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

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

Table of Contents:

Note: Page numbering according to the order of appearance in the merged PDF file.

Course Specification
(2025)

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutical Analytical Chemistry III			
Course Code (according to the bylaw)	PA 303			
Department/s participating in delivery of the course	Pharmaceutical Analytical Chemistry			
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			
Academic Program	Bachelor in pharmacy (Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Dr. Galal Magdy			
Course Specification Approval Date	9/2025			
Course Specification Approval	Department council			

2. Course Overview (Brief summary of scientific content)

This course covers the principles and the application of oxidation-reduction reactions. In addition to the principles and the application of electrochemical analysis and polarography.

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 successful completion of this course, students will be able to integrate knowledge from basic inorganic and analytical chemistry to standardized materials. 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**	Understand the principles of basic analytical chemistry techniques and their applications
		1.1.2	Understand the principles and applications of redox titrations .
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**	Understand the principles and applications of conductometric, potentiometric and polarographic methods of analysis.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-2- COMPETENCY		**Upon finishing this course, students will be able to apply the acquired knowledge to standardize some pharmaceutical materials. 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**	Demonstrate the principles of various analytical instruments used for the analysis of different pharmaceutical materials
2.2.2	Apply the basic requirements of quality management system in developing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	**2.2.2**	Use effectively appropriate titrimetric and electrochemical methods for laboratory analysis of selected inorganic and pharmaceutical materials.
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	**2.2.3**	Select and apply redox or electrochemical analytical methods to analyze pharmaceutical materials
		2.2.4	Explain the principles of pharmaceutical calculations and their applications to pharmaceutical
2-3- COMPETENCY		**Upon finishing this course, students will be able to handle and dispose chemical 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 synthetic/natural materials, biotechnology-based and radio-labeled products, and other materials/products used in pharmaceutical fields.	**2.3.1**	Handle chemical materials safely to avoid harm to individuals.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of pharmaceutical materials/products.	**2.3.2**	Use laboratory reagents, glassware and equipment safely and appropriately
2-4- COMPETENCY		**Upon finishing this course, students will be able to properly and safely handle chemicals avoiding their harm**	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
		This competency will be developed via the following key elements:	
2.4.1	Ensure safe handling/use of poisons to avoid their harm to individuals and communities	**2.4.1**	Select appropriate methods for handling and disposal of materials used in pharmaceutical analysis
2-5- COMPETENCY		**Upon finishing this course, students will be able to Contribute to pharmaceutical research studies and needed to authorize medicinal products.** **This competency will be developed via the following key elements:**	
2.5.1	Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements	**2.5.1**	Perform analytical identification of analytes as raw material or in dosage forms as well as determination of their concentration in accordance to ethical research regulations.
		2.5.2	Evaluate pharmaceutical products for compliance with quality, safety, and efficacy standards.

3. Teaching and Learning Methods

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

Course Schedule						
Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)	**Training (Practical /Clinical/ .....)**	**Self-learning (Tasks/ Assignments/ Projects/ ...)**	**Other (to be determined)**
1	- Introduction to Redox reaction -Electrical properties of redox systems, Nernest eqution for electrode potential.	3	1	2	-	-
2	- Nernest equation for oxidation potential - Factros affecting oxidation potential	3	1	2	-	-
3	- Detection of the end point in redox titrations - Types of redox indicators. - Redox titration curve and applied examples.	3	1	2	-	-
4	Different oxidizing agents.	3	1	2	-	-
5	Iodine titrations	3	1	2	-	-
6	Applications to Redox titration	3	1	2	-	-
7	**periodical exam**					
8	Introduction to instrumental methods of analysis and overview on electrochemical ones.	3	1	2	-	-
9	Basic principles of potentiomety.	3	1	2	-	-

10	- Galvanic and lectrolytic cells. - Types of reference electrodes. - Types of indicator electrodes.	3	1	2	-	-
11	- Membrane eleectrodes and glass electrode. - Ion selecive electrodes. - Applications	3	1	2	-	-
12	Conductimetric titration	3	1	2	-	-
13	Applications to Conductimetric titration.	3	1	2	-	-
14	Principle of polarographic measurements	1	1	Practical exam	-	-
15	- Derivatization in polarography - Applications	1	1	Practical exam	-	-

4. Methods of students' assessment

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

5. Learning Resources and Supportive Facilities *

Learning resources (books,	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	1- CHRISTIAN, Gary D.; DASGUPTA, Purnendu K.; SCHUG, Kevin A. Analytical chemistry. John Wiley & Sons, 2013.

