020), Pharmaceutical Press, USA. 5) Acharya, P. C., & Kurosu, M. (Eds.). (2023). *Medicinal Chemistry of Chemotherapeutic Agents:* *6) A Comprehensive Resource of Anti-infective and Anti-cancer Drugs* (1st ed.). 7) Liu, G. (Ed.). (2025). *Medicinal Chemistry and Drug Development* (1st ed.). 8) Dunlap, N. K., & Huryn, D. M. (2025). *Medicinal Chemistry*. Taylor & Francis.
	Other References	William O Foye, " Principle of Medicinal Chemistry" 8th edition (2019), Williams & Wilkins, London.
	Electronic Sources	www.fda.gov , www.mohp.gov , www.emea.org , www.who.int
	Learning Platforms	https://lms3.kfs.edu.eg/pharm/login/index.ph
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	- Data show, Computers, Library, Internet.
	Supplies	Classrooms.

Course Plan

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

Course title: Medicinal chemistry III **Course code:** PC 706

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	**Antibacterial Antibiotics**	1.1.1, 1.1.2, 1.1.3, 1.1.5, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.4,1, 2.5.1, 3.2.1,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 2	**Antibacterial Antibiotics (cont.)**	1.1.1, 1.1.3, 1.1.4, 1.1.6, 2.2.1, 2.2.2, 2.2.5, 2.2.6, 2.2.7, 2.3.3, 2.4.2, 2.4.3, 3.2.6,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 3	**Antibacterial Antibiotics (cont.)**	1.1.1, 1.1.2, 1.1.3, 1.1.7, 1.1.8, 1.1.9, 1.1.10, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.3.2, 2.3.4, 2.4.1, 2.4.3, 3.2.2, 3.2.3,	Lectures, e-learning, discussion, and brainstorming activities	Written and oral exams
Week # 4	**Synthetic Antibacterial agents (cont.)**	1.1.1, 1.1.3, 1.1.6, 1.1.7, 1.1.8, 1.1.10, 1.1.11, 1.1.12, 2.2.1, 2.2.2, 2.2.3, 2.2.5, 2.2.8, 2.4.1, 2.5.1, 3.2.1, 3.2.3, 3.2.4,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 5	**Antiviral drugs**	1.1.1, 1.1.3, 1.1.6, 1.1.7, 1.1.11, 1.1.12, 1.1.13, 1.1.14, 1.1.15, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.3, 2.3.5, 2.4.5, 2.5.1, 2.5.3, 3.2.1, 3.2.2, 4.2.2.	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 6	**Antiviral drugs (cont.)**	1.1.4, 1.1.5, 1.1.7, 1.1.8, 1.1.9, 1.1.10, 2.2.2, 2.2.3, 2.3.1, 2.4.4, 2.5.1, 2.5.3, 3.2.1, 3.2.2, 3.2.3, 3.2.6,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 7	**Midterm Exam**			
Week # 8	**Antifungal drugs**	1.1.4, 1.1.5, 1.1.7, 1.1.8, 1.1.9, 1.1.10, 2.2.2, 2.2.3, 2.2.6, 2.2.7, 2.3.1, 2.3.2, 2.3.3, 2.4.1, 2.4.2, 2.4.3, 2.5.1, 2.5.2, 3.2.1,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 9	**Antifungal drugs (cont.)**	1.1.1, 1.1.3, 1.1.5, 1.1.6, 1.1.7, 1.1.10, 1.1.11, 2.2.1, 2.2.2, 2.2.3, 2.2.6, 2.2.7, 2.3.1, 2.3.2, 2.3.5, 2.4.4, 2.5.1, 2.5.2, 3.2.1, 3.2.3, 3.2.4, 4.2.2.	Lectures, e-learning, discussion, and brainstorming	Written and oral exams

Week # 10	**Anti-TB drugs**	1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.2.1, 2.2.2, 2.2.3, 2.2.8, 2.3.1, 2.3.2, 2.4.4, 2.4.5, 2.5.5,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 11	**Antiprotozoal agents**	1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.11, 1.1.13, 2.2.1, 2.2.3, 2.3.1, 2.3.2, 2.3.5, 2.4.1, 2.4.2, 2.4.4, 2.5.2, 3.2.1, 3.2.5,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 12	**Antimalarial drugs**	1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.2.3, 2.3.1, 2.3.2, 2.3.4, 2.4.4, 2.5.1, 3.2.1,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 13	**Anthelmintics**	1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.2.3, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.4.4, 2.5.5, 2.5.6, 3.2.6,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 14	**Anti-infective agents**	1.1.4, 1.1.5, 1.1.6, 1.1.7, 2.2.2, 2.2.3, 2.3.1, 2.3.2, 2.4.4, 2.5.3, 2.5.4, 3.2.3,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams
Week # 15	**Revision**	1.1.5, 1.1.6, 1.1.7, 1.1.9, 1.1.10, 1.1.11, 1.1.13, 2.2.1, 2.2.2, 2.3.1, 2.3.2, 2.4.4, 2.5.1, 2.5.2, 3.2.3, 3.2.4,	Lectures, e-learning, discussion, and brainstorming	Written and oral exams

Name and Signature
Course Coordinator

Assoc. Prof. Rofida Salem

Name and Signature
Program Coordinator

Prof. Abdel Aziz El-Sayed

Kafrelsheikh University

Faculty of Pharmacy

جامعة كفر الشيخ
كلية الصيدلة

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Clinical Biochemistry			
Course Code (according to the bylaw)	**PB 704**			
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	Fourth level, first semester			
Academic Program	Bachelor degree in Pharmacy (pharm D)			
Faculty/Institute	Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Dr/ Tarek Okda			
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 fundamental aspects of clinical chemistry of various diseases such as cancer, liver, heart, and kidney. The necessary clinical knowledge and skills correlate with the biochemical analyses of a certain disease and its appropriate management. The recent specific diagnostic markers of each disease and how they can be analyzed.

