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

Clinical (Pharm-D) program

Course Specification

2025/2026

Second Level

First Semester

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Kafrelsheikh University

Faculty of Pharmacy

جامعة كفر الشيخ

كلية الصيدلة

Course Specification
(2025)

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutical Organic Chemistry III			
Course Code (according to the bylaw)	PC 303			
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	1	--------	3
Course Type	Compulsory			
Academic level at which the course is taught	Second level, Semester (1)			
Academic Program	Bachelor of Pharmacy (Pharm D) (Clinical pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Associate. Prof. Wagdy Mohamed Eldehna			
Course Specification Approval Date	9/2025			
Course Specification Approval	Department Council			

2. Course Overview (Brief summary of scientific content)

This course covers chemistry of different classes of organic compounds such as heterocyclic compounds, amino acids and proteins. In addition to the use of different spectroscopic tools for the structural elucidation of organic compounds, including Infrared (IR) spectroscopy, Nuclear magnetic resonance (NMR) spectroscopy and Mass spectrometry (MS).

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
Domain 1 (Fundamental Knowledge) 1.1-COMPETENCY		**Upon completing this course, students will be able to integrate knowledge from basic and applied pharmaceutical and clinical sciences to standardize materials, formulate and manufacture products, and deliver population and patient-centered care. This competency will be developed via the following key elements:**	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.1.1**	Explain the chemical structures, reactivity, and properties of advanced functional groups and heterocycles relevant to drugs.
		1.1.2	Correlate organic chemistry concepts with pharmaceutical applications such as drug design and synthesis.
		1.1.3	Describe stereochemistry and its influence on drug activity and biological response.
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**	Use separation and purification techniques (distillation, crystallization, chromatography) for organic compounds.
		1.1.5	Interpret spectroscopic data (IR, NMR, and MS) for structural identification of pharmaceuticals.
		1.1.6	Assess the effect of compounds substituents on their reactivity and subsequent reactions.
1.1.6	Utilize scientific literature and collect and interpret information to enhance professional decisions.	**1.1.7**	Search literature to find synthetic routes, properties, and applications of organic pharmaceutical compounds.

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**
		1.1.8	Critically evaluate organic chemistry research related to drug molecules and intermediates.
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**	Design synthetic routes for heterocyclic compounds of pharmaceutical importance.
		2.2.2	Perform isolation and purification of synthetic organic molecules.
		2.2.3	Apply structural elucidation techniques to confirm identity and purity.
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 GMP and GLP principles in laboratory organic synthesis.
		2.2.5	Evaluate stability issues of organic drug molecules during preparation and storage.
		2.2.6	Ensure reproducibility and reliability of synthetic and analytical results.
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**	Select appropriate techniques for synthesis and analysis of organic compounds.
		2.2.8	Recognize the role of spectroscopy in elucidating organic drug structures.
		2.2.9	Apply microwave-assisted and green chemistry techniques in drug synthesis.
		2.2.10	Handle synthetic organic compounds according to safety guidelines.
2-3- COMPETENCY		**Upon completing this course, students will be able to handle and dispose of biological and synthetic/natural**	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
		pharmaceutical 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 field	**2.3.1**	Follow safety procedures in handling toxic and flammable organic solvents.
		2.3.2	Label, store, and classify organic reagents according to hazard categories.
		2.3.3	Implement correct waste disposal methods for organic laboratory residues.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biological and pharmaceutical materials/products.	**2.3.4**	Apply national and international guidelines for disposal of hazardous organic materials.
		2.3.5	Demonstrate legal compliance in handling controlled organic substances.
		2.3.6	Incorporate environmental protection measures in lab practices.
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:**	
2.4.1	Ensure safe handling/use of poisons to avoid their harm to individuals and communities.	**2.4.1**	Identify organic compounds classified as poisons or toxic agents.
		2.4.2	Explain mechanisms of toxicity of selected organic compounds.
		2.4.3	Apply protective measures when working with highly toxic reagents.
		2.4.4	Outline emergency protocols for exposure to poisonous organic materials.

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 4-2- COMPETENCY		**Upon completing this course, students will be able to effectively communicate verbally, non-verbally and in writing with individuals and communities. This competency will be developed via the following key elements:**	
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.2.1**	Prepare PowerPoint presentations explaining reaction mechanisms and synthetic strategies.
		4.2.2	Use chemical drawing software (ChemDraw, Marvin Sketch) for professional representation of organic structures.
		4.2.3	Present case studies of drug-related organic chemistry in seminars.
		4.2.4	Design digital infographics summarizing organic reactions and their pharmaceutical applications.

4. Teaching and Learning Methods

1- **Lectures (√)**
2- **E-learning (√)**
3- **Practical training/ laboratory (√)**
4- **Discussion (√)**
5- **Brainstorming (√)**
6- **Assignments (√)**
7- **Case study (√)**
8- **Seminars (√)**

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/ discussion groups/ .....)	Training (Practical/ Clinical/ .....)	Self-learning (Tasks/ Assignments/ Projects/ ...)	Other (to be determined)
1	Introduction to spectroscopy& IR spectroscopy	**4**	**2**	**2**	**---**	**---**
2	Mass Spectroscopy	**4**	**2**	**2**	**---**	**---**
3	Mass Spectroscopy (cont.)	**4**	**2**	**2**	**---**	**---**
4	1H NMR spectroscopy	**4**	**2**	**2**	**---**	**---**
5	^{1}H NMR spectroscopy (cont.) & ^{13}C NMR spectroscopy	**4**	**2**	**2**	**---**	**---**
6	^{1}H NMR spectroscopy (cont.) & ^{13}C NMR spectroscopy (cont.)	**4**	**2**	**2**	**---**	**---**
7	Mid-term Exam					
8	Nomenclature & Chemistry of five-membered heterocycles	**4**	**2**	**2**	**---**	**---**
9	Chemistry of five-membered heterocycles (cont.)	**4**	**2**	**2**	**---**	**---**
10	Chemistry of six-membered heterocycles	**4**	**2**	**2**	**---**	**---**
11	Chemistry of six-membered heterocycles (cont.)	**4**	**2**	**2**	**---**	**---**
12	Nomenclature and Chemistry of Fused Bicyclic Heterocycles	**4**	**2**	**2**	**---**	**---**
13	Chemistry of Fused Bicyclic Heterocycles (cont.)	**4**	**2**	**2**	**---**	**---**

