وحدة ضمان الجودة

Courses Specifications
Faculty of Pharmacy

Bachelor of pharmacy- Pharm D

Program

Elective courses

2025-2026

وحدة ضمان الجودة

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COURSE SPECIFICATIONS

Gene Regulation and Epigenetic

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	**Gene Regulation & Epigenetic**			
Course Code (according to the bylaw)	PM E 07			
Department/s participating in delivery of the course	**Microbiology and Immunology Department**			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1 hr/week	1 hr/week	-	2hrs/week
Course Type	Faculty Requirements (elective course)			
Academic level at which the course is taught	level 4 or 5 / Semester 8 or 10			
Academic Program	Bachelor of Pharmacy-Pharm D			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	----------			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview **(Brief summary of scientific content)**

On completion of the course, the student will be able to explain the molecular basis of gene regulation, including transcriptional and post-transcriptional control.
The student can describe epigenetic mechanisms such as DNA methylation, histone modifications, and chromatin remodeling, and the role of non-coding RNAs.
Furthermore, the student will analyze how gene regulation and epigenetic modifications influence cellular differentiation, development, and disease progression, with emphasis on cancer and genetic disorders. Finally, the student will apply knowledge of gene regulation and epigenetics to practical applications in diagnostics, therapeutics, and biotechnological innovation.

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**
1-1-1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.2.1**	Describe the fundamental molecular processes of gene regulation at the transcriptional, post-transcriptional, and transrational levels.
		1.C1.3.1	Explain the major types of epigenetic modifications such as (DNA methylation, histone modification, non-coding RNAs) and their mechanisms
		1.C1.3.2	Compare and contrast the fundamental principles governing the inheritance of genetics and epigenetic traits, highlighting their medical applications, including implications for disease susceptibility, diagnostic approaches, and therapeutic strategies.

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**
3-1-1	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	**3.C1.1.1**	Apply knowledge of regulatory pathways to predict the cellular response to pharmaceutical agents.

4. Teaching and Learning Methods

1. Lectures
2. Practical sessions
3. Self- Learning (Activity)*
4. Co-operative learning (Activity)*

*The activity consists of student presentations on specific topics, combining self- learning and co-operative learning, as students work together in teams to prepare and deliver their presentations during practical sessions.

5. 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	➢ **Lecture:** Introduction to genetic regulation.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** DNA extraction, detection and PCR amplification	**2**	**-**	**1**	**-**	**-**
2	➢ **Lecture:** DNA transcription mechanisms	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** DNA methylation detection	**2**	**-**	**1**	**-**	**-**
3	➢ **Lecture:** Post transcriptional regulation	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** RNA extraction & detection	**2**	**-**	**1**	**-**	**-**
4	➢ **Lecture:** Translation control & protein synthesis -**Formative assessment (quiz 1)**	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session** cDNA synthesis	**2**	**-**	**1**	**-**	**-**
5	➢ **Lecture** Regulatory elements & transcriptional factors.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session** • Micro RNA isolation & detection. • si RNA-mediated gene silencing.	**2**	**-**	**1**	**-**	**-**
6	➢ **Lecture** Epigenetic fundamentals (DNA methylation & Histone modification).	**1**	**1**	**-**	**-**	**-**

	➢ **Practical session:** Protein extraction & detection.	**2**	**-**	**1**	**-**	**-**
7	➢ **Lecture:** Chromatin remodeling & gene silencing.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Histone extraction & modification detection.	**2**	**-**	**1**	**-**	**-**
8	**Periodical Exam**					
9	➢ **Lecture:** . Genetic regulation in cellular development & differentiation & disease.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Chromatin immunoprecipitation (CHIP)	**2**	**-**	**1**	**-**	**-**
10	➢ **Lecture:** Advanced epigenetic modifications & technologies. **-Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Epigenetic Drug Treatment	**2**	**-**	**1**	**-**	**-**
11	➢ **Lecture:** Epigenetics in disease & therapeutics.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Promoter Activity & Reporter Assays	**2**	**-**	**1**	**-**	**-**
12	➢ **Lecture:** Comparative principles of genetic & epigenetic inheritance. **-Formative assessment (quiz 3)**	**1**	**1**	**-**	**-**	**-**
	➢ **Practical exam**	**2**	**-**	**1**	**-**	**-**
13	➢ **Lecture:** Emerging technologies in genetic & epigenetic research and their clinical implications.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Discussion and assessment of activities.	**2**	**-**	**1**	**-**	**-**
14	**Lecture** General revision and open discussion.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session** Discussion and assessment of activities.	**2**	**-**	**1**	**-**	**-**
15	**Final written exam**					

6. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Weeks 12	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Activity**)	Weeks 13,14	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,10,12	-	-
8	Other (Mention)	-	-	-

7. 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)	- Student book of "Gene regulation and epigenetic" approved by Microbiology and Immunology department. - Practical book of "Gene regulation and epigenetic" approved by Microbiology and Immunology department.
	Other References	⇒ **Recommended books and Periodicals** - Ewald, P. W., & Ewald, H. A. S. (2019). Genetics and epigenetics. Oxford handbook of evolutionary medicine, 77-129. - Huang, S., Litt, M. D., & Blakey, C. A. (Eds.). (2015). Epigenetic gene expression and regulation. Academic Press. - Mandal, S. S. (Ed.). (2017). Gene regulation, epigenetics and hormone signaling (Vol. 1). John Wiley & Sons. - Abdul, Q. A., Yu, B. P., Chung, H. Y., Jung, H. A., & Choi, J. S. (2017). Epigenetic modifications of gene expression by lifestyle and environment. Archives of pharmacal research, 40(11), 121. - Weidemüller, P., Kholmatov, M., Petsalaki, E., & Zaugg, J. B. (2021). Transcription factors: Bridge between cell signaling and gene regulation. Proteomics, 21(23-24), 2000034.
	Electronic Sources (Links must be added)	https://www.ekb.eg/ www.Pubmed.Com www.sciencedirect.com https://www.wiley.com/ https://www.springernature.com/gp
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagazig**	**https://phstudent.eps.zu.edu.eg/Views/StudentViews/StudentLogin**