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 clinical biochemistry science to 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**	Recognize how biochemical processes and molecules in diabetes, liver, kidney, tumor markers, nutrition, plasma proteins, immunoglobulins, hormones, coagulation, enzymes, and electrolytes relate to human health and disease.
		1.1.2	Identify laboratory tests to diagnose, monitor, and manage medical conditions in diabetes, liver, kidney, tumor markers, nutrition, plasma proteins, immunoglobulins, hormones, coagulation, enzymes, and electrolytes through the measurement of biomarkers in body fluids.
1.1.5	Retrieve information from fundamental sciences to solve therapeutic problems.	**1.1.3**	Apply concepts from basic sciences to address therapeutic problems in diabetes, liver, kidney, tumor markers, nutrition, plasma proteins, immunoglobulins, hormones, coagulation, enzymes, and electrolytes, and this supports evidence-based decision-making

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**
			in selecting, monitoring, and adjusting treatment plans for optimal patient outcomes.
1.1.6	Utilize scientific literature, collect and interpret information to enhance professional decisions.	**1.1.4**	Search, critically appraise, and extract relevant data from scientific literature about diabetes, liver, kidney, tumor markers, nutrition, plasma proteins, immunoglobulins, hormones, coagulation, enzymes, and electrolytes to inform clinical judgments.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE **2-1 competency**		**Upon finishing 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**	Adhere to the pharmaceutical law and legislation in clinical biochemistry laboratories and respect human rights.
2.1.2	Adopt the ethics of health care and the pharmacy profession, respecting patients' rights and valuing people's diversity.	**2.1.2**	Obey the ethical and legal guidelines in clinical biochemistry laboratories while performing their responsibilities and recognize patients' rights.
2.1.3	Recognize your own personal and professional limitations and accept the conditions of referral to or guidance from other members of the health care team.	2.1.3	Recognize self-professional limitations and accept guidance from other health care colleagues.

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 competency		**Upon finishing this course, students will be able to handle and dispose of biological and synthetic/natural pharmaceutical materials/products effectively and safely with respect to relevant laws and legislations.** **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 fields	2.3.1	Manipulate different chemical, pharmaceutical, and biological products such as blood and urine samples.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals and pharmaceutical materials/products.	2.3.2	Handle and dispose of biological materials and synthetic/natural pharmaceutical products, taking into consideration ethical, legal, and safety guidelines
2-4 competency		**Upon finishing this course, students will be able to actively share professional decisions and proper actions to save patient's life in emergency situations through different lab investigation tests. That can detect poisoning with various xenobiotics.** **This competency will be developed via the following key elements:**	
2.4.4	Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens.	2.4.1	Detect the cause of toxicity based on lab investigations such as serum creatinine, ALT, and AST, and work efficiently in the forensic team.
2-5 competency		**Upon finishing this course, students will be able to contribute to clinical biochemistry research studies and learn about different types of specimens, analysis methods, and instruments.**	

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:	
2.5.2	Retrieve, interpret, and critically evaluate evidence-based information needed in the pharmacy profession.	2.5.1	Detect possible disorder based on lab investigations
2.5.3	Contribute to planning and conducting research studies using appropriate methodologies.	2.5.2	Select a suitable method for the analysis of different body fluid samples.
Domain 3 (Pharmaceutical Care) **3-1 competency**		**Upon finishing this course, students will be able to apply the principles of body biochemistry to improve health care services using evidence-based information.** **This competency will be developed via the following key elements:**	
3.1.1	Apply the principles of body function and the basis of genomics in health and disease states to manage different diseases.	3.1.1	Relate the biochemistry of normal and abnormal body function to manage different disorders and diseases, especially disorders of the endocrine systems and metabolic diseases to improve health care services.
3.1.3	Monitor and control microbial growth and carry out laboratory tests for the identification of infections/diseases.	3.1.2	Perform different biochemical tests to identify and diagnose different infections/diseases.
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.	3.1.3	Relate disease etiology, epidemiology, pathophysiology, clinical features, and lab investigation and pharmacotherapy approaches based on recent international practice guideline
		3.1.4	Make necessary changes in the therapeutic plan based on the clinical picture and lab investigations.
Domain 4: Personal Practice **4-1 competency**		**Upon finishing this course, students will be able to express leadership, manage time, solve problems, work in a team, be independent, and be creative.**	

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:	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills	**4.1.1**	Plan and set realistic targets to achieve the required task in deadlines based on the available information.
		4.1.2	Manage different and unexpected challenges in to effectively work independently and in a team.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.1.3**	Demonstrate critical thinking skills, including problem-solving, creativity, and time management, in team performance evaluation.
4-2 competency		**Upon finishing this course, students will be able to communicate verbally, non-verbally, and in writing with either their colleagues in the medical field, patients, or communities.** **This competency will be developed via the following key elements:**	
4.2.1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care teams, patients, and communities.	**4.2.1**	Communicate clearly by verbal and written means with patients and members of healthcare society.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills	**4.2.2**	Present clinical biochemistry data and topics effectively using recent technology.
4-3 competency		**Upon finishing this course, students will be able to express self-awareness and be lifelong learners for continuous professional improvement.** **This competency will be developed via the following key elements:**	

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**
4.3.1	Perform self-assessment to enhance professional and personal competencies.	4.3.1	Determine self-merits/limitations to improve personal and professional skills using information from different clinical biochemistry sources.
4.3.2	Practice independent learning is needed for continuous professional development.	4.3.2	Track the continuous updates with respect to new regulations and guidelines.
		4.3.3	Learn independently to develop professional skills.