14	Amino acids and Proteins	**2**	**2**	**Practical exam**		
15	Amino acids and Proteins	**2**	**2**	**Practical exam**		

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage From Total Course Marks
1	Periodical exam	Week 7	15 Marks	15%
2	Final Practical/Clinical/Exam	Week 14,15	20 Marks	20%
3	Final Written Exam	Week 16,17	50 Marks	50%
4	Final Oral Exam	Week 16,17	10 Marks	10%
5	Assignments / Project /Portfolio/ Logbook	All semester long	5 Marks	5%
	Total		100	100%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	**The main (essential) reference for the course**	Notes on Organic chemistry prepared and distributed by Dept. of Pharmaceutical Chemistry. Lab Manual of Organic Chemistry prepared and distributed by Dept. of Pharmaceutical Chemistry.
	Other References	Fundamentals of heterocyclic chemistry (Importance in Nature and in the Synthesis of Pharmaceuticals), 2010, louis d. Quin, john a. Tyrell. The Chemistry of Heterocycles: Structure, Reactions, Syntheses and Applications, 2nd ed. (2003), Wiley-VCH, Weinheim Organic Chemistry-Craig B. Fryhle, Scott A. Snyder, T. W. Graham Solomons -Wiley (2016)_12e Organic Chemistry-Paula Yurkanis Bruice-Pearson (2016) David R. Klein - Organic Chemistry-Wiley (2017)-3rd edition
	Electronic Sources	https://pubchem.ncbi.nlm.nih.gov/ http://www.sciencedirect.com/ https://pubmed.ncbi.nlm.nih.gov/
	Learning Platforms	https://lms3.kfs.edu.eg/pharm/login/index.php
	Devices/Instruments	Data show, Computers, Library, Internet.

Supportive facilities & equipment for teaching and learning	**Supplies**	Classrooms.

Course Plan

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

Course title: Pharmaceutical Organic Chemistry III **Course code: PC 303**

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	**Introduction to spectroscopy and IR spectroscopy**	1.1.1, 1.1.5, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 4.2.2	Lectures, E-learning practical training and class activities	Written, practical and oral exams
Week # 2	**Mass Spectroscopy**	1.1.1, 1.1.5, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 4.2.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 3	**Mass Spectroscopy (cont.)**	1.1.1, 1.1.5, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 4.2.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 4	**1H NMR spectroscopy**	1.1.1, 1.1.5, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 4.2.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 5	**^{1}H NMR spectroscopy (cont.) & ^{13}C NMR spectroscopy**	1.1.1, 1.1.5, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 4.2.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 6	**^{1}H NMR spectroscopy (cont.) & ^{13}C NMR spectroscopy (cont.)**	1.1.1, 1.1.5, 2.2.3, 2.2.6, 2.2.7, 2.2.8, 4.2.2	Lectures, E-learning, practical training and class activities	Written, practical and oral exams

Week # 7	**Mid-term Exam**			
Week # 8	**Nomenclature & Chemistry of five-membered heterocycles**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 9	**Chemistry of five-membered heterocycles (cont.)**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 10	**Chemistry of six-membered heterocycles**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 11	**Chemistry of six-membered heterocycles (cont.)**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures, E-learning, practical training, seminars and class activities	Written, practical and oral exams
Week # 12	**Nomenclature and Chemistry of Fused Bicyclic Heterocycles**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures, E-learning, seminars and practical training	Written, practical and oral exams
Week # 13	**Chemistry of Fused Bicyclic Heterocycles (cont.)**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures and E-learning	Written, practical and oral exams
Week # 14	**Amino acids and Proteins**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures and E-learning	Written and oral exams

Week # 15	**Amino acids and Proteins**	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.6, 1.1.7, 1.1.8, 2.2.1, 2.2.2, 2.2.4, 2.2.5, 2.2.6, 2.2.7, 2.2.9, 2.2.10, 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 4.2.1, 4.2.2, 4.2.3, 4.2.4.	Lectures and E-learning	Written and oral exams

Name and Signature
Course Coordinator

Associate. Prof. Wagdy Mohamed Eldehna

Name and Signature
Program Coordinator

Associate. Prof. Ahmed Amin Ali

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Instrumental Analysis			
Course Code (according to the bylaw)	PA 303			
Department/s participating in delivery of the course	Pharmaceutical Analytical Chemistry department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1	1	----	2
Course Type	Compulsory			
Academic level at which the course is taught	Second Level, First semester			
Academic Program	Bachelor in pharmacy (Clinical Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof.Dr. Fathalla Belal			
Course Specification Approval Date	1/9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department council			

2. Course Overview (Brief summary of scientific content)

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

3. Course Learning Outcomes CLOs

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

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

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

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

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

4. Teaching and Learning Methods

1- Lectures

2- E-learning

3- Practical training/ laboratory

4- Presentation

5- Discussion

6- Brain storming

7- Assignments

8- Case study

Course Schedule

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

8	Atomic absorption	**3**	**1**	**2**		
9	Flame emission	**3**	**1**	**2**		
10	Chromatography ▪ Introduction, comparison between the classical and modern L.C	**3**	**1**	**2**		
11	Chromatography ▪ Theoretical aspects , principles, parameters and techniques of chromatography	**3**	**1**	**2**		
12	Chromatography Factors governing the retention compounds, HPLC detectors	**3**	**1**	**2**		
13	Column chromatography and TLC	**3**	**1**	**2**		
14	Gas chromatography	**1**	**1**	**Practical exam**		
15	Capillary electrophoresis; types, detectors	**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 16,17	50	50%
3	Final Practical/Clinical/… Exam	Week 14,15	20	20%
4	Final Oral Exam	Week 16,17	10	10%
5	Assignments / Project /Portfolio/ Logbook	Week 9	5	5%

6. Learning Resources and Supportive Facilities

Learning	**The main (essential) reference for the course**	1. D.A.skoog,D.M.west ,F.J holler and S.R. crouch

resources (books, scientific references, etc.)	(must be written in full according to the scientific documentation method)	,"fundamentals of analytical chemistry", latest edition, book/cole-thomson learning, inc. 2. G. D. Christian and J. E. Oreilly, "instrumental analysis ", latest edition, Ally n and Bacon, inc.
	Other References	- Notes on instrumental analysis for second year pharmacy students, prepared and distributed by Dept. of Pharmaceutical Analytical Chemistry. - Lab manual of instrumental analysis for second year pharmacy students, prepared and distributed by Dept. of Pharmaceutical Analytical Chemistry.
	Electronic Sources (Links must be added)	http://ull.chemistry.uakron.edu/analytical/
	Learning Platforms (Links must be added)	https://lms3.kfs.edu.eg/pharm/login/index.php
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	Laboratory facilities like pH meters, UV-VIS spectrophotometer, and HPLC
	Supplies	Chemicals and analytical tools
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