	University for students	
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning	**Devices/Instruments**	• **For lectures:** whiteboard, data show and computer. • **For Labs:** thermal cyclers for PCR, gel electrophoresis apparatus, western blot and protein analysis tools, epigenetics- specific tools, computers with bioinformatics software, access to online tutorials and visualization tools for genomics and epigenomics.
	Supplies	Chemicals, and microbiological culture media.
	Electronic Programs	1. Microsoft office 2. Microsoft teams 3. Online Database (NCBI) 4. BLAST tool (NCBI)
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	Videos

Name and Signature
Course Coordinator
Dr. Hisham Abdel-Monem

Name and Signature
Head of Department

Ass.Prof. Dr. Momen Ezz-Elarab

COURSE SPECIFICATIONS

Infection Control

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Infection Control			
Course Code (according to the bylaw)	**PM E 08**			
Department/s participating in delivery of the course	Department of Microbiology and Immunology			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hrs/week	1 hrs/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 4- semester 8			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof.Dr Momen Askora			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

This course aims to ensure that the students are well prepared to direct the hospital infection control services and to develop, implement, and supervise infection control programs in different health care facilities. Moreover, this course will provide the students with the skills and knowledge that keep them alert to basic guidelines of infection control that enable them to work with the hospital team and in the integrated programs of quality management and accreditation.

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**
2-3-1	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products	2.C3.1.1	Ensure the safe handling, storage, and disposal of hazardous chemicals, solvents, and radiopharmaceuticals to eliminate environmental risks.
		2.C3.1.2	Implement strict protocols for managing and disposing of biological specimens and natural wastes to prevent environmental hazards
3-1-3	Apply the principles of public health and pharmaceutical microbiology to select and assess proper methods of infection control.	3.C1.3.1	Recommend evidence-based strategies for effective infection control in healthcare settings.
		3.C1.3.2	Apply tailored methods of public health promotion to safeguard community well-being.
3-2-6	Maintain public awareness on social health hazards of drug misuse and abuse	3.C2.6.1	Advise patients, the public, and healthcare professionals on the safe, effective, and rational use of antimicrobials, emphasizing correct

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**
			usage, contraindications, storage, and management of side effects to mitigate antimicrobial resistance.
		3.C2.6.2	Provide evidence-based guidance on the appropriate use of antimicrobial agents and related medical devices, ensuring that the risks of misuse—including the development of resistance—are clearly communicated and managed.
4-1-2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	4.C1.5.1	Cultivate advanced problem-solving capabilities by diagnosing infection control challenges and formulating comprehensive management plans in collaboration with interdisciplinary healthcare teams.
		4.C1.5.2	Direct the identification of critical infection control issues and engineer innovative, collaborative management strategies to optimize antibiotic use and curb antimicrobial resistance.

4. Teaching and Learning Methods

1. Lectures
2. Practical sessions
3. Internet search and self-learning
4. Others: videos

5. 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	**Lecture** • Introduction to nosocomial infection and infection control (IC)	**1**	**1**	**-**	**-**	**-**
	Practical session • Hospital acquired infection	**1**	**-**	**1**	**-**	**-**
2	**Lecture** • Standard and general IC measures (Hand hygiene, personal protective equipments & cough etiquette) • Case study.	**1**	**1**	**-**		**-**
	Practical session • Standard infection control precaution hand hygiene	**1**	**-**	**1**	**-**	**-**
3	**Lecture** • Standard IC measures (Handling of sharps, reprocessing of reusable equipment, environmental control & waste disposal)	**1**	**1**	**-**	**-**	**-**
	Practical session • PPE and sharps disposal	**1**	**-**	**1**	**-**	**-**
4	**Lecture** • Transmission-based measures for IC • Case study **Formative assessment quiz2**	**1**	**1**	**-**	**-**	**-**
	Practical session • Transmission-based precautions	**1**	**-**	**1**	**-**	**-**

5	**Lecture** • Surveillance systems, Isolation precautions & Patient safety	**1**	**1**	**-**	**-**	**-**
	Practical session • AMR and hazard levels (urgent threats)	**1**	**-**	**1**	**-**	**-**
6	**Lecture** • Antibiotic resistance and antibiotic stewardship. • Case study.	**1**	**1**	**-**	**-**	**-**
	Practical session • hazard levels (serious threats)	**1**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** • Most common MDR strains (biggest threats)	**1**	**1**	**-**	**-**	**-**
	Practical session • Nosocomial infection	**1**	**-**	**1**	**-**	**-**
9	**Lecture** • Most common healthcare-associated infections (HAIs)	**1**	**1**	**-**	**-**	**-**
	Practical session Bioterrorism	**1**	**-**	**1**	**-**	**-**
10	**Lecture** • Infection control guidelines for Staff health and safety • **Activity** **Formative assessment quiz3**	**1**	**1**	**-**	**-***	**-**
	Practical session Revision	**1**	**-**	**1**	**-**	**-**
11	**Lecture** • Infection control strategies for MDR organisms	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**1**	**-**	**1**	**-**	**-**
12	**Lecture** • Infection control strategies for MDR organisms • **Activity**	**1**	**1**	**-**	**-**	**-**
	Practical session • Discussion and Assessment of the activity	**1**	**-**	**1**	**-**	**-**

13	**Lecture** • Infection control measures against Bioterrorism	**1**	**1**	-	-	-
	Practical session	-	-	-	-	-
14	**Lecture** •Final Revision and open discussion	**1**	**1**	-	-	-
15	**Final written exam**					

***** In the Infection Control course, week 10 included a lecture segment dedicated to introducing the poster presentation activity, with emphasis on the guidelines, rules, and assessment rubric. In week 12, practical sessions were allocated for students to deliver their poster presentations on the assigned self-learning topics, according to the announced distribution. During these sessions, supervisors engaged students in discussions to evaluate the skills demonstrated, the findings presented, and the conclusions drawn. The activity was formally assessed against a set of predefined criteria to ensure rigor, consistency, and fairness in evaluation.