4. Teaching and Learning Methods

1. Lecture
2. Practical
3. Presentation
4. E. learning
5. Brain storming
6. Discussion
7. Case study
8. Assignment
9. Virtual lab

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	Diabetes mellitus and laboratory tests	**4**	**2**	**2**		
2	Liver Functions and laboratory Tests	**4**	**2**	**2**		
3	Renal Functions and laboratory tests	**4**	**2**	**2**		
4	Urine as a diagnostic tool for diseases	**4**	**2**	**2**		
5	Electrolyte balance and imbalance	**4**	**2**	**2**		
6	Nutrition and health	**4**	**2**	**2**		
7	**Mid-term exam**					
8	Tumor markers	**4**	**2**	**2**		
9	Hormonal disturbances	**4**	**2**	**2**		
10	Hormonal disturbances 2	**4**	**2**	**2**		
11	Hormonal disturbances 3	**4**	**2**	**2**		
12	Plasma proteins	**4**	**2**	**2**		
13	Coagulations.	**4**	**2**	**2**		
14	Immunoglobulins.	**2**	**2**	Practical exam		
15	Plasma and non-pasma enzymes.	**2**	**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	10	10%
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 3,6,11	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)	1- Michael Murphy Rajeev Srivastava Kevin Deans (2018) Clinical Biochemistry, 6th Edition, Elsevier. 2-**Murphy, M. J., Srivastava, R., & Deans, K. A. (2022).** *Clinical biochemistry: An illustrated colour text* (7th ed.). Elsevier.
	Other References	**Vasudevan, D. M., Sreekumari, S., & Vaidyanathan, K. (2022).** *Textbook of medical biochemistry* (9th ed.). Jaypee Brothers Medical Publishers
	Electronic Sources (Links must be added)	www.highwire.com,www.google.com,www.pubmed.com &www.biomed.net
	Learning Platforms (Links must be added)	**https://lms3.kfs.edu.eg/pharm/login/index.php**
	Other (to be mentioned)	Notes in Clinical Biochemistry by staff members of the Department of Biochemistry. Lab manual in Clinical Biochemistry by staff members of the Department of Biochemistry
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	Laboratory facilities
	Supplies	lab instruments such as glassware, pH meters, electrophoretic apparatus, centrifuge, spectrophotometers, session rooms
	Electronic Programs	
	Skill Labs/ Simulators	
	Virtual Labs	Praxi lab
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet, and Library.

Course Plan

Course title: Clinical biochemistry **Course code: PB 704**

Wk.	Topic	Key Elements	Teaching & Learning Methods	Student Assessment Methods
1	**Diabetes mellitus and laboratory tests**	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams
2	**Liver Functions and laboratory Tests**	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams
3	**Renal Functions and laboratory tests**	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, virtual lab, assignment and presentation	Written, practical and oral exams
4	**Urine as a diagnostic tool for diseases**	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3. 1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams

5	**Electrolyte balance and imbalance**	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams
6	**Nutrition and health**	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, virtual lab, assignment and presentation	Written, practical and oral exams
7				
8	Tumor markers	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams
9	Hormonal disturbances	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams
10	Hormonal disturbances 2	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2,	Lectures, E-learning, practical training, discussion, brain storming,	Written, practical and oral exams

		4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	case study, and virtual lab,	
11	Hormonal disturbances 3	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, virtual lab, assignment and presentation	Written, practical and oral exams
12	Plasma proteins	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study, and virtual lab,	Written, practical and oral exams
13	Coagulations.	1.1.1,1.1.2,1.1.3, 1.1.4,2.1.1,2.1.2, 2.1.3,2.3.1,2.3.2, 2.4.1,2.5.1,2.5.2, 3.1.1,3.1.2,3.1.3, 3.1.4,4.1.1,4.1.2, 4.1.3,4.2.1,4.2.2, 4.3.1,4.3.2,4.3.3	Lectures, E-learning, practical training, discussion, brain storming, case study and virtual lab	Written, practical and oral exams
14	Immunoglobulins.	1.1.1,1.1.2,1.1.3, 1.1.4,3.1.1,3.1.2, 3.1.3,3.1.4,4.1.1, 4.1.2,4.1.3,4.2.1, 4.2.2,4.3.1,4.3.2, 4.3.3	Lectures, E-learning, discussion, brain storming and case study	Written and oral exams
15	Plasma and non-pasma enzymes.	1.1.1,1.1.2,1.1.3, 1.1.4,3.1.1,3.1.2, 3.1.3,3.1.4,4.1.1, 4.1.2,4.1.3,4.2.1, 4.2.2,4.3.1,4.3.2, 4.3.3	Lectures, E-learning, discussion, brain storming and case study	Written and oral exams

Name and Signature Course Coordinator Dr/ Tarek Okda	Name and Signature Program Coordinator Prof. Abdelaziz Elsayed

Course Specification
2025

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutical Technology I			
Course Code (according to the bylaw)	PT 708			
Department/s participating in delivery of the course	Pharmaceutics & 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	Fourth level, semester (1)			
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. Ahmed Adel			
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 with an introduction to industrial pharmacy. It deals with the principles of various unit operations such as heat transfer, evaporation, drying, distillation, filtration, centrifugation, crystallization and extraction. It focuses on the application of these unit operations in pharmaceutical industry with emphasis on the equipment and machines used during the production of different dosage forms

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 sciences to formulate and manufacture conventional and new drug products.** **This competency will be developed through 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 mechanisms of various unit operations including heat transfer, evaporation, drying, distillation, filtration, centrifugation, crystallization, and extraction.
		1.1.2	List all factors affecting the abovementioned unit operations.
1.1.3	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of	**1.1.3**	Classify all equipment used in the abovementioned unit operations.