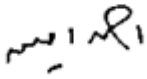
Course Plan

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

Course title: Instrumental Analysis **Course code: PA 303**

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

			class activity	
7	**Periodical exam**			
8	Atomic absorption	1.1.1,1.1.2,1.1.3,2.2.4,2.3.2, 2.5.1,2.5.2,4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
9	Flame emission	1.1.1,1.1.2,1.1.3,2.2.4,2.3.2, 2.3.3,2.5.1,2.5.2,4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
10	Chromatography ▪ Introduction, comparison between the classical and modern L.C	1.1.1, 4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
11	Chromatography ▪ Theoretical aspects, principles, parameters and techniques of chromatography	1.1.1,2.2.4,2.3.2,2.3.3,2.5.1, 2.5.2,4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
12	Chromatography Factors governing the retention compounds, HPLC detectors	1.1.1, 4.3.1	Lectures, class activity, E-learning and brain storming	Written and oral exams
13	Column chromatography and TLC	1.1.1,2.2.3, 2.2.4, 2.3.1, 2.3.2, 4.3.1	Lectures, class activity, E-learning and brain storming	Written, and oral exams
14	Gas chromatography	1.1.1,2.2.3,2.2.4,2.3.1, 2.3.2, 4.3.1	Lectures, class activity, E-learning and brain storming	Written and oral exams
15	Capillary electrophoresis; types, detectors	1.1.1,2.2.3, 2.2.4, 2.3.1,2.3.2, 4.3.1	Lectures, class activity, E-learning and brain storming	Written and oral exams

Name and Signature Course Coordinator Prof.Dr. Fathalla Belal	Name and Signature Program Coordinator Prof.Dr. Ahmed Amin
	

Kafrelsheikh University

Faculty of Pharmacy

جامعة كفر الشيخ
كلية الصيدلة

Course Specification

1. Basic Information

Course Title (according to the bylaw)	Biochemistry I			
Course Code (according to the bylaw)	PB 302			
Department/s participating in the delivery of the course	Biochemistry			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2	**1**		**3**
Course Type	Compulsory			
Academic level at which the course is taught	Second year, first semester			
Academic Program	Bachelor of Clinical Pharmacy (PharmD clinical)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Dr/Shimaa Ali			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

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

3. Course Learning Outcomes CLOs

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

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

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

4. Teaching and Learning Methods

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

Course Schedule

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

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

5. Methods of students' assessment

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

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	1. **Abali, Emine Ercikan, et al. *Lippincott® illustrated reviews: biochemistry*. Lippincott Williams & Wilkins, 2025.** 2. Harper's illustrated Biochemistry by Murray RK, Bender DA, Botham KM, Kennelly PJ, Rodwell VW, P. Anthony Weil PA (2018), 31th Edition, McGraw Hill. 3. Essential Biochemistry: Pratt CW and Cornely K (2017), 4th edition John Wiley &Sons Inc., USA.
	Other References	1-Biochemistry: Jeremy M. Berg, Lubert Stryer, John Tymoczko, Gregory Gatto (2019), 9th Edition, WH Freeman. 2- Biochemistry with Clinical Correlations, Devlin TM (2019), 8th Edition ,Wiley-Liss INC, USA. 3- Biochemistry, Satyanarayana and Chakrapani (2020), 6th Edition, Arunabha Sen USA.
	Electronic Sources (Links must be added)	http://www.freescience.info/Biology.php. www.highwire.com, www.google.com,

		www.pubmed.com & www.biomed.net 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)	1- Notes in Biochemistry I by staff-members of department of Biochemistry. 2- Lab Notes in Biocemistry I by staffmembers of department of Biochemistry.
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	Laboratory facilities
	Supplies	Water bath, digital balances and other lab instruments
	Electronic Programs	---
	Skill Labs/ Simulators	---
	Virtual Labs	
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

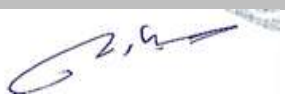
Week	Topic	Key Elements	Teaching & Learning Methods	Student Assessment Methods
1	Proteins - protein structure - biologically important peptides	1.1.1, 1.1.2,1.1.3, 2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming,	Written, practical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

			and presentation	
3	Amino acids -Structure - Classification - Use of amino acids in biosynthesis of biomolecules	1.1.1, 1.1.2,1.1.3, 2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
4	Carbohydrates -Structure -Classification	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
5	Carbohydrates (Cont.) - Glycoproteins and proteoglycans - Glucose transporters	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming, assignment and presentation	Written, practical and oral exams
6	Lipids - Classification of lipids - Digestion and absorption of lipids	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
7	**Mid-term exam**			
8	Lipids (Cont.) Cholesterol structure, metabolism, related diseases.	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion,	Written, practical and oral exams

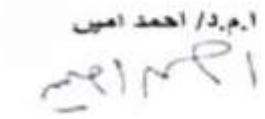
			brain storming	
9	Lipids (Cont.) - Lipoprotein metabolism	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
10	Enzymology - Enzyme kinetics – Role of enzymes in regulation of biochemical reaction	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
11	Enzymology (Cont.) - Enzyme inhibitors as drugs	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming, assignment and presentation	Written, practical and oral exams
12	Hemoglobin and porphyrins -Hb derivatives and types	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams
13	Hemoglobin and porphyrins(Cont.) -Metabolism of Hb and regulation	1.1.1, 1.1.2, 1.1.3,2.3.1, 2.3.2,2.3.3,3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, practical training, discussion, brain storming	Written, practical and oral exams

14	Biological oxidation and ATP synthesis	1.1.1, 1.1.2, 1.1.3, 3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, discussion, brain storming	Written, and oral exams
15	Clinical correlations..	1.1.1, 1.1.2, 1.1.3, 3.1.1,3.1.2,3.1.3, 4.2.1,4.2.2	Lectures, E-learning, discussion, brain storming	Written, and oral exams

Name and Signature
Course Coordinator
Dr/ Shimaa Ali



Name and Signature
Program Coordinator



Kafrelsheikh University

Faculty of Pharmacy

جامعة كفر الشيخ

كلية الصيدلة

Course Specification

2025

1. Basic Information

Course Title (according to the bylaw)	Pharmacognosy II			
Course Code (according to the bylaw)	PG 303			
Department/s participating in delivery of the course	Pharmacognosy 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	Second level, semester 1			
Academic Program	Bachelor of Pharmacy (Pharm D.) (clinical pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelshiekh University			
Name of Course Coordinator	Dr. Abdallah Elgazar. Dr. Mai H elnaggar			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department council			
Prerequisite	Pharmacognosy I - PG 202			