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical** Exam	Week 11	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity, poster presentation**)	Weeks 10,12	5	5%
7	Assignment (**Formative assessment, Case study**)	Weeks 2,4,6,10	-	-
8	Other (Mention)	-	-	-

7-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)	Student book and practical notes of "Infection Control" approved by the Department of Microbiology and Immunology 2025-2026.
	Other References	1. Australian Dental Association. ADA Guidelines for Infection Prevention and Control, 5th Edition, 2024. https://www.ada.org.au/ 2. Siegel JD, Rhinehart E, Jackson M et al (Healthcare Infection Control Practices Advisory Committee), (**2007**) *Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings.* United States Centers for Disease Control and Prevention 3. **Royal Australian College of General Practitioners (RACGP), 2022–2023** RACGP. *Infection Prevention and Control Guidelines for General Practices and Other Office-Based Practices*, most recent update released November 2022 as part of broader Practice Standards revision; now aligned with RACGP Standards 5th Edition, published 2023–2025
	Electronic Sources (Links must be added)	https://www.ekb.eg/
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagaig University for students**	**http://phstudent.eps.zu.edu.eg/Views/StudentViews/StudentLogin**
	Other (to be	-

	mentioned)	
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board, and Light microscopes
	Supplies	PPE
	Electronic Programs	1. Microsoft office 2. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature

Course Coordinator

Ass. Prof. Momen Askora

Name and Signature

Head of Department

Ass. Prof. Momen Askoura

COURSE SPECIFICATIONS

Chromatography and Separation Techniques

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Chromatography and Separation Techniques			
Course Code (according to the bylaw)	PG E 08			
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**
	1 hrs/week	1 hrs/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 4 –Semester 7			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Samih El-Dahmy			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

On completion of the course, the student will be able to illustrate different modes of separation like high-pressure liquid chromatography, gas liquid chromatography, gel filtration and permeation, ion exchange and their applications.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.2.1**	Outline the principles of different chromatographic separation techniques.
		1.C1.2.2	Illustrate the applications of different chromatographic techniques.
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.C1.9.1**	Identify suitable chromatographic techniques for qualitative and quantitative determination of drugs in body fluids
2.2.1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/ natural pharmaceutical materials.	**2.C2.1.1**	Predict different analytical tools used for determination of chemicals qualitatively and quantitatively.
		2.C2.1.2	Select appropriate chromatographic methods for isolation and identification of different classes of compounds in the body and in different dosage forms
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team	**4.C1.5.1**	Work effectively as a member of a team.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.2.1**	Write reports and present it and develop communications skills with systematic and creative thinking.

4. Teaching and Learning Methods

1. Lectures (data show, board)
2. Practical sessions
3. Self- learning (Activity)
4. Blended- learning (Activity)
5. Field visit (Practical)

5. 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	**Lecture** -Introduction, classification, and terminology and mode of chromatographic separation.	**1**	**1**	**-**	**-**	**-**
	Practical session Laboratory safety measures Extraction of herbal drugs.	**2**	**-**	**1**	**-**	**-**

2	**Lecture** - Classical chromatographic techniques (Column chromatography)	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration on Soxhlet apparatus (Using video)	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - Con. Classical chromatographic techniques (TLC and paper)	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration on column chromatography (Using video)	**2**	**-**	**1**	**-**	**-**
4	**Lecture** Non classical chromatographic techniques (HPLC chromatography)	**1**	**1**	**-**	**-**	**-**
	Practical session Orientation on Activity (1): Write a report on: Using any chromatographic techniques, how can you perform qualitative and quantitative analysis of medicinal plant metabolites or a toxic plant metabolite in body fluid (group discussion, 3 weeks for preparation)	**2**	**-**	**1**	***-**	**-**
5	**Lecture** - Applications of HPLC chromatography **Formative assessment (quiz1)**	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration on TLC (Using video)	**2**	**-**	**1**	**-**	**-**
6	**Lecture** -Gas chromatography, principle, mobile phase, stationary phase	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration of HPLC in the Faculty analytical central lab	**2**	**-**	**1**	**-**	**-**
7	**Periodical exam**					
8	**Lecture** Gas chromatography, detectors, quantification and application.	**1**	**1**	**-**	**-**	**-**

	Practical session Report presentation and group discussion on activity (1).	**2**	**-**	**1**	***-**	**-**
9	**Lecture** -Retention parameters in GC -Hyphenated technique	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration of GC in the Faculty analytical central lab	**2**	**-**	**1**	**-**	**-**
10	**Lecture** -Ion exchange chromatography **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration on the ion exchange chromatography (Using video)	**2**	**-**	**1**	**-**	**-**
11	**Lecture** - Gel chromatography	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration on the gel chromatography (Using video)	**2**	**-**	**1**	**-**	**-**
12	**Lecture** - Affinity chromatography	**1**	**1**	**-**	**-**	**-**
	Practical session Demonstration on affinity chromatography (Using video)	**2**	**-**	**1**	**-**	**-**
13	**Lecture** - Open discussion	**1**	**1**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-**	**-**
14	**Lecture** -Revision	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
15	**Final written exam**					

***** As part of a self-learning activity in Chromatography and Separation Techniques course, a part of practical session in week 4 was specified for the explanation of activity guidelines, rules and assessment rubric. Also, practical sessions in weeks 8 and 14 were facilitated for students to present their reports on the various activity self-learning topics according to the announced student distribution on topics. Supervisors engaged students in a discussion to evaluate the key skills acquired, findings, and conclusions they reached.