scientific references, etc.) *		2-David S. Hage, James D. Carr "Analytical chemistry and Quantitative Analysis,"(2011). 3- Skoog, Douglas A. ;West, Donald M.; Holler, F. James; Crouch, Stanley R.(2014), "Fundamentals of analytical chemistry".belmot: books/Cole .
	Other References	-Notes on pharmaceutical analytical chemistry for pre-pharmacy students, prepared and distributed by Dept. of Pharmaceutical Analytical Chemistry. - Lab manual of pharmaceutical analytical chemistry for pre-pharmacy students, prepared and distributed by Dept. of Pharmaceutical Analytical Chemistry
	Electronic Sources (Links must be added)	www.pubmed.com www.sciencedirect.com
	Other (to be mentioned)	1-D. A. Skoog, D. M. west, F. J. holler and S. R. crouch, "fundamentals of analytical chemistry", eighth edition brooks / cole-thomson learning, inc. (2004).
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Laboratory facilities (burettes, flasks, and reagents)
	Supplies	pH meter and conductometer
	Virtual Labs	Praxilabs
	Other (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Name and Signature **Course Coordinator** **Dr. Galal Magdy**	**Name and Signature** **Program Coordinator** **Prof. Dr. Abdelaziz Elashmawy**

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)			
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 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 biologicals, 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, WeinheimOrganic 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.ph
Supportive facilities &	**Devices/Instruments**	- Data show, Computers, Library, Internet.
	Supplies	Classrooms.

equipment for teaching and learning		

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,	Lectures and E-learning	Written and oral exams

		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.		
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

Prof. Abdelaziz Elsayed

Kafrelsheikh University
Faculty of Pharmacy

جامعة كفر الشيخ
كلية الصيدلة

Course Specification
(2025)

1. Basic Information

Course Title (according to the bylaw)	Scientific Writing			
Course Code (according to the bylaw)	NP 302			
Department/s participating in delivery of the course	Pharmaceutical Chemistry Department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1	----	----	1
Course Type	Compulsory			
Academic level at which the course is taught	Second Level, semester (1)			
Academic Program	Bachelor of Pharmacy (PharmD)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Assoc. Prof. Dr. Wagdy Mohamed			
Course Specification Approval Date	9/2025			
Course Specification Approval	Department council			

2. Course Overview (Brief summary of scientific content)

This course covers basic information that introduces students to the principles of good scientific writing to be familiar with the basic structure of scientific reports and research articles to cover:

1- Methods of paraphrasing and common mistakes in scientific writing.
2- Different writing styles and how to write a scientific report.
3- Proposal and manuscript to use tables and figures in data presentation.
4- Evaluation of literature and information sources.

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**	Use accurately pharmaceutical and biomedical topics and incorporating relevant scientific terminology and concepts.
		1.1.2	Integrate clinical and administrative sciences in writing reports, reviews, and case studies and writing clear recommendations for patient care plans, drug utilization reviews.
1.1.5	Retrieve information from fundamental sciences to solve therapeutic problems.	**1.1.3**	Retrieve and synthesize scientific data from basic sciences to write evidence-based therapeutic recommendations.
		1.1.4	Apply writing skills related to the retrieval of primary scientific sources (journals, research papers) and apply them effectively in solving therapeutic issues.
1.1.6	Utilize scientific literature and collect and interpret information to enhance professional decisions.	**1.1.5**	Interpret scientific articles, clinical trials, and other literature to improve writing and decision-making.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	**1.1.6**	Identify and write about the latest breakthroughs, clinical trials, drug approvals, or technological innovations in pharmacy and healthcare.
		1.1.7	Write about the impact of new healthcare policies, regulations, or legislation on pharmaceutical practice.
DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE 2-5- COMPETENCY		**Upon completing this course, students will be able to contribute to pharmaceutical research studies and clinical trials needed to authorize medicinal products.** **This competency will be developed via the following key elements:**	
2.5.2	Retrieve, interpret, and critically evaluate evidence-based information needed in pharmacy profession.	**2.5.1**	Learn how to efficiently search for and retrieve relevant scientific literature from databases and refine search queries, using appropriate search tools and filters.
		2.5.2	Develop the ability to assess the quality and reliability of scientific studies, understanding study designs, statistical methods, and biases and recognize the strengths and weaknesses of different types of evidence.
2.5.3	Contribute to planning and conducting research studies using appropriate methodologies.	**2.5.3**	Design various research experiments and learn how to select the appropriate design based on research questions and objectives.
		2.5.4	Design surveys, collecting data, using statistical tools to analyze data, and interpreting data outcomes.
DOMAIN 3: PHARMACEUTICAL CARE 3-2- COMPETENCY		**Upon completing this course, students will be able to provide counseling and education services to patients and communities about safe and rational use of medicines and medical devices.** **This competency will be developed via the following key elements:**	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
3.2.3	Provide evidence-based information about safe use of complementary medicine including phytotherapy, aromatherapy, and nutraceuticals.	**3.2.1**	Identify and evaluate reliable sources of evidence on phytotherapy, aromatherapy, and nutraceuticals
		3.2.2	Translate complex scientific evidence into clear, accessible language for different audiences.
3.2.5	Educate and counsel patients, other health care professionals, and communities about safe and proper use of medicines including OTC preparations and medical devices.	**3.2.3**	Develop the scientific writing aspect, and create patient-friendly leaflets, infographics, or online resources.
Domain 4: Personal Practice **4-1- Competency**		**Upon completing this course, students will be able to express leadership, time management, critical thinking, problem solving, independent and teamwork, creativity and entrepreneurial skills.** **This competency will be developed via the following key elements:**	
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.1.1**	Develop skills for effective teamwork in scientific writing projects, including peer review processes and constructive feedback and encourages team collaboration and peer evaluation of writing drafts, fostering teamwork and responsibility for collective output.
		4.1.2	Organize writing tasks to meet deadlines, demonstrating the ability to allocate time effectively for research, drafting, and revision processes.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.1.3**	Apply the skills of sourcing credible scientific literature, analyzing data, and critically assessing sources for the purpose of writing a robust research paper.
		4.1.4	Recognize gaps in knowledge, formulate research questions, for problem-solving aspect and identify issues in writing research and propose solutions.
		4.1.5	Foster creativity in presenting research findings in novel and engaging ways, such as