2. Course Overview (Brief summary of scientific content)

After completion of the course the student should have the knowledge and skills that enable the student to differentiate between different organs of through their monographs. The course comprises the study of identification of different organs through their monographs. (fruits, herbs, Subterranean organs, unorganized drugs in addition to drugs of marine and animal origin) , including identify their active constituents and adulterants describe micro- and macromorphological characteristics, benefits and precautions of their medicinal uses., side effects and contraindications and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

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 correlate knowledge from basic chemistry, microscopic character and ethnopharmacological properties of plants to identify different plants and their uses in Egyptian and worldwide pharmaceutical markets. 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 basis of medicinal values of fruits, herbs, subterranean organs, unorganized, marine, and animal drugs in correlation with disease etiology
		1.1.2	Describe the morphological and histological features of different natural fruits, herbs, subterranean organs.
		1.1.3	Discuss the production and processing steps for fruits, herbs, subterranean organs, unorganized, marine, and animal drugs.
		1.1.4	Recognize the social and therapeutic significance of natural drugs in healthcare systems.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.2	Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	1.1.5	Apply appropriate botanical and pharmacological terminology when describing natural drugs.
		1.1.6	Interpret pharmacopeial abbreviations and symbols related to fruits, herbs, subterranean organs, unorganized, marine, and animal drugs.
		1.1.7	Use correct terms when documenting natural drug identification, analysis, and quality control reports.
1.1.3	Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products	1.1.8	Select suitable microscopic and analytical techniques for identifying natural drugs.
		1.1.9	Perform macroscopic and microscopic examinations to ensure quality and detect adulteration.
		1.1.10	Select standard extraction and preparation techniques to produce natural drug products.
		1.1.11	Evaluate quality parameters to ensure compliance with pharmacopeial and GMP standards.
1.1.4	Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.	1.1.12	Correlate the active constituents of natural drugs with their pharmacological actions.
		1.1.13	Assess the therapeutic appropriateness of natural drugs for different patient populations.
		1.1.14	Identify possible adverse effects and contraindications of medicinal plants.
		1.1.15	Discuss the evidence supporting safety and efficacy of natural 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**
1.1.5	Retrieve information from fundamental sciences to solve therapeutic problems.	1.1.16	Search for morphological, histological, and pharmacological data relevant to therapeutic uses of natural drugs.
		1.1.17	Interpret retrieved data to recommend appropriate medicinal plants for specific conditions.
		1.1.18	Apply evidence-based information to solve therapeutic problems involving natural drug use.
1.1.6	Utilize scientific literature and collect and interpret information to enhance professional decisions.	1.1.19	Outline reliable sources for evidence-based information on medicinal plants.
		1.1.20	Critically appraise literature on the pharmacology, safety, and quality of natural drugs.
		1.1.21	Integrate research findings into clinical and pharmaceutical decision-making regarding natural products.
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	1.1.22	Recognize recent trends in the use and regulation of medicinal plants in the pharmaceutical industry.
		1.1.23	Evaluate the impact of adulteration, counterfeit products, and market changes on patient safety.
		1.1.24	Discuss advances in analytical techniques and their role in quality control of natural drugs.
		1.1.25	Analyze case studies of emerging pharmacognosy-related issues affecting healthcare outcomes.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE **2-2- COMPETENCY**		Students will be able to prepare, dispense, store, and distribute medical plant-derived products according to national and WHO guidelines in healthcare institutes and formulary 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**
2.2.1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/natural pharmaceutical materials.	2.2.1	Select appropriate organoleptic, morphological, microscopic, and chemical tests to identify natural drugs of plant, marine, and animal origin.
		2.2.2	Differentiate genuine crude drugs from adulterated samples based on standard pharmacognostical monographs.
		2.2.3	Correlate the observed microscopic features and chemical profiles with the authenticity and quality of the drug.
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	Employ GMP principles during the preparation and standardization of natural drugs.
		2.2.5	Follow quality assurance protocols to ensure stability, purity, and efficacy of crude drugs.
		2.2.6	Detect and prevent incompatibilities in storage and formulation of plant, marine, and animal drugs.
		2.2.7	Document quality control results according to accepted pharmaceutical standards.
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.	2.2.8	Select suitable microscopic, chromatographic, and spectroscopic methods for the identification and standardization of natural drugs.
		2.2.9	Operate basic laboratory tools for crude drug analysis following safety protocols.
		2.2.10	Interpret analytical data to confirm drug identity and quality.

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 lab pharmaceutical materials 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	Handle plant, and raw materials in compliance with biosafety guidelines.
		2.3.2	Identify hazardous characteristics of natural products materials in pharmacy practice
		2.3.3	Apply correct disposal methods for laboratory waste generated from natural drug testing.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products	2.3.4	Adhere to ethical principles in sourcing, handling, and using natural drug materials.
		2.3.5	Apply local and international legal guidelines for safe handling and transport of crude drugs.
		2.3.6	Maintain accurate records of drug origin, processing, and disposal for traceability.
2-4- COMPETENCY		Actively apply professional knowledge to identify and evaluate different crude drugs from plant, marine, and animal origin through their monographs, ensuring appropriate guidance on their safe medicinal use. This competency will be developed via the following key elements:	
2.4.1	Ensure safe handling/use of poisons to avoid their harm to individuals and communities.	2.4.1	Identify poisonous natural drugs and their toxic constituents
		2.4.2	Apply safety measures to prevent accidental poisoning during handling and processing.
		2.4.3	Educate others on the safe use and storage of poisonous herbal and animal-derived drugs.
2.4.3		2.4.4	Recommend safe alternatives when adulteration or contamination is detected.

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**
	Take actions to solve any identified medicine-related and pharmaceutical care problems.	2.4.5	Advise on appropriate storage and transport solutions to preserve drug quality.
2-5- COMPETENCY		Contribute to pharmacognostic research and preclinical/clinical studies required for the evaluation and approval of herbal medicinal products. This competency will be developed via the following key elements:	
2.5.2	Retrieve, interpret, and critically evaluate evidence-based information needed in pharmacy profession	2.5.1	Retrieve and systematically gather up-to-date, evidence-based information relevant to natural products and their pharmacognostic evaluation.
		2.5.2	Interpret scientific data and research findings critically to assess the quality, safety, and efficacy of medicinal plants and natural materials.
	Domain 3: Pharmaceutical Care **3-2- Competency**	Upon finishing this course, students will be able to provide counseling and education services to patients and community about safe and rational use of drugs derived from plants. 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	Describe the mechanisms of action and therapeutic uses of fruits, herbs, subterranean organs, unorganized, marine, and animal drugs.
		3.2.2	Explain safe dosage ranges, contraindications, and precautions for crude drugs and their preparations.
		3.2.3	Analyze potential drug–herb interactions based on pharmacokinetic and pharmacodynamic profiles.
		3.2.4	Predict possible adverse effects of herbal medicines using evidence-based literature.