The activity was formally evaluated against a set of established criteria to ensure a rigorous and consistent assessment.

6. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Week 13	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Weeks 4,8 and 14	5	5%
7	Assignment (**Formative assessment**)	Weeks 5 and 10	-	-
8	Other (Mention)	-	-	-

7. 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)	Student book and practical notes of "Chromatography and Separation Techniques" approved by Pharmacognosy department 2025-2026.
	Other References	1. Relevant Applications of High-Performance Liquid Chromatography in Food, Environmental, Clinical and Biological Fields, Edited by Oscar Núñez; IntechOpen, London. UK (2022). 2. Hearn, Milton TW. "High–Performance Liquid Chromatography and Its Application to Protein Chemistry." Advances in Chromatography (2021): 1-82. 3. Robards, Kevin, and Danielle Ryan. Principles and practice of modern chromatographic methods. Academic Press, 2021.

		4. Li, Nan, Tianlang Zhang, Guosheng Chen, Jianqiao Xu, Gangfeng Ouyang, and Fang Zhu. "Recent advances in sample preparation techniques for quantitative detection of pharmaceuticals in biological samples." TrAC Trends in Analytical Chemistry 142 (2021): 116318. 5. Berezkin, V٢٠٢٠) .). Gas-Liquid-Solid Chromatography. CRC Press. 6. McNair, Harold M., James M. Miller, and Nicholas H. Snow. Basic gas chromatography. John Wiley & Sons, 2019. 7. Sample Preparation of Pharmaceutical Dosage Forms (Challenges and Strategies for Sample Preparation and Extraction), Beverly Nickerson, Springer Science & Business Media (2011). 8. Ismail, B. Pam. "Basic Principles of Chromatography." In Nielsen's Food Analysis, pp. 167-192. Cham: Springer International Publishing, 2024. 9. Principles and Practice of Modern Chromatographic Methods. D. Ryan and K. Robards (2021). Academic Press. London, UK. 10. HPLC in the Pharmaceutical Industry Edited by Godwin W. Fong (2022) CRC Press. 11. High Performance Liquid Chromatography: Theory, Instrumentation and Application in Drug Quality Control by Al Sayed Omar, O., Khalifa, M. A (2022) De Gruyter, Germany. 12. Mutelet, F. (Ed.). (2022). Recent Advances in Gas Chromatography. IntechOpen. doi: 10.5772/intechopen.87748 13. Advances in Chromatography. Edited by N. Grinberge (2017) Volume 55. Marcel Dekker Inc., New York and Basel. 14. The Essence of Chromatography by C. F. Poole (2003) 1st, ELSEIVIER Inc., San Diego, CA 92101-4495, USA.
	Electronic Sources (Links must be added)	https://www.ekb.eg/ https://scholar..google.com.eg/ www.Pubmed.Com and www.sciencedirect.com
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagaig University for students**	**https://shorturl.at/sar8D**

	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board, screen
	Supplies	Chemicals and Glassware
	Electronic Programs	1-Microsoft office 2-Microsoft teams
	Skill Labs/ Simulators	Central lab
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator

Prof. Dr. Samih El-Dahmy

Name and Signature
Head of Department

Prof. Dr. Amal Al-Gendy

COURSE SPECIFICATIONS

Analysis of Food and Flavor

2025-2026

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Analysis of food and flavors			
Course Code (according to the bylaw)	PG E 09			
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**
	1 hr/week	1 hr/week		2hrs/week
Course Type	Faculty Requirements (Elective Course)			
Academic level at which the course is taught	Level 5- semester 9			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Wafaa Hassan Badr			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview **(Brief summary of scientific content)**

On completion of the course, students will be able to describe food and flavor chemistry, different flow sheets as well as identify recent advances in qualitative and quantitative analysis of food and flavor contents based on their nature including sample preparation, micro extraction techniques and headspace analysis. Also, students will outline challenges of analyzing food, food additives and flavor, safety and allowed limits of flavor and additives in edible and pharmaceutical preparations.

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**
1-1-1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences	**1.C1.2.1**	Describe different types of food and flavors
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.C1.9.1**	Identify different types of foods and flavors
		1.C1.9.2	Outline contaminants of different foods and flavors
2-2-1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/ natural pharmaceutical materials.	**2.C2.1.1**	Examine and analyze the constituents of food and flavors
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.C2.5.1**	Select the appropriate method for analysis.
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills	**4.C2.2.1**	Demonstrate good information technology skills as well as presentation skills.