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.	**1.1.4**	Identify the applications of the abovementioned unit operations during the production of different dosage forms.
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	**1.1.5**	Describe the construction of the most recent industrial equipment used in pharmaceutical manufacturing, their working principles, and applications.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-2- COMPETENCY		**Upon completing this course, students will be able to apply the working principles of these major industrial unit operations in pharmaceutical product development and design.** **This competency will be developed via the following key elements:**	
2.2.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	**2.2.1**	Construct methods of isolation, purification, and crystallization of different raw materials
2.2.4	Adopt the principles of pharmaceutical calculations, biostatistical analysis, bioinformatics, pharmacokinetics, and biopharmaceutics and their applications in new drug delivery	**2.2.2**	Operate pharmaceutical equipment in industrial production lines

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**
	systems, dose modification, bioequivalence studies, and pharmacy practice.	**2.2.3**	Apply different pharmaceutical technologies in recent drug delivery systems.
2-3- COMPETENCY		**Upon finishing this course, students will be able to Apply appropriate procedures for the handling and disposal of biological and pharmaceutical materials—both synthetic and natural—ensuring compliance with current Good Manufacturing Practices (cGMP), environmental regulations, and biosafety standards.** **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 fields.	**2.3.1**	Safely handle different chemicals to avoid harm to the students.
2-5- Competency		**Upon finishing this course, students will be able to Contribute to pharmaceutical research and clinical development activities essential for the regulatory approval and market authorization of medicinal products** **This competency will be developed via the following key elements:**	
2.5.1	Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements.	**2.5.1**	Achieve regulatory approval for a medicinal product by presenting validated data supporting its manufacturing quality, non-clinical and clinical safety, and therapeutic effectiveness.

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 4: Personal Practice **4-1- Competency**		**Upon finishing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and team working, creativity and entrepreneurial skills** **This competency will be developed via the following key elements:**	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.1.1**	Contribute to team success by being accountable for group performance, offering constructive feedback to peers, and effectively managing time to meet project goals
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.1.2**	Source and critically evaluate relevant data, identify and implement systematic solutions, and operate autonomously with strong collaboration in cross-functional teams
4.1.3	Demonstrate creativity and apply entrepreneurial skills within a simulated entrepreneurial activity.	**4.1.3**	Demonstrate strategic thinking and creative problem-solving within a simulated pharmaceutical commercialization or start-up scenario.
4-2- Competency		**Upon completing this course, students will be able to effectively communicate verbally, non-verbally, and in writing with individuals in pharmaceutical plants.** **This competency will be developed via the following key elements:**	
4.2.1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care teams, patients, and communities.	**4.2.1**	Maintain professional, evidence-based communication with multidisciplinary healthcare teams, patients, and the public to enhance therapeutic outcomes and pharmaceutical services

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**
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.2.2**	Retrieve information from different sources and set realistic targets and time plan to accomplish a required mission in deadlines

4. Teaching and Learning Methods

1- **Lectures** **(√)**

2- E-learning **(√)**

3- Practical training/ laboratory **(√)**

4- discussion **(√)**

5- Brain storming **(√)**

6- Assignment **(√)**

7- Seminars **(√)**

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	**4**	**2**	**2**	-------	-------
2	Heat transfer	**4**	**2**	**2**	-------	-------
3	Evaporation	**4**	**2**	**2**	-------	-------
4	Evaporation	**4**	**2**	**2**	-------	-------
5	Drying	**4**	**2**	**2**	-------	-------
6	Drying	**4**	**2**	**2**	-------	-------
7	Semester works					
8	Distillation	**4**	**2**	**2**	-------	-------
9	Extraction	**4**	**2**	**2**	-------	-------
10	Filtration	**4**	**2**	**2**	-------	-------
11	Filtration	**4**	**2**	**2**	-------	-------
12	Centrifugation	**4**	**2**	**2**	-------	-------
13	Crystallization	**4**	**2**	**2**	-------	-------
14	Crystallization	**4**	**2**	**Practical exam**	-------	-------
15	Crystallization	**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/Clinical/… Exam	14,15	15	15%

3	Final Written Exam	16,17	50	50%
4	Final Oral Exam	16,17	10	10%
5	Assignments / Project /Portfolio/ Logbook	All semester long	10	10%

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)	Notes and Lab manual prepared by the department staff
	Other References	Essentials of Industrial Pharmacy Basics of Pharmaceutical Manufacturing and Quality Operations
	Electronic Sources (Links must be added)	https://www.fda.gov/ https://www.ich.org/
	Learning Platforms (Links must be added)	**https://lms3.kfs.edu.eg/pharm/login/index.php**
	Other (to be mentioned)	Pharmaceutical Manufacturing Handbook: Production and Processes
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	Laboratory facilities (Equipment of factory).
	Supplies	
	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: Pharmaceutical Technology **I** **Course code: PT 708**

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Introduction	1.1.1,1.12,1.1.4,1.15, ,2.2.1, 2.2.3, , 2.3.1,4.2.2	Lectures and discussion	Written, practical and oral exams
Week # 2	Heat transfer	1.1.1,1.12,1.1.4,1.15 ,2.2.1, 2.2.3 , 2.3.1,2.5.1,4.2.2	Lectures and practical training	Written, practical and oral exams
Week # 3	Evaporation	1.1.1,1.12,1.1.3,1.1.4, ,2.2.1, 2.2.3, 2.3.1,4.2.1,4.2.2	Lectures and practical training	Written, practical and oral exams
Week # 4	Evaporation	1.1.2, 1.1.4,1.1.5, 2.2.1, 2.2.2, 2.2.3, 2.5.1,	Lectures, practical training and discussion.	Written, practical and oral exams
Week # 5	Drying	1.1.1, 1.1.3, 1.15, 2.2.1, 2.2.2, 2.2.3, 4.1.3,4.2.1	Lectures and discussion.	Written, practical and oral exams
Week # 6	Drying	1.1.2, 1.13, 1.14,, 2.2.2, 2.3.1,2.5.1,4.1.2,	Lectures and brain storming.	Written, practical and oral exams
Week # 7	Semester works			
Week # 8	Distillation	1.1.1,1.1.3,1.1.4, 1.1.5 , 2.2.2, 2.3.1,4.1.3,4.2.1	Lectures and practical training	Written, practical and oral exams
Week # 9	Extraction	1.1.1,1.1.2, 1.1.4,1.1.5, 2.2.1, 2.2.2, , 2.3.1, 4.2.2,	Lectures and discussion.	Written, practical and oral exams