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**
3.2.3	Provide evidence-based information about safe use of complementary medicine including phytotherapy, aromatherapy, and nutraceuticals.	3.2.5	Select appropriate OTC herbal preparations for specific patient symptoms, following safety and efficacy criteria.
		3.2.6	Advise patients and healthcare professionals on proper use, storage, and handling of phytotherapeutic products.
		3.2.7	Compare the therapeutic benefits and limitations of herbal drugs with conventional treatments based on scientific evidence.
3.2.4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.	3.2.9	Identify toxic constituents present in selected medicinal plants, marine, and animal-derived drugs.
		3.2.10	Describe signs and symptoms of toxicity related to misuse or overuse of herbal and marine-origin drugs.
		3.2.11	Recommend evidence-based management strategies for toxicity and adverse reactions from herbal products.
		3.2.12	Educate healthcare providers and patients about prevention of poisoning through safe selection, dosing, and monitoring of herbal medicines.
Domain 4: Personal Practice **4-2- Competency**		Upon finishing this course, Students will be able to effectively communicate verbally, non-verbally and in writing with patient and health care team. 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	Organize and summarize the monograph content into logical, audience-friendly sections using digital presentation tools (e.g., PowerPoint, Prezi).
		4.2.2	Incorporate relevant images, diagrams, and chemical structures into the presentation to enhance comprehension and engagement.
		4.2.3	Deliver the presentation clearly, maintaining scientific accuracy, proper timing, and effective use of visual aids.

4. Teaching and Learning Methods

1- Lectures

2- Practical

3- E-learning

4- Discussion

5- Brainstorming

6- Assignment

7- Presentation

8- Case study

Course Schedule						
Number of the Week	**Scientific content of the course (Course Topics)**	**Total Weekly Hours**	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)	**Training (Practical /Clinical/ .....)**	**Self-learning (Tasks/ Assignments/ Projects/ ...)**	**Other (to be determined)**
1	-Introduction of fruits -Umbelliferous fruits (fennel, anise, Cumin)	**4**	**2**	**2**		
2	-Umbelliferous fruits (ammi visnaga, ammi majus, coriander, Carawy, Dill, Celery)	**4**	**2**	**2**		
3	-Medicinal fruits as capsicum, colocynth, vanilla, Black pepper, cubebs, poppy capsule, bitter orange peel, star anise, wheat grain	**4**	**2**	**2**		
4	-Introduction of subterranean organs	**4**	**2**	**2**		
5	-Rhizomes as rhubarb, filix mas, podophyllum, ginger, hydrastis, galangl, colchicum	**4**	**2**	**2**		
6	-Roots as ipecacuanha, senega	**4**	**2**	**2**		
7	**Mid-term exam**					
8	-unorganized drugs -1	**4**	**2**	**2**		
9	-unorganized drugs -2	**4**	**2**	**2**		

10	-unorganized drugs -3	**4**	**2**	**2**		
11	Introduction to herb	**4**	**2**	**2**		
12	Herbs-1	**4**	**2**	**2**		
13	Herbs-2	**4**	**2**	**2**		
14	applications	**2**	**2**	**Practical exam**		
15	revision	**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 (formative exam)			
2	Periodical exam	Week 7	15	
3	Final Written Exam	Week 16,17	50	
4	Final Practical/Clinical/... Exam	Week14, 15	25	
5	Final Oral Exam	Week 16,17	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)	
		1. Badal McCreath, S., & Clement, Y. N. (Eds.). (2023). *Pharmacognosy: Fundamentals, applications and strategies* (2nd ed.). Academic Press. https://doi.org/10.1016/C2020-0-01935-8 2. Odoh, U. E. (2025). *Pharmacognosy and phytochemistry: Principles, techniques, and clinical applications*. Wiley. https://www.readings.com.au/product/9781394203659

		3. World Health Organization. (2010). WHO monographs on medicinal plants commonly used in the Newly Independent States (NIS). WHO Press. https://apps.who.int/iris/handle/10665/42052 Wallis, T. E. (2018). Textbook of pharmacognosy (5th ed.). CBS Publishers & Distributors.
	Other References	Notes and Lab manual prepared by the department staff
	Electronic Sources (Links must be added)	websites https://apps.who.int/medicinedocs/en/m/abstract/Js14213e/ 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**	Laboratory facilities (Microscopes)
	Supplies	Microscopes, digital balances and other lab instruments
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Name and Signature **Course Coordinator**	**Name and Signature** **Program Coordinator**

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Basic pharmacology			
Course Code (according to the bylaw)	PO301			
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			2
Course Type	Compulsory			
Academic level at which the course is taught	level2, semester1			
Academic Program	Bachelor of Pharmacy (Pharm D Clinical)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafr Elsheikh University			
Name of Course Coordinator	Dr. Samar Elsebaay			
Course Specification Approval Date	9-2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department of Pharmacology & Toxicology Council			

2. Course Overview (Brief summary of scientific content)

This course defines the general principles of basic pharmacology by identifying the pharmacokinetics of drugs within the body. It illustrates the methods of signal transduction as well as drug receptors and drug receptor interaction. It identifies the ion channels, action potential, enzymes and carrier protein.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		**Upon finishing this course, students will be able to integrate knowledge from basic pharmaceutical science to formulate different classes of semisolid dosage forms as a preliminary step in the manufacture of therapeutic and cosmetic products.** **This competency will be developed via the following key elements:**	
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral , administrative, and clinical sciences	1.1.1	demonstrate the principles of basic pharmacology
		1.1.2	Demonstrate understanding of different type of receptors and relate each type with the specific signal transduction processes.
		1.1.3	Demonstrate understanding of different type of ion channels and their important physiological responses.
		1.1.4	Articulate knowledge about enzymes and their mechanisms of action
		1.1.5	Identify different type of carrier protein and their function
Domain 3: Pharmaceutical Care		**Apply the principles of body functions to participate in improving health care services using evidence-based**	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
3-1- Competency		**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	Relate the body functions to different types of proteins
		3.1.2	Explain the pharmacokinetics of drugs within the body to understand their role in maintaining or restoring normal body function
		3.1.3	Analyze drug–receptor interactions and signal transduction pathways to guide disease management based on physiological and genomic principles
		3.1.4	Identify the role of ion channels, enzymes, and carrier proteins in mediating drug effects for targeted therapy in various diseases
Domain 4: Personal Practice **4-2- Competency**		**Upon finishing this course, students will be able to effectively communicate verbally, non-verbally and in writing with individuals and communities.** **This competency will be developed via the following key elements:**	
4.2.2	Use contemporary technologies and media to demonip9-strate effective presentation skills.	4.2.1	Present pharmacokinetic processes, including drug absorption, distribution, metabolism, and excretion, using modern digital tools and interactive media.
		4.2.1	Use contemporary presentation technologies to illustrate signal transduction pathways, drug–receptor interactions, and roles of ion channels, enzymes, and carrier protein