4. Teaching and Learning Methods

1. Interactive lectures (data show, board)
2. Practical sessions
3. Co-operative (Activity)
4. Field visit (Activity)
5. Self-learning (Activity)

5. 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	**Lecture** Introduction to types of food (meat, fish, poultry, milk and milk products, eggs, vegetables, fruits, cereals) and food contents and their chemistry (proteins, lipids, carbohydrates, vitamins, minerals, antioxidants, other metabolites (like glucosinolates, terpenes, etc), etc), physical and chemical properties and contaminants	**1**	**1**	-	-	-
	Practical session Chemistry of food and flavors Contamination of food	**2**	-	**1**	-	-
2	**Lecture** Introduction to flavours, additives, colorants, types of flavors in food (natural and synthetic) and pharmaceutical formulations and their chemistry	**1**	**1**	-	-	-
	Practical session Methods of analyses of food, food additives and flavor	**2**	-	**1**	-	-

3	**Lecture** Recent methods for analysis of food, food additives and flavors (Introduction and types like HPLC, LC-MS, GC-MS, Spectrophotometric, etc).	**1**	**1**	**-**	**-**	**-**
	Practical session Challenges of analyses methods of food, food additives and flavors	**2**	**-**	**1**	**-**	**-**
4	**Lecture** Challenges of analyses methods of food, food additives and flavours. Safety and allowed limits of flavours and additives in edible and pharmaceutical preparations, toxins and residues	**1**	**1**	**-**	**-**	**-**
	Practical session Application on analysis of proteins	**2**	**-**	**1**	**-**	**-**
5	**Lecture** Different flow sheets for analysis of proteins including sample preparation, extraction methods and recent analytical techniques (HPLC, LC-MS, Spectrophotometric and fluorometric using Bradford's, EZQ and others, etc). **Formative assessment (quiz 1)**	**1**	**1**	**-**	**-**	**-**
	Practical session Application on analysis of lipids. **Activity (presentation on a predetermined food product/ pharmaceutical preparation containing flavors, additives or colorants describing methods of its handling and analysis for quality control purposes)**	**2**	**-**	**1**	**-***	**-**
6	**Lecture** Different flow sheets for analysis of lipids including sample preparation, extraction	**1**	**1**	**-**	**-**	**-**

	methods and recent analytical techniques (HPLC, LC-MS, GC-MS, etc).					
	Practical session Application on analysis of carbohydrates	**2**	**-**	**1**	**-**	**-**
7	**Periodical Exam**					
8	**Lecture** Different flow sheets for analysis of carbohydrates including sample preparation, extraction methods and recent analytical techniques (HPLC, LC-MS, GC-MS, etc).	**1**	**1**	**-**	**-**	**-**
	Practical session Application on analysis of vitamins.	**2**	**-**	**1**	**-**	**-**
9	**Lecture** Different flow sheets for analysis of vitamins including sample preparation, extraction methods and recent analytical techniques (HPLC, LC-MS, etc).	**1**	**1**	**-**	**-**	**-**
	Practical session Application on analysis of minerals.	**2**	**-**	**1**	**-**	**-**
10	**Lecture** Different flow sheets for analysis of minerals including sample preparation, extraction methods and recent analytical techniques (atomic absorption, etc). **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Application on analysis of antioxidants and other food metabolites	**2**	**-**	**1**	**-**	**-**
11	**Lecture** Different flow sheets for analysis of antioxidant (phenolics, polyphenolics, flavonoids, etc) including sample preparation, extraction methods and recent analytical techniques (HPLC, LC- MS, Spectrophotometric, etc).	**1**	**1**	**-**	**-**	**-**

	Practical session Application on analysis of flavors, additives and colorants.	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Different flow sheets for analysis of flavours, additives and colorants including sample preparation, extraction methods and recent analytical techniques (HPLC, LC-MS, GC-MS using solid phase extraction and headspace analysis, etc	**1**	**1**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Different flow sheets for analysis of other metabolites including sample preparation, extraction methods and recent analytical techniques (HPLC, LC-MS, GC-MS, etc).	**1**	**1**	**-**	**-**	**-**
	Practical session Field visit to the central lab	**2**	**-**	**1**	**-**	**-****
14	**Lecture** General discussion and revision	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
15	**Final Written and Oral Exams**					

* As part of a self-learning activity in medicinal plants course, a part of practical session was specified for the explanation of activity guidelines, rules and assessment rubric. Also, practical sessions were facilitated for students to present their reports on the various activity self-learning topics according to the announced student distribution on topics. Supervisors engaged students in a discussion to evaluate the key skills acquired, findings, and conclusions they reached. The activity was formally evaluated against a set of established criteria to ensure a rigorous and consistent assessment.

6. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
١	Exam ١written)**Midterm exam**(	Week 7	10	10%
٢	Exam ٢ .....)Semester work(	-	-	-
٣	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Week 12	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Weeks 5 and 14	5	5%
7	Assignment (**Formative assessment**)	Weeks 5 and 10	-	-
8	Other (Mention)	-	-	-

7. 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)	Student book and practical notes of "Analysis of food and flavors" approved by the Pharmacognosy Department (2025-2026).
	Other References	• Meyer, Lillian Hoagland. *Food Chemistry*. 6th ed. New York: Springer, 2003. • Thomas J. Montville, Karl R. Matthews, Kalmia E. Kniel; Food Microbiology: An Introduction, 2012. • Harry T. Lawless, Hildegarde Heymann; Sensory Evaluation of Food: Principles and Practices (Food Science Text Series), 2nd ed., 2010. • S. Suzanne Nielsen, Food Analysis (Food Science Text Series), 5th ed., 2017 • Lawless, Harry T., and Hildegarde Heymann. *Sensory Evaluation of Food: Principles and Practices*. 2nd ed. New York: Springer, 2020. • Eskin, N. A. M., F. P. Downes, and Keith Ito. *Compendium of Methods for the Microbiological Examination of Foods*. 5th ed. Washington, D.C.: American Public Health Association, 2015. • Egan, Harold, Ronald S. Kirk, and Ronald Sawyer. Pearson's Chemical Analysis of Food. 9th ed. Edinburgh: Longman