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
4.1.3	Demonstrate creativity and apply entrepreneurial skills within a simulated entrepreneurial activity.		through clear, compelling arguments or unique angles in scientific writing.
		4.1.6	Develop skills to communicate scientific research clearly and persuasively to a non-expert audience, thereby increasing the impact of the research.
4-2- Competency		**Upon completing this course, students will be able effectively communicate verbally, non-verbally and in writing with individuals and communities.** **This competency will be developed via the following key elements:**	
4.2.1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care teams, patients, and communities.	**4.2.1**	Use techniques for clear, concise, and empathetic writing with patients, healthcare providers, and interdisciplinary teams.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.2.2**	Design visuals (charts, graphs, diagrams) to effectively communicate data and research findings.
4-3- Competency		**Upon completing this course, students will be able Express self-awareness and be a life-long learner for continuous professional improvement.** **This competency will be developed via the following key elements:**	
4.3.1	Perform self-assessment to enhance professional and personal competencies.	**4.3.1**	Develop the ability to evaluate personal strengths and weaknesses in scientific writing and encouraging students to critically assess their writing skills, identify areas for improvement.
		4.3.2	Learn to evaluate the ability to present research findings clearly and effectively, whether through written communication.

4. Teaching and Learning Methods

1- **Lectures** (√)
2- **E-learning** (√)
3- **Practical training/ laboratory (X)**
4- **Class activity** (√)
5- **Seminars** (X)

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	Methods of paraphrasing and common mistakes in scientific writing	**1**	**1**	------	------	------
2	Methods of paraphrasing and common mistakes in scientific writing	**1**	**1**	------	------	------
3	Different writing styles and how to write a scientific report.	**1**	**1**	------	------	------
4	Different writing styles and how to write a scientific report.	**1**	**1**	------	------	------
5	Proposal, manuscript and how to use tables and figures in data presentation	**1**	**1**	------	------	------
6	Proposal, manuscript and how to use tables and figures in data presentation	**1**	**1**	------	------	------
7	Evaluation of literature and information sources	**1**	**1**	------	------	------
8	Evaluation of literature and information sources	**1**	**1**	------	------	------
9	**Mid-term exam**					
10	Laboratory Notebook	**1**	**1**	------	------	------
11	Laboratory Notebook	**1**	**1**	------	------	------
12	Article Journal metrics	**1**	**1**	------	------	------
13	Article Journal metrics	**1**	**1**	------	------	------
14	Short Answers	**1**	**1**	------	------	------

15	Revision	**1**	**1**	------	------	------

5. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Periodical exam	7	15	15%
2	Final Written Exam	16,17	85	85%
3	Total	16,17	100	100%

6. Learning Resources and Supportive Facilities

Learning resources (books, scientific references, etc.)	**The main (essential) reference for the course**	• Notes on scientific writing communication skills
	Other References	• Writing science • Writing literature reviews • The scientist's guide to write • Scientific writing and communication: papers, proposals and presentations. • Concepts in scientific writing. • clinical skills, guide for pharmacist, 3rd edition
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	- Data show, Computers, Library, Internet. -Interactive boards and distant learning unit
	Supplies	- Classrooms.