Week # 10	Filtration	1.1.1,1.1.2,1.1.3, 1.1.5,2.2.1, 2.2.2, 2.2.3, 2.5.1,4.1.1,4.1.2	Lectures	Written, practical and oral exams
Week # 11	Filtration	1.1.2,1.1.3,1.1.4, , 2.2.3, 2.5.1,4.1.1,4.2.1	Lectures and class activity.	Written, practical and oral exams
Week # 12	Centrifugation	1.1.1,1.12,1.1.3,1.1.4,1.1.5, 2.2.1,2.2.3, 4.1.3,4.2.2	Lectures and class activity.	Written, practical and oral exams
Week # 13	Crystallization	1.1.1,1.1.21.1.3,1.14, ,2..2.1,2..2.3,2.5.1,4.1.3,4.2.1	Lectures and class activity.	Written, practical and oral exams
Week # 14	Crystallization	1.1.1,1.12,1.1.3, 1.15, 2.2.1, 2.2.2, 2.2.3, 2.5.1,4.1.1,4.1.2	Lectures and brainstorming	Written and oral exams
Week # 15	Crystallization	1.1.1,1.1.2,1.1.3 1.1.4,2.2.1, 2.2.2, 2.2.3, 2..5.1,4.1.1,4.1.2	Lectures and discussion	Written and oral exams

Name and Signature
Course Coordinator
Prof. Abd El-Aziz EL-said
Lecturer. Ahmed Adel

Name and Signature
Program Coordinator
Prof. Abd El-aziz EL-said

Kafrelsheikh University

Faculty of Pharmacy

جامعة كفر الشيخ

كلية الصيدلة

Course Specification

2025

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutical Legislations and Regulatory Affairs			
Course Code (according to the bylaw)	NP704			
Department/s participating in delivery of the course	Pharmaceutics & Pharmaceutical Technology			
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	Fourth level/ Semester (1)			
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 Ass. Prof. Eman Mazyed			
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)

A detailed presentation of law that governs and affects the practice of pharmacy, legal principles for non-controlled and controlled prescriptions, OTC drug requirements, opening new pharmacies, opening medical stores, opening factories, opening scientific offices, medicine registration, pharmacies and medicine stores management. Pharmacist duties and responsibilities, pharmacist-patient relationship, patient's rights and ethical principles and moral rules.

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 legislation and ethics to apply good practice.** **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 understanding of different laws and legislations.
		1.1.2	Integrate biomedical, social, and administrative principles to ensure safe, effective, and ethical pharmacy practice.
		1.1.3	Recognize pharmacist duties and responsibilities, pharmacist-patient relationship, patient's rights and ethical principles
		1.1.4	Identify legal principles for non-controlled and controlled prescriptions.
		1.1.5	Identify requirements needed for opening new pharmacies, medical stores, factories and scientific offices.

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 2: PROFESSIONAL AND ETHICAL PRACTICE 2-1- COMPETENCY		**Upon finishing this course, students will be able to work collaboratively as a member of a health care team to improve the quality of life of individuals and communities, and respect patient 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**	Perform responsibilities in compliance with the legal and professional structure and role of all members of the health care professional team.
		2.1.2	Adopt ethics of health care and pharmacy profession respecting patients' rights and valuing people diversity.
2-1.2	Adopt ethics of health care and pharmacy profession respecting patients' rights and valuing people diversity.	**2.1.3**	Demonstrate ethical decision-making in dispensing, compounding, and counseling, ensuring respect for patients' rights, confidentiality, and cultural diversity.
		2.1.4	Comply with legal and professional responsibilities related to drug control, record keeping, and safe handling of narcotic and psychotropic substances
2-1.3	Recognize your own personal and professional limitations and accept the conditions of referral to or guidance from other members of the health care team.	**2.1.5**	Identify legal limits of professional practice in community, institutional, and other pharmaceutical settings, and refer cases beyond authority to competent bodies.
		2.1.6	Seek guidance from qualified health or regulatory professionals in matters related to pharmacy practice laws, narcotic schedules, and institutional regulations.
2-5- Competency		**Upon finishing this course, students will be able to Apply national and international pharmaceutical laws and regulations governing the conduct of research studies and clinical trials for the authorization of medicinal products.** **This competency will be developed via the following key elements**	
2.5.1	Fulfill the requirements of the regulatory framework to	**2.5.1**	Ensure adherence to legal requirements for safety evaluation, including pre-clinical and clinical data submission.

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**
	authorize a medicinal product including quality, safety, and efficacy requirements.	**2.5.2**	Follow regulatory guidelines for demonstrating the therapeutic efficacy of medicinal products prior to licensing
2-6- competency		**Apply the legal and regulatory frameworks related to pharmacoeconomic analysis, drug promotion, sales, marketing, and business administration to ensure compliance with pharmaceutical laws and ethical standards.** **This competency will be developed via the following key elements**	
2.6.2	Utilize the principles of drug promotion, sales, marketing, accounting, and pharmacoeconomic analysis.	**2.6.1**	Implement the legal and ethical standards governing drug promotion, sales, marketing, accounting, and pharmacoeconomic evaluation in accordance with national and international pharmaceutical regulations
		2.6.2	Ensure compliance with regulatory restrictions and documentation requirements for drug promotion and marketing practices, supported by scientific data on drug safety, efficacy, and cost-effectiveness to safeguard public health
Domain 4: Personal Practice **4-1- Competency**		**Upon finishing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and team working skills.** **This competency will be developed via the following key elements:**	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.1.1**	Ensure compliance with pharmacy laws and regulations when coordinating tasks within the team and evaluating colleagues' adherence to professional and legal standards
		4.1.2	Demonstrate effective leadership skills among students and staff.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.1.3**	Interpret and apply national pharmacy legislation to resolve legal and ethical issues in pharmaceutical practice.
		4.1.4	Independently review pharmacy-related regulations and collaborate with team members to address compliance challenges in various pharmacy settings