		Scientific & Technical, 1991. • Fox, P. F., and P. L. H. McSweeney. Dairy Chemistry and Biochemistry. 3rd ed. New York: Springer, 2015. • Owusu-Apenten, Richard. *Introduction to Food Chemistry*. 3rd ed. Boca Raton: CRC Press, 2020.
	Electronic Sources (Links must be added)	• **https://ift.onlinelibrary.wiley.com/journal/17503841** • **http://www.journalmeattechnology.com/** • **https://www.sciencedirect.com/journal/food-microbiology** • **https://www.sciencedirect.com/journal/journal-of-food-protection** • **https://journals.acspublisher.com/index.php/jms/index** • **https://pmc.ncbi.nlm.nih.gov/articles/PMC5523730/**
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy-Zagazig University for students**	**https://shorturl.at/sar8D**
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Black (white) board, data show, microscope, digital balances, water baths and oven.
	Supplies	Chemicals and glassware precoated TLC.
	Electronic Programs	1. Microsoft office 2. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator
Prof. Dr. Wafaa Hassan Badr

Name and Signature
Head of Department
Prof. Dr. Amal Al-Gendy

COURSE SPECIFICATIONS

Advanced Pharmaceutical Analysis – Spectroscopy

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Advanced Pharmaceutical Analysis Spectroscopy			
Course Code (according to the bylaw)	PA E06			
Department/s participating in delivery of the course	Analytical chemistry department			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hrs/week	1 hrs/week	-	2hrs/week
Course Type	Faculty Requirements (elective)			
Academic level at which the course is taught	Level 4- semester 8			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator				
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview **(Brief summary of scientific content)**

On completion of the course, students will be able to outline the basic concepts and applications of advanced spectroscopic techniques including Fourier Transform, Infra-red (FTIR), Near Infra-red (NIR), Raman, X-rays spectroscopy and Mass spectrometry.

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**
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.C1.9.1	Discuss applications of Fourier Transform Infrared (FTIR) Spectroscopy, Near Infrared Spectroscopy, Raman Spectroscopy, X-rays Diffraction and Mass Spectrometry.
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.C2.2.1	Evaluate validation parameters to ensure standardization and quality of pharmaceutical products
2.2.3	Recognize the principles of various tools and instruments and select the proper techniques for synthesis and analysis of different materials and production of pharmaceuticals.	2C2.4.1	Explain principle and instrumentation of Fourier Transform Infrared (FTIR) Spectroscopy, Near Infrared Spectroscopy, Raman Spectroscopy, X-rays Diffraction and Mass Spectrometry.
		2C2.5.1	Choose the most appropriate analytical methods for analysis of different compounds
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	4.C2.2.1	Integrate computer-aided tools to analyze and present validation data

4. Teaching and Learning Methods

1. Lectures (data show, board)
2. Practical sessions
3. Electronic-based learning (practical sessions)
4. Self-learning (Activity)
5. Blended-learning (Activity)

5. 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	**Lecture** Introduction to Vibrational Spectroscopy Theory and instrumentation	**1**	**1**	**-**	**-**	**-**
	Practical session -Introduction to analytical method validation	**2**	**-**	**1**	**-**	**-**
2	**Lecture** Fourier Transform Infrared (FTIR) Spectroscopy Theory, instrumentation	**1**	**1**	**-**	**-**	**-**
	Practical session Discussing method specificity	**2**	**-**	**1**	**-**	**-**
3	**Lecture** Pharmaceutical applications of FTIR Spectroscopy	**1**	**1**	**-**	**-**	**-**
	Practical session Evaluate method linearity using Microsoft excel	**2**	**-**	**1**	**-**	**-**
4	**Lecture** - Introduction to Raman Spectroscopy **Formative assessment (quiz1)**	**1**	**1**	**-**	**-**	**-**

	Practical session Evaluate LOD&LOQ using Microsoft excel	**2**	**-**	**1**	**-**	**-**
5	**Lecture** - Quantitative Raman Spectroscopy	**1**	**1**	**-**	**-**	**-**
	Practical session . Evaluate method accuracy using Microsoft excel	**2**	**-**	**1**	**-**	**-**
6	**Lecture** Instrumental details for Raman spectroscopy and applications of Raman Spectroscopy	**1**	**1**	**-**	**-**	**-**
	Practical session Evaluate method precision using Microsoft excel	**2**	**-**	**1**	**-**	**-**
7	**Lecture** Introduction to X rays	**1**	**1**	**-**	**-**	**-**
	Practical session Evaluate method robustness using Microsoft excel	**2**	**-**	**1**	**-**	**-**
8	**Midterm exam**					
9	**Lecture** X-ray Diffraction (XRD)	**1**	**1**	**-**	**-**	**-**
	Practical session Discuss system suitability parameters	**2**	**-**	**1**	**-**	**-**
10	**Lecture** - Application of X-rays **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Revision on calculating validation parameters	**2**	**-**	**1**	**-**	**-**
11	**Lecture** - Introduction to Near Infrared Spectroscopy (NIR), instrumentation	**1**	**1**	**-**	**-**	**-**
	Practical session Orientation on Activity	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Calibration of Near Infrared Spectroscopy and applications	**1**	**1**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-**	**-**

13	**Lecture** Introduction to mass Spectroscopy theory and instrumentation	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	*****	**-**
14	**Lecture** Applications for mass Spectrometry	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	*****	**-**
15	**Final written exam**					

***** As part of this course, a self-learning activity is introduced. In week 11, students are briefed on activity guidelines, rules, and assessment rubric. The activity involved searching for an open access research article on spectrophotometric drug determination, followed by preparing a PowerPoint presentation on method validation in the selected paper. Presentations and discussions of the validated parameters and their significance take place in weeks 13 and 14. Evaluation is based on established criteria, including slide design and readability, language accuracy, presentation flow and organization, delivery skills, and bibliography, ensuring fair and objective assessment.