4. Teaching and Learning Methods

1. . Lectures
2. E-learning
3. Case study
4. Brain storming
5. Assignment
6. Discussion
7. Seminars

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)	**Training** (Practical/Clinical/ .....)	**Self-learning** (Tasks/ Assignments/ Projects/ ...)	**Other** (to be determined)
1	Pharmacokinetics	2	2			
2	Pharmacokinetics	2	2			
3	Pharmacokinetics	2	2			
4	Drug receptors	2	2			
5	Drug receptor interaction	2	2			
6	Signal transduction	2	2			
7	Semester work	2	2			
8	Signal transduction	2	2			
9	Dose response curve	2	2			
10	Action potential	2	2			
11	Action potential	2	2			
12	Adverse drug reactions	2	2			
13	Enzymes	2	2			
14	Revision and open discussion	2	2			
15	Revision and open discussion	2	2			

5. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks (%)
1	Exam 1written (formative exam)	4th week	5	5
2	Periodical exam	7th week	10	10
3	Final Written Exam	16th ,17th	75	70
4	Final Oral Exam	16th ,17th	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)	- Harvey Lodish, Arnold Berk, S Lawrence Zipursky, Paul Matsudaira, David Baltimore, and James Darnell. Molecular Cell Biology, 4th edition. New York: W. H. Freeman; 2000. - Goodman and Gilman
	Other References	Notes and Lab manual prepared by the department staff.
	Electronic Sources (Links must be added)	www.pubmed.com www.medscape.com www.biomedcentral.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 . -Board -Internet

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

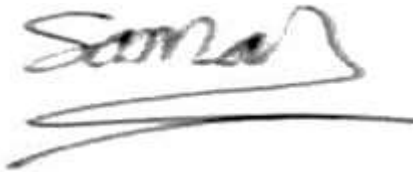
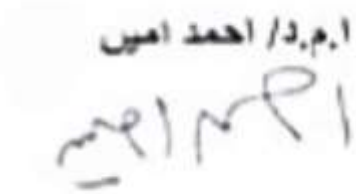
Course Plan

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

Course title: basic pharmacology Course code: PO301

Course Contents		**Key elements**	**Teaching and Learning Methods**	**Student Assessment Methods**
Week #	Course Contents	Key Elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Pharmacokinetics	1.1.1, 2.1.2, 3.1.2, 4.1.2	Lectures	Written and oral exams
Week # 2	Pharmacokinetics	1.1.1, 2.1.2, 3.1.1, 4.1.2	Lectures	Written and oral exams
Week # 3	Pharmacokinetics	1.1.1, 2.1.2, 3.1.1, 4.1.2	Lectures	Written and oral exams
Week # 4	Drug receptors	1.1.2, 2.1.2, 3.1.2, 4.1.2, 4.1.3	Lectures and discussion	Written and oral exams
Week # 5	Drug receptor interaction	1.1.2, 2.1.2, 3.1.2, 4.1.2, 4.1.3	Lectures	Written and oral exams

Week # 6	Signal transduction	1.1.2, 2.1.1, 3.1.1, 4.1.2	Lectures and brain storming	Written and oral exams
Week # 7	Semester work			
Week # 8	Signal transduction	1.1.2, 2.1.1, 3.1.1, 4.1.1, 4.1.2, 4.1.3	Lectures	Written and oral exams
Week # 9	Dose response curve	1.1.5, 2.1.3, 3.1.2, 4.1.1, 4.1.2, 4.1.3	Lectures	Written and oral exams
Week # 10	Action potential	1.1.3, 2.1.3, 3.1.2, 4.1.1, 4.1.2	Lectures	Written and oral exams
Week # 11	Action potential	1.1.3, 2.1.3, 3.1.2, 4.1.1, 4.1.2	Lectures	Written and oral exams
Week # 12	Adverse drug reactions	1.1.4, 2.1.3, 3.1.2, 4.1.1, 4.1.2, 4.1.3	Lectures	Written and oral exams
Week # 13	Enzymes	1.1.4, 2.1.3, 3.1.2, 4.1.1, 4.1.2, 4.1.3	Lectures	Written and oral exams
Week # 14	Revision and open discussion	1.1.1, 1.1.2, 1.1.3, 1.1.5, 1.1.6, 2.1.1, 2.1.2, 2.1.3, 3.1.1, 3.1.2, 4.1.1, 4.1.2, 4.1.3	Brain storming and discussion	Written and oral exams
Week # 15	Revision and open discussion	4.1.1, 4.1.2, 4.1.3	Brain storming and discussion	Written and oral exams

Name and Signature Course Coordinator Dr. Samar Elsebaay	Name and Signature Program Coordinator Dr.Ahmed Amin
	

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Physiology I			
Course Code (according to the bylaw)	MD 304			
Department/s participating in delivery of the course	Biochemistry department (Physiology department, faculty of medicine)			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	2	-	-	2
Course Type	Compulsory			
Academic level at which the course is taught	Second Year-first Term			
Academic Program	Pharm D Clinical			
Faculty/Institute	Pharmacy			
University/Academy	Kafrelsheikh			
Name of Course Coordinator	Dr. Sanad Elkholy			
Course Specification Approval Date	1/9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

This course covers the normal physiological functions of respiratory system, autonomic nervous system, digestive system and blood.

It also covers the abnormal pathophysiological conditions affecting respiratory system, autonomic nervous system, digestive system and blood.