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- 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:**	
4.2.1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care teams, patients, and communities.	**4.2.1**	Communicate clearly with regulatory authorities, pharmacy institutions, and professional bodies to ensure compliance with pharmacy legislation and ethical standards.
		4.2.2	Prepare accurate and legally compliant pharmaceutical documentation, reports, and records for communication with health care teams, patients, and the public
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.2.3**	Prepare and deliver a presentation in the Pharmacy Legislation course covering topics such as the regulation of pharmaceutical institutions, drug classification and scheduling, narcotic control laws, licensing procedures, and the Pharmacy Practice Law
		4.2.4	Acquire effective presentation skills in the 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.
4-3 competency		**Upon finishing this course, students will be able to express self-awareness and be a life-long learner for continuous professional improvement.** **This competency will be developed via the following key elements**	

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**
4.3.1	Perform self-assessment to enhance professional and personal competencies.	**4.3.1**	Conduct regular self-evaluation of understanding and application of pharmacy legislation and regulations governing pharmaceutical institutions to strengthen legal compliance and professional effectiveness
4.3.2	Practice independent learning is needed for continuous professional development.	**4.3.2**	Demonstrate commitment to independent learning by continuously updating knowledge of pharmacy legislation and regulatory requirements to enhance professional competence and ensure full legal compliance

4. Teaching and Learning Methods

.1- Lectures **(√)**

2- E-learning **(√)**

3- Seminars **(√)**

4- Discussion **(√)**

5- 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	قانون مزاولة مهنة الصيدلة	**1**	**1**	----------	----------	----------
2	المؤسسات الصيدلية (الصيدليات العامة)	**1**	**1**	----------	----------	----------
3	المؤسسات الصيدلية (الصيدليات الخاصة - مخازن الادوية)	**1**	**1**	----------	----------	----------
4	المؤسسات الصيدلية (مجال الاتجار في النباتات الطبية)	**1**	**1**	----------	----------	----------
5	المؤسسات الصيدلية (المستحضرات الصيدلية الخاصة والدستورية)	**1**	**1**	----------	----------	----------
6	جداول المواد المخدرة وطريقة تخزينها	**1**	**1**	----------	----------	----------
7	Periodical exam					
8	المواد المؤثرة على الحالة النفسية	**1**	**1**	----------	----------	----------
9	جداول المواد المؤثرة على الحالة النفسية	**1**	**1**	----------	----------	----------
10	قواعد تكليف الصيادلة	**1**	**1**	----------	----------	----------
11	قانون مكافحة المخدرات وتنظيم استعمالها والاتجار فيها	**1**	**1**	----------	----------	----------
12	جداول قانون مكافحة المخدرات	**1**	**1**	----------	----------	----------
13	جداول قانون مكافحة المخدرات (تكمله)	**1**	**1**	----------	----------	----------
14	جداول قانون مكافحة المخدرات (تكمله)	**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	Periodical exam	7	15	15%
2	Final Written Exam	16,17	85	85%
	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)	مجموع القوانين والقرارات التي تحكم مزاولة مهنة الصيدلة
	Other References	Notes on Pharmacy laws and regulations prepared by the department staff
	Electronic Sources (Links must be added)	www.pubmed.com
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
	Other (to be mentioned)	مجموع القوانين التي تحكم مزاولة المهن الطبية.
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	Projector, smart board, Computers, and Internet
	Supplies	----------
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	Data shows, smart board, Unit for distance learning, and Library.

Course Plan

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

Course title: Pharmacy Legislation and practice ethics

Course code: NP 704

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	**قانون مزاولة مهنة الصيدلة**	1.1.1, 1.1.2 ,1.1.3 , 2.2.1, 2.1.2 ,2.1.6, 2.5.1	Lectures, E-learning, and class activities	Written exams
Week # 2	**المؤسسات الصيدلية الصيدليات العامة**	1.1.1, 1.1.3, 1.1.4 2.1.1, 2.1.2 , 2.1.3 , 2.1.4, 2.6.1 , 4.1.4, 4.2.1, .	Lectures, and discussion	Written exams
Week # 3	**المؤسسات الصيدلية الصيدليات الخاصة مخازن الادوية**	1.1.1, 1.1.3, 1.1.5 2.1.1, 2.1.2 , 2.1.5 , 2.1.6, 2.6.2, 4.1.3, 4.2.2, 4.2.3 , 4.2.1, 4.2.2 .	Lectures, and presentation	Written exams
Week # 4	**المؤسسات الصيدلية مجال الاتجار في النباتات الطبية**	1.1.1, 1.1.3, 1.1.4, 1.1.5, 2.1.1, 2.1.2 , 2.1.5 , 2.1.6, 2.6.2, 4.1.1, 4.1.2, 4.2.3 .	Lectures, E-learning, and seminar	Written exams
Week # 5	**المؤسسات الصيدلية المستحضرات الصيدلية الخاصة والدستورية**	1.1.1,1.1.2,1.1.3, 2.1.1,2.1.2,2.1.3, 2..5.1, 2.6.2 4.1.3, 4.1.4	Lectures, and discussion	Written exams
Week # 6	**جداول المواد المخدرة وطريقة تخزينها**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 2.1.2, 2.1.5, 2.5.1	Lectures, E-learning, and discussion	Written exams
Week # 7	**Periodical exam**			
Week # 8	**المواد المؤثرة على الحالة النفسية**	1.1.1, 1.1.3, 1.1.4 2.1.1, 2.1.2 , 2.1.3 , 2.1.4, 2.6.1, 4.2.1, 4.2.4 .	Lectures, and presentation	Written exams
Week # 9	**جداول المواد المؤثرة على الحالة النفسية**	1.1.1, 1.1.3, 1.1.4 2.1.1, 2.1.2 , 2.1.3 , 2.1.4, 2.6.1 .	Lectures, E-learning, and class activities	Written exams