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Mid-term Exam	Week 8	10	10%
3	Final Written Exam	Week 15	50	50%
4	Final Practical Exam	Week 12	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Self-learning Activity	Weeks 13,14	5	5%
7	Formative assessment	Weeks 4,10	-	-

7-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)	**Student book and practical notebook** of Advanced Pharmaceutical Analysis: Spectroscopy" approved by the analytical chemistry department 2025-2026.
	Other References	1. Kellner, R., Mermet, J.-M., Otto, M., Widmer, H. M., & Moller, D. (2004). *Analytical chemistry: A modern approach to analytical science* (2nd ed.), Wiley-VCH. 2. Griffiths, P. R., & de Haseth, J. A. (2007). *Fourier transform infrared spectrometry* (2nd ed.), Wiley-Interscience. 3. Burns, D. A., &Ciurczak, E. W. (Eds.), (2007) *Handbook of near-infrared analysis* (3rd ed.), CRC Press. 4. Skoog, D. A., Holler, F. J., & Crouch, S. R. (2017) *Principles of instrumental analysis* (7th ed.), Cengage Learning. 5. Smith, E., & Dent, G. (2019) *Modern Raman spectroscopy: A practical approach* (2nd ed.), Wiley.
	Electronic Sources (Links must be added)	https://www.thermofisher.com/blog/materials/forensic-analysis-of-drugs-using-x-raydiffraction/ Thermo Fisher Scientific – Training Services https://www.ekb.eg/ http://chemwiki.ucdavis.edu/ www.Pubmed.Com and www.sciencedirect.com
	Electronic platform of Faculty of	**https://shorturl.at/sar8D**

	Pharmacy- Zagaig University for students	
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board, data show
	Supplies	-
	Electronic Programs	Microsoft Excel
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator

Name and Signature
Head of Department

Prof . Dr. Amal Al- Gendi

COURSE SPECIFICATIONS

Veterinary Pharmacology

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Veterinary pharmacology			
Course Code (according to the bylaw)	PO E 08			
Department/s participating in delivery of the course	Pharmacology and Toxicology			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hrs/week	1 hrs/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 4- semester 8			
Academic Program	Bachelor of Pharmacy -Pharm D			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	-			
Course Specification Approval Date	18-8-2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview **(Brief summary of scientific content)**

On completion of the course, students will be able to:

- Recognize pharmacokinetics and pharmacodynamics differences in drugs affecting different systems of the animals' body compared to human body.
- Assess possible species-specific differences in drug response
- Choose the correct route of drug administration for food-producing and companion animals
- Select the proper drug in various disease conditions
- Provide the veterinary clinician with useful information for the practice of therapeutics
- Comply with all legal provisions regarding the use of veterinary drugs
- Predict the impact of genetic variation on drug effects (pharmacogenomics)
- Recognize side effects of medications (including human OTC medications) on animals
- Describe drugs that control and treat parasitic diseases in animals
- Choose the optimum analgesic for domestic animals
- Understand the use of behavioral medications in animals
- Select the proper drug for common dermatologic and ophthalmic conditions in animals
- Get knowledge about equine, food, animal and non-traditional pets' pharmacotherapy
- Counsel animal owners on veterinary pharmacotherapeutics

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical .sciences	**1.C1.3.1**	Explain the principal differences of drug pharmacokinetics and pharmacodynamics between human and animals
		1.C1.3.2	Know the fundamental measures to prevent antibiotic resistance.
1-1-2	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	**1.C1.8.1**	Implement different treatment protocols depending on the animal species (difference between the species)
		1.C1.8.2	Outline a veterinary treatment regimen for a particular disease condition based on case circumstances and drug related information.
1-1-4	Monitor and control microbial growth and carry out laboratory tests for identification of infections/ diseases.	**1.C1.12.1**	State legal aspects related to the treatment of animals.
2-4-1	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team	**2.C4.1.1**	Improve public awareness on the proper **veterinary use** of over the counter (OTC) and prescribed drugs of natural or synthetic origin as well as medical devices.
3-1-4	Use contemporary technologies and media to demonstrate effective presentation skills.	**3.C1.4.1**	Select the appropriate medication therapy for a given disease based on its etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/ diseases.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
3-2-4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control..	**3.C2.4.1**	Counsel community pharmacists and animal owners about toxic profiles of drugs and other toxic substances.
4-2-1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care team, patients, and communities	**4.C2.1.1**	Demonstrate effective oral communication skills with the community.
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.2.1**	Write and present activities using advanced information technology skills.

4. Teaching and Learning Methods

1. Lectures (data show , board)
2. Practical sessions
3. Case study
4. Co-operative Learning (Activity)
5. Self -Learning (Activity)

5. 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	**Lecture** Introduction: Basic consideration of vet. Pharmacology	**1**	**1**	**-**	**-**	**-**
	Practical session Course orientation & introduction to the veterinary physiology	**2**	**-**	**1**	**-**	**-**
2	**Lecture** species differences in pharmacokinetics and pharmacodynamics, Drug delivery systems and routes of drug administration in domestic animals	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies of species differences in pharmacokinetics and pharmacodynamics	**2**	**-**	**1**	**-**	**-**
3	**Lecture** Comparative and veterinary pharmacogenomics, Compounding of drugs for veterinary use, Legal aspects of medication usage in veterinary medication Considerations regarding the use of human OTC in animals	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies of the effect of pharmacogenomics in different species	**2**	**-**	**1**	**-**	**-**
4	**Lecture** Pharmacotherapy of Parasitic Disease **Formative assessment (quiz 1)**	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies of the use of human OTC in animals	**2**	**-**	**1**	**-**	**-**
5	**Lecture** Pain Management in Veterinary Species	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies of the pharmacotherapy of Parasitic Disease	**2**	**-**	**1**	**-**	**-**
6	**Lecture** Behavioral Pharmacotherapeutics	**1**	**1**	**-**	**-**	**-**