And the identification of some physiological parameters such as ESR, Respiratory rate, ….etc.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
Domain 1- Fundamental Knowledge **1-1 COMPETENCY**		**Upon finishing this course, students will be able to integrate knowledge from basic physiological knowledge to identify the abnormality in body function.** **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 Physiological aspects of different body systems including respiratory system, autonomic nervous system and blood.
		1.1.2	Identify the normal and abnormal body function.
		1.1.3	Identify The basic epidemiology and pathophysiology of diseases of the different body systems.
		1.1.4	Identify Different physiological parameters.
DOMAIN 3: PHARMACEUTICAL CARE **3-1- COMPETENCY**		**Upon finishing this course, students will be able to apply the principles of body functions to participate in improving 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 difference between physiology of body systems studied.
		3.1.2	Monitor some common physiological tests e.g. blood group testing and ESR.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
		3.1.3	Integrate effectively library search, retrieval of information, carry out private study as well as analyze and interpret experimental results.

4. Teaching and Learning Methods

1. Lectures (√)
2. Seminar / Workshop (√)
3. Class Activity (√)
4. 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	Introduction to Physiology and Homeostasis	**2**	**2**	-		
2	Composition and Functions of Blood	**2**	**2**	-		
3	Hemostasis and Blood Coagulation	**2**	**2**	-		
4	Blood Indices and Diagnostic Parameters	**2**	**2**	-		
5	Respiratory System Physiology Mechanics of Breathing and Lung Volumes	**2**	**2**	-		
6	Gas Exchange and Transport	**2**	**2**	-		
7	**Mid-term exam**	**2**	-	-		
8	Regulation of Respiration and Respiratory Disorders	**2**	**2**	-		
9	Organization and Functions of the ANS	**2**	**2**	-		
10	Autonomic Control of Body Functions and Related Disorders	**2**	**2**	-		
11	Overview of Digestive System and Gastrointestinal Motility	**2**	**2**	-		
12	Secretion and Digestion	**2**	**2**	-		
13	Absorption and Gastrointestinal Hormones	**2**	**2**	-		
14	Measurement of Physiological Parameters	**2**	**2**	-		
15	Pathophysiological Correlations and Clinical Applications	**2**	**2**	-		

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of Total Course Marks

1	Midterm exam	**7th week**	**10**	**10%**
2	Final Written Exam	**17th week**	**75**	**75%**
3	Final Oral Exam	**17th week**	**10**	**10%**
4	Assignments / Project /Portfolio/ Logbook	**3th week, 5th week and 10th one**	**5**	**5%**

6. Learning Resources and Supportive Facilities *

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

Course Plan

Week	Topic	Key Elements	Teaching & Learning Methods	Student Assessment Methods
1	Introduction to Physiology and Homeostasis	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
2	Composition and Functions of Blood	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
3	Hemostasis and Blood Coagulation	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
4	Blood Indices and Diagnostic Parameters	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
5	Respiratory System Physiology Mechanics of Breathing and Lung Volumes	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
6	Gas Exchange and Transport	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
7	**Mid-term exam**			
8	Regulation of Respiration and Respiratory Disorders	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
9	Organization and Functions of the ANS	1.1.1, 1.1.2, 1.1.3, 1.1.4,	Lectures and class activities	Written and oral exams

		3.1.1, 3.1.2, 3.1.3		
10	Autonomic Control of Body Functions and Related Disorders	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
11	Overview of Digestive System and Gastrointestinal Motility	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
12	Secretion and Digestion	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
13	Absorption and Gastrointestinal Hormones	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
14	Measurement of Physiological Parameters	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams
15	Pathophysiological Correlations and Clinical Applications	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures and class activities	Written and oral exams

Name and Signature
Course Coordinator
Dr/ Sanad Elkholy

Name and Signature
Program Coordinator
Prof/ Abdelaziz Elashmawy

Kafrelsheikh University
Faculty of Pharmacy

جامعة كفر الشيخ
كلية الصيدلة

Course Specification
(2025)

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutical Dosage Forms- I			
Course Code (according to the bylaw)	PT 303			
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	Second Level, Semester (1)			
Academic Program	Bachelor of Pharmacy (Pharm D.) (Clinical pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof. Abd El-Aziz El-Said Lecturer. Walid Anwar			
Course Specification Approval Date	9/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department council			

2. Course Overview (Brief summary of scientific content)

This course is a study of the system of weights, measures, mathematical expertise and pharmaceutical calculations requisite to the compounding, dispensing, and utilization of drugs in pharmacy practice. It is also concerned with all manufacturing formulations aspects, packaging, storage and stability of liquid dosage forms including solutions (aqueous and non-aqueous), suspensions, emulsions and colloids with emphasis on the technology and pharmaceutical rationale fundamental to their design and development. The incompatibilities occurring during dispensing are also considered.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
Domain 1 (FUNDAMENTAL KNOWLEDGE) 1-1- COMPETENCY		**Upon finishing this course, students will be able to integrate knowledge from basic pharmaceutical science to formulate different classes of liquid dosage forms as a preliminary step in the manufacture of active pharmaceutical 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**	Identify pharmaceutical calculations requisite to the compounding and dispensing of drugs in pharmacy practice.
		1.1.2	Demonstrate understanding of sedimentation theory and Identify factors affecting sedimentation rate
		1.1.3	Distinguish between flocculated and deflocculated systems
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**	Express knowledge of methods of preparation of pharmaceutical solutions, suspension, emulsions, syrup and other disperse systems.
		1.1.5	Integrate knowledge from fundamental pharmaceutical sciences to assess the efficacy and safety in patient and community.
		1.1.6	List the specifications of ideal suspension, emulsion, syrup and colloid.

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**
		1.1.7	Define the best additives to enhance the stability of pharmaceutical solutions, suspension, syrup and other disperse systems.
		1.1.8	Discuss the factors affecting stability of pharmaceutical colloid, suspensions, syrup and emulsions
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-2- COMPETENCY		**Upon finishing this course, students will be able to formulate and standardize different liquid dosage forms which are useful in the manufacture of pharmaceutical products.** **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**	Formulate and prepare aromatic water, suspension, syrup and emulsion according to good pharmaceutical practices.
2.2.2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	**2.2.2**	Apply the rules of manufacturing, storage and transportation of pharmaceutical disperse systems.
		2.2.3	Examine the best method for preparation of different pharmaceutical dispers systems
		2.2.4	Integrate pharmaceutical knowledge in formulating safe and effective dosage forms taking into consideration incompatibilities issues.
		2.2.5	Select the best suspending/ emulsifying agent for a given formulation.
		2.2.6	Recognize factors affecting stability of solutions, suspensions, syrup and emulsions
2.2.3	Recognize the principles of various tools and instruments and select the	**2.2.7**	Recognize different methods for preparation of liquid dosage forms.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
	proper techniques for synthesis and analysis of different materials and production of pharmaceuticals.	**2.2.8**	Select suitable method for characterization of liquid dosage forms, active ingredient and excipients
		2.2.9	Develop and evaluate the quality attributes of liquid dosage forms.
		2.2.10	Apply the principles of different techniques to operate the pharmaceutical equipment and instruments used in liquid dosage forms
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.	**2.2.11**	Recognize principles of pharmaceutical calculation for preparation of liquid dosage forms
		2.2.12	Recognize recent knowledge in pharmaceutical technology to design new liquid dosage forms
2-3- COMPETENCY		**Upon finishing this course, students will be able to handle and dispose synthetic pharmaceutical 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**	Safely handle different chemicals to avoid harm to the students.