Week # 10	**قواعد تكليف الصيادلة**	1.1.1, 1.1.2 ,1.1.3 , 2.2.1, 2.1.2 ,2.1.6, 2.5.1 ,4.3.1, 4.3.2 .	Lectures, and Assignment	Written exams
Week # 11	**قانون مكافحة المخدرات وتنظيم استعمالها والاتجار فيها**	1.1.1, , 1.1.2, 1.1.3, 2.1.3, 2.1.5, 2.5.1, 2.5.2, 2.6.1, 4.1.1, 4.1.3, 4.1.4 ,4.2.1.	Lectures, E-learning, seminars	Written exams
Week # 12	**جداول قانون مكافحة المخدرات**	1.1.1, , 1.1.2, 1.1.3, 2.1.3, 2.1.5, 2.5.1, 2.5.2, 2.6.1, 4.1.1, 4.1.3, 4.1.4, 4.3.2.	Lectures, Assignment	Written exams
Week # 13	**جداول قانون مكافحة المخدرات** (تكمله)	1.1.1, , 1.1.2, 1.1.3, 2.1.3, 2.1.5, 2.5.1, 2.5.2, 2.6.1, 4.1.1, 4.1.3, 4.1.4.	Lectures and E-learning	Written exams
Week # 14	**جداول قانون مكافحة المخدرات** (تكمله)	1.1.1, , 1.1.2, 1.1.3, 2.1.3, 2.1.5, 2.5.1, 2.5.2, 2.6.1, 4.1.1, 4.1.3, 4.1.4.	Lectures and E-learning	Written exams
Week # 15	**Revision**	1.1.1, , 1.1.2, 1.1.3, 2.1.3, 2.1.5, 2.5.1, 2.5.2, 2.6.1, 4.1.1, 4.1.3, 4.1.4 ,4.2.1.	Discussion and Assignment	Written exams

Name and Signature
Course Coordinator
Prof. Abd El-Aziz EL-said
Ass. Prof. Eman Mazyed

Name and Signature
Program Coordinator
Prof. Abd El-Aziz EL-said

Course Specification
(2025)

1. Basic Information

Course Title (according to the bylaw)	Cosmetic Preparations			
Course Code (according to the bylaw)	PT E13			
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
	1	1	----	2
Course Type	Elective			
Academic level at which the course is taught	Fourth Level, Semester (1)			
Academic Program	Bachelor of Pharmacy (PharmD)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof. Abdelaziz Elsayed Ass. Prof. Eman Mazyad			
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 an introduction to cosmetics, creams, face preparations, face and eye make-up, shaving preparations, sunscreen products, nails and nail products, deodorant and anti-Perspirant, hair preparations, dandruff and its control, tooth and oral health, quality control of cosmetic products and using nanotechnology for formulation of cosmetics.

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 cosmetics sciences to formulate different cosmetic formulations.** **This competency will be developed through the following key elements:**	
1-1-1-	**Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.**	**1.1.1.**	Recognize the nature of different cosmetic formulations.
1-1-3-	**Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.**	**1.1.2.**	Identify the formulation procedure and formulation additives of different cosmetic formulations.
		1.1.3.	Record the specifications of healthy skin and hair, and how to maintain this healthy state.

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 decision.**	**1.1.4.**	Point out the principles of controlling the body odour.
		1.1.5.	List the basics of dental problems and how to maintain dental and oral health and appearance.
		1.1.6.	Recognize the quality measures of different cosmetic formulations.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE **2-2- COMPETENCY**		**Upon finishing this course, students will be able to standardize pharmaceutical materials, formulate and manufacture different cosmetic products, participate in systems for dispensing, storage, and distribution of cosmetics.** **This competency will be developed via the following key elements:**	
2-2-2-	**Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.**	**2.2.1.**	Understand the fundamental aspects of cosmetic formulations, which include all formulations intended for cleansing and/or beautifying the human body.
		2.2.2.	Formulate different cosmetic products based on pharmaceutical knowledge.
		2.2.3.	Apply the rules of manufacturing, storage and transportation of different cosmetic products.
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.**	Recognize factors affecting the stability of different cosmetic products.
		2.2.5.	Select suitable method for characterization of different cosmetic products, active ingredient and excipients.
		2.2.6.	Predict drug interaction with different bases.

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**
		2.2.7.	Recognize principles of pharmaceutical calculation for preparation of different 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.**	**2.2.8.**	Recognize recent knowledge in pharmaceutical technology to design new cosmetic products.
		2.2.9.	Assess the quality of different cosmetic products.
2-3- COMPETENCY		**Upon finishing this course, students will be able to handle and dispose of different cosmetic products effectively and safely with respect to relevant laws and legislations. 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 field.**	**2.3.1.**	Handle safely different chemicals to avoid harm to the students.
		2.3.2.	Demonstrate the safe use and storage of different cosmetic 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**
2-3-2-	**Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biological and pharmaceutical materials/products.**	**2.3.3.**	Recognize and adopt MSDS safety guidelines for safe and appropriate handling and disposal of pharmaceutical chemical materials
Domain 4: PERSONAL PRACTICE **4-1- COMPETENCY**		**Upon finishing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and teamworking, creativity and entrepreneurial skills.** **This competency will be developed via the following key elements:**	
4-1-1-	**Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.**	**4.1.1.**	Participate in interdisciplinary teams.
		4.1.2.	Develop natural cosmetic products designed and prepared by them.
4-1-2-	**Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.**	**4.1.3.**	Analyze potential problems that may arise between the active ingredient and the excipients in different cosmetic preparations.
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:**	
4-2-1-	**Demonstrate effective communication skills verbally, non-verbally, and in writing**	**4.2.1.**	Communicate counseling information clearly to patients and discuss differences between the available cosmetic 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**
	with professional health care teams, patients, and communities.	**4.2.2.**	Perform presentation on the advanced drug delivery systems and their benefits in cosmetic field.
4-2-2-	**Use contemporary technologies and media to demonstrate effective presentation skills.**	**4.2.3.**	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, students can enhance audience engagement, clarify complex information, and leave a lasting impact.
4-3- COMPETENCY		**Upon finishing this course, students will be able to express self-awareness and be a life-long learner for continuous professional improvement.** **This competency will be developed via the following key elements:**	
4-3-2-	**Practice independent learning needed for continuous professional development.**	**4.3.1.**	Identify and utilize credible information sources.
		4.3.2.	Apply critical thinking in evaluating information and solving problems.
		4.3.3.	Adapt to new tools, methods, and professional demands.
		4.3.4.	Apply newly acquired knowledge and skills in professional practice.