Name and Signature Course Coordinator	Name and Signature Program Coordinator
Assoc. Prof. Dr. Wagdy Mohamed	Prof. Abd Elaziz El-Said

Course Specification (Pharmacognosy II- PG 303)

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			
Academic Program	Bachelor of Pharmacy (Pharm D.)			
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	Periodical exam	Week 7	15	
2	Final Written Exam	Week 16,17	50	
3	Final Practical/Clinical/... Exam	Week14, 15	25	
4	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)	**Physiology I**			
Course Code (according to the bylaw)	**MD 304**			
Department/s participating in delivery of the course	**Physiology department, faculty of medicine**			
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 Term			
Academic Program	Pharm D			
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	4	2	2		
2	Composition and Functions of Blood	4	2	2		
3	Hemostasis and Blood Coagulation	4	2	2		
4	Blood Indices and Diagnostic Parameters	4	2	2		
5	Respiratory System Physiology Mechanics of Breathing and Lung Volumes	4	2	2		
6	Gas Exchange and Transport	4	2	2		
7	**Mid-term exam**	-	-	-		
8	Regulation of Respiration and Respiratory Disorders	4	2	2		
9	Organization and Functions of the ANS	4	2	2		
10	Autonomic Control of Body Functions and Related Disorders	4	2	2		
11	Overview of Digestive System and Gastrointestinal Motility	4	2	2		
12	Secretion and Digestion	4	2	2		
13	Absorption and Gastrointestinal Hormones	4	2	2		
14	Measurement of Physiological Parameters	2	2	**Practical exam**		
15	Pathophysiological Correlations and Clinical Applications	2	2	**Practical exam**		

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**	**50**	**50%**

3	Final Oral Exam	**17th week**	**10**	**10%**
4	Assignments / Project /Portfolio/ Logbook	**3th week, 5th week and 10th one**	**5**	**5%**
5	Practical exam	**14th, 15th weeks**	**25**	**25%**

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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical and oral exams
9	Organization and Functions of the ANS	1.1.1, 1.1.2, 1.1.3, 1.1.4, 3.1.1, 3.1.2, 3.1.3	Lectures, practical training and class activities	Written, practical and oral exams

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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical 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, practical training and class activities	Written, practical and oral exams

Name and Signature
Course Coordinator

Dr/ Sanad Elkholy

Name and Signature
Program Coordinator

ا.د/ عبدالعزيز العشماوي

Kafrelsheikh University
Faculty of Pharmacy

جامعة كفر الشيخ
كلية الصيدلة

Course Specification
(2025)

1. Basic Information

Course Title (according to the bylaw)	Pharmaceutics 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
	222	1	----	3
Course Type	compulsory			
Academic level at which the course is taught	Second Level, Semester (1)			
Academic Program	Bachelor of Pharmacy (Pharm D.)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Kafrelsheikh University			
Name of Course Coordinator	Prof. Abd El-Aziz El-Said Lecturer. 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.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
		1.1.6	List the specifications of ideal suspension, emulsion, syrup and colloid.
		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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
2.2.3	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**	Recognize different methods for preparation of liquid dosage forms.
		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:**	

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
2.3.1	Handle, identify, and dispose biologicals, synthetic/natural materials, biotechnology-based and radio-labeled products, and other materials/products used in pharmaceutical fields.	**2.3.1**	Safely handle different chemicals to avoid harm to the students.
2.3.2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biological, and pharmaceutical materials/products.	**2.3.2**	Recognize and adopt MSDS safety guidelines for safe and appropriate handling and disposal of pharmaceutical chemical materials.
		2.3.3	Demonstrate the safe use and storage of the 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 pharmaceutics 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- Brain - storming	(√)
6- Assignment	(√)
7- Presentation	(√)
8- Case study	(√)

Course Schedule						
Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/ discussion groups/ .....)	**Training (Practical/ Clinical/ .....)**	**Self-learning (Tasks/ Assignments/ Projects/ ...)**	**Other (to be determined)**
1	Introduction -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://ms3.kfs.edu.eg/pharm/login/index.php**
	Other (to be mentioned)	
Supportive facilities & equipment for teaching	**Devices/Instruments**	Laboratory facilities (Equipment of factory).
	Supplies	Water bath, digital balances and other lab instruments
	Electronic Programs	----
	Skill Labs/ Simulators	----
	Virtual Labs	----

and learning	**Other** (to be mentioned)	Data show, smart board, Unit for distance learning, Computers, Internet and Library.

Course Plan

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

Course title: Pharmaceutics-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
Prof. Abd El-Aziz El-Said