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.	**2.3.2**	Recognize and adopt MSDS safety guidelines for safe and appropriate handling and disposal of pharmaceutical chemical materials.
		2.3.3	Demonstrate the safe use and storage of the prescribed medicine to the patient.
Domain 4: Personal Practice **4-2- Competency**		**Upon finishing this course, students will be able to Effectively communicate verbally, non-verbally and in writing with individuals and communities.** **This competency will be developed via the following key elements:**	
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.2.1**	Perform presentation on the advanced topics in dosage form I.
		4.2.2	Acquire effective presentation skills in modern technology and media to create engaging and memorable experiences. This includes using interactive slides, incorporating multimedia (videos, images, audio), and employing tools for real-time feedback and collaboration. By integrating these elements, student can enhance audience engagement, clarify complex information, and leave a lasting impact.

4. Teaching and Learning Methods

1- Lectures **(√)**

2- E-learning **(√)**

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

4- Discussion **(√)**

5- Brainstorming **(√)**

6- Assignment **(√)**

7- Presentation **(√)**

8- Case study **(√)**

Course Schedule						
Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)	**Training (Practical/ Clinical/ .....)**	**Self-learning (Tasks/ Assignments/ Projects/ ...)**	**Other (to be determined)**
1	Introduction - Pharmaceutical calculations	**4**	**2**	**2**	---------	---------
2	Liquid dosage forms - Aromatic water	**4**	**2**	**2**	---------	---------
3	Syrup	**4**	**2**	**2**	---------	---------
4	Pharmaceutical solutions - Mixtures	**4**	**2**	**2**	---------	---------
5	Introduction to disperse system – Suspensions - Reasons for preparing suspension - Characters of ideal suspension	**4**	**2**	**2**	---------	---------
6	ideal characters of suspending agents - Formulation and evaluation of suspensions - Stability of suspensions	**4**	**2**	**2**	---------	---------
7	Periodical exam					
8	Emulsion (Definition - Types of emulsion)	**4**	**2**	**2**	---------	---------
9	Theories of emulsification	**4**	**2**	**2**	---------	---------
10	Stability of emulsions	**4**	**2**	**2**	---------	---------
11	Different methods for Preparation of emulsion	**4**	**2**	**2**	---------	---------
12	ideal characters of Emulsifying agents - examples of emulsifying agents	**4**	**2**	**2**	---------	---------

13	Colloids (definition - Pharmaceutical application of colloids)	**4**	**2**	**2**	---------	---------
14	Types of colloidal systems	**4**	**2**	**Practical exam**	---------	---------
15	ideal characters of colloids - Stability of colloids)	**4**	**2**	**Practical exam**	---------	---------

5. Methods of students' assessment

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

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	Kevin Taylor, Michael Aulton, Aulton's Pharmaceutics: The Design and Manufacture of Medicines. 6th Edition, 2022. Geoffrey D. Tovey, Pharmaceutical Formulation: The Science and Technology of Dosage Forms, 2018.
	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)	

Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	Laboratory facilities (Equipment of factory).
	Supplies	Water bath, digital balances and other lab instruments
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

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

Course title: Pharmaceutical Dosage Forms-I **Course code: PT 303**

Course Contents		Key elements	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Introduction Pharmaceutical calculations	1.1.1, 2.2.10	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 2	Liquid dosage forms Aromatic water	1.1.1, 1.1.4, 1.1.5, 1.1.7, 2.2.3, 2.2.5, 2.2.6, 2.2.7, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 3	Syrup	1.1.1, 1.1.4, 1.1.5, 1.1.6, 1.1.7, 1.1.8, 2.2.3, 2.2.5, 2.2.6, 2.2.7, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 4	Pharmaceutical solutions Mixtures	1.1.1, 1.1.4, 1.1.7, 2.2.3, 2.2.5, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 5	Introduction to disperse system Suspensions Reasons for preparing suspension Characters of ideal suspension	1.1.2, 1.1.3, 1.1.5, 1.1.6, 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 6	Ideal characters of suspending agents Formulation and evaluation of suspensions Stability of suspensions	1.1.4, 1.1.5, 1.1.7, 1.1.8, 2.2.3, 2.2.5, 2.2.6, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams

Week # 7	Periodical exam			
Week # 8	Emulsion Definition Types of emulsion	1.1.1, 1.1.4, 2.2.1, 2.2.2, 2.2.3, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 9	Theories of emulsification	1.1.4, 2.2.1, 2.2.3, 2.2.4, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 10	Stability of emulsions	1.1.5, 1.1.6, 1.1.7, 1.1.8, 2.2.3, 2.2.5, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, practical training and class activities	Written, practical and oral exams
Week # 11	Different methods for Preparation of emulsion	1.1.1, 1.1.4, 2.1.1, 2.2.1, 2.2.4, 2.2.5, 2.2.6, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, and practical training	Written, practical and oral exams
Week # 12	Ideal characters of Emulsifying agents examples of emulsifying agents	1.1.1, 2.2.1, 2.2.4, 2.2.5, 2.2.6, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, and practical training	Written, practical and oral exams
Week # 13	Colloids definition Pharmaceutical application of colloids	1.1.1, 2.2.1, 2.2.2, 2.2.3, 2.3.1, 2.3.2, 2.3.3.	Lectures, E-learning, and practical training	Written, practical and oral exams
Week # 14	Types of colloidal systems	1.1.4, 1.1.5, 1.1.7, 2.2.1, 2.2.2, 2.2.3, 2.2.5, 2.3.1, 2.3.2, 2.3.3.	Lectures and E-learning	Written and oral exams
Week # 15	Ideal characters of colloids Stability of colloids	1.1.4, 1.1.5, 1.1.6, 1.1.8, 2.2.1, 2.2.2, 2.2.6, 2.2.7, 2.2.9	Lectures and E-learning	Written and oral exams

Name and Signature Course Coordinator Prof. Abd El-Aziz El-Said Lecturer. Walid Anwar	Name and Signature Program Coordinator Ass. Prof. Ahmed Amin Ali