4. Teaching and Learning Methods

1. Lectures (√)
2. Practical training (√)
3. Seminar / Workshop (√)
4. E-learning (√)
5. Brainstorming (√)
6. Presentation (√)
7. Discussion (√)
8. 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	Introduction to cosmetics	3	1	2	------	------
2	Creams	3	1	2	------	------
3	Face preparations	3	1	2	------	------
4	Face and eye makeup	3	1	2	------	------
5	Shaving preparations	3	1	2	------	------
6	Sunscreen products	3	1	2	------	------
7	Periodical exam					
8	Nails and nails products	3	1	2	------	------
9	Deodorants and anti-Perspirants	3	1	2	------	------
10	Hair preparation: shampoos and conditioners	3	1	2	------	------
11	Hair preparation: tonics and colorants	3	1	2	------	------
12	Dandruff and its control	3	1	2	------	------
13	The tooth and oral health - Dentifrices	3	1	2	------	------
14	Foot Preparations Quality control of cosmetic products	3	1	Practical exam	------	------
15	Revision	3	1	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	Practical Assignments	During practical work	5	5 %
3	Final Practical Exam	14.15	20	20 %

4	Final Written Exam	16.17	50	50 %
5	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)	Dreher, F., Jungman, M., Sakamoto, F., & Maibach, H. I. (Eds.). Handbook of cosmetic science and technology (5th ed.) (2022). Baran, R., & Maibach, H. I. (Eds.). Textbook of cosmetic dermatology (2024).
	Other References	Notes on cosmetic preparations prepared by the department staff.
	Electronic Sources (Links must be added)	http://www.FDA.gov /https://www.sciencedirect.com
	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**	- Data show – Computers – Library Internet - Distant learning unit - Smart board - Educational Factory
	Supplies	- Classrooms - Water bath - digital balances and other lab instruments
	Electronic Programs	----------
	Skill Labs/ Simulators	----------
	Virtual Labs	----------
	Other (to be mentioned)	----------

Course Plan

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

Course title: Cosmetic Preparations **Course code:** PT E13

Week	Course Contents	Key elements	Teaching and Learning Methods	Student Assessment Methods
1	Introduction to cosmetics	1.1.1, 1.1.2, 2.2.2, 2.2.5, 2.2.7, 2.3.1, 2.3.2, 4.1.1, 4.1.2, 4.3.1	Lectures, Discussion, practical training and class activities	Written and oral exams
2	Creams	1.1.1, 1.1.2, 1.1.4, 2.2.1, 2.2.2, 2.2.6, 2.3.1,4.1.3, 4.2.1, 4.3.2, 4.3.3	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
3	Face preparations	1.1.1, 1.1.2, 2.2.1, 2.2.2, 2.2.4, 2.3.2, 4.1.1, 4.3.4	Lectures, Brainstorming, practical training and class activities	Written, practical and oral exams
4	Face and eye makeup	1.1.1, 1.1.2, 2.2.1, 2.2.2, 2.2.3, 2.2.9, 2.3.1,4.1.2, 4.2.1, 4.3.1	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
5	Shaving preparations	1.1.3, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.3.2, 4.1.1, 4.1.2, 4.2.3, 4.3.2	Lectures, Presentation, practical training and class activities	Written, practical and oral exams
6	Sunscreen products	1.1.5, 2.2.1, 2.2.2, 2.2.3, 2.3.3, 4.1.3, 4.2.2, 4.2.3, 4.3.3	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
7	Periodical exam			
8	Nails and nails products	1.1.5, 2.2.1, 2.2.2, 2.2.6, 2.3.1, 4.1.1, 4.1.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
9	Deodorants and anti-Perspirants	1.1.4,1.1.6 2.2.1,2.2.2, 2.2.3, 2.2.7, 2.2.8, 2.3.2,4.1.1,4.1.2, 4.1.3, 4.3.4	Lectures, E-learning, practical training and class activities	Written, practical and oral exams

10	Hair preparation: shampoos and conditioners	1.1.4, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.2.6, 2.3.3, 4.1.1	Lectures, Presentation, practical training and class activities	Written, practical and oral exams
11	Hair preparation: tonics and colorants	1.1.4, 2.2.1, 2.2.2, 2.2.7, 2.2.8, 2.3.1, 2.3.2, 4.1.2, 4.3.1	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
12	Dandruff and its control	1.1.6, 4.2.1, 4.2.2, 4.2.3, 4.3.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
13	The tooth and oral health - Dentifrices	1.1.6, 4.2.1, 4.2.2, 4.2.3, 4.3.3	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
14	Foot Preparations Quality control of cosmetic products	1.1.6, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, 2.3.3, 4.1.3, 4.3.4	Lectures, brainstorming & educational factory	Written and oral exams
15	Revision	1.1.6, 2.2.1, 2.3.3 4.2.1, 4.2.2, 4.2.3	Lectures and discussion	Written and oral exams

Name and Signature
Course Coordinator
Prof. Abdelaziz Elsayed
Ass. Prof. Eman Mazyad

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Program Coordinator
Prof. Abdelaziz Elsayed