	Practical session Pain Management in Veterinary Species	**2**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** Dermatologic Pharmacotherapeutics	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on Pain Management in Veterinary Species	**2**	**-**	**1**	**-**	**-**
9	**Lecture** Ophthalmic Pharmacotherapeutics **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Behavioral Pharmacotherapeutics	**2**	**-**	**1**	**-**	**-**
10	**Lecture** Equine Pharmacotherapy	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on Behavioral Pharmacotherapeutics	**2**	**-**	**1**	**-**	**-**
11	**Lecture** Food Animal Pharmacotherapy	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on Equine Pharmacotherapy	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Pharmacotherapeutics for Nontraditional Pets **Formative assessment (quiz 3)**	**1**	**1**	**-**	**-**	**-**
	Practical session - Veterinary pharmacy questionnaire	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Counseling for Owners of Veterinary Patients	**1**	**1**	**-**	**-**	**-**
	Practical sessions **Activity**	**2**	**-**	**1**	**-**	**-**
14	**Lecture** General discussion and revision	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**		**1**		
15	**Final written exam**					

6. Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50 %
4	Final **Practical**/Clinical/… Exam	Week 14	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Week 13	5	5%
7	Assignment (**Formative assessment**)	Week 4,9,12	-	-
8	Other (Mention)	-	-	-

7. 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)	- Student book of Veterinary Pharmacology approved by the Department of Pharmacology and Toxicology, 2024/2025. - Practical notes of Veterinary Pharmacology approved by the Department of Pharmacology and Toxicology, 2024/2025
	Other References	1. Pharmacotherapeutics for Veterinary Dispensing, Katrina L. Mealey (2019) 2. Comparative and Veterinary Pharmacology; Cunningham, Fiona, Elliott, Jonathan, Lees, Peter (2010) 3. Veterinary Pharmacology and Therapeutics 10th edition; Jim E. Riviere, Mark G. Papich (2017) 4. Handbook of Veterinary Pharmacology; Walter H. Hsu (2008)
	Electronic Sources (Links must be added)	-

	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy-Zagaig University for students**	http://phstudent.eps.zu.edu.eg/Views/StudentViews/StudentLogin
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	- White boards, data show, ai conditioned classroom - Well-equipped labs.
	Supplies	-
	Electronic Programs	1. Microsoft office 2. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator

Name and Signature
Head of Department
Prof . Dr . Islam Ahmed

COURSE SPECIFICATIONS

Biological Standardization

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Biological standardization			
Course Code (according to the bylaw)	PO E 09			
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**
	1 hr/week	1 hr/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 4- semester 7			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Islam Ahmed			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

On completion of the course, students will be able to:

- comprehensively understand the principles and practices involved in the evaluation and approval of pharmacological agents and equip with the knowledge and skills necessary to critically assess drug development processes, including preclinical testing, clinical trials, and the design of clinical studies such as case reports, observational studies (e.g., case-control and cohort), and experimental and quasi-experimental research.

-Evaluate and understand pharmacological screening and biological standardization techniques, explore various types of bioassays used to assess drug efficacy and safety. Select, classify and discuss animal behavioral assays and specific experimental models for diseases such as epilepsy, Parkinson's disease, Grave's disease, and pain management understand and apply screening tools in translational pharmacology and drug discovery.

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.3.1.**	Describe the stages of the drug approval process including preclinical testing and phases of clinical trials.
		1.C1.3.2.	Explain the design and characteristics of study types such as case reports, cohort and case-control studies, experimental and quasi-experimental designs, as well as systematic reviews and meta-analyses in pharmacological research
		1.C1.3.3	Describe the principles, types, and applications of bioassays and animal behavioral assays, including disease-specific models used for evaluating pharmacological activity in conditions such as epilepsy, Parkinsonism, Grave's disease, and pain.
		1.C1.7.1	Explain the foundational principles of clinical research methodology.

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.C1.15.1.**	Interpret and evaluate pharmacological data and drug-related information to understand their implications for therapeutic decision-making and patient safety.
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.C2.5.1.**	Select appropriate methods for the analysis of pharmaceutical substances to ensure accuracy and reliability of assay procedures.
2.5.1	Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements.	**2.C5.1.1**	Demonstrate awareness of regulatory standards governing the authorization of medicinal products, with emphasis on quality, safety, and efficacy requirements.
2.5.3	Contribute in planning and conducting research studies using appropriate methodologies.	**2.C5.4.1.**	Adopt ethical guidelines and professional standards when initiating and carrying out research activities.
		2.C5.5.1.	Disseminate research findings responsibly and in line with ethical and professional standards.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.C1.5.1**	Demonstrate critical thinking, problem-solving, and decision-making skills while collaborating in research-related team tasks.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.2.1**	Demonstrate effective use of information technology and presentation tools to communicate pharmacological research outcomes.

4. Teaching and Learning Methods

1. Lectures (data show, board)
2. Practical sessions
3. Problem solving- based learning (Practical)

4. Self- Learning (Activity)
5. Blended- learning (Activity)
6. Team- based Learning (Activity)

5- 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	**Lecture** -Drug approval process, Preclinical testing	**1**	**1**	**-**	**-**	**-**
	Practical session - Survey research	**1**	**-**	**1**	**-**	**-**
2	**Lecture** Clinical trials	**1**	**1**	**-**	**-**	**-**
	Practical session Institutional Review Board	**1**	**-**	**1**	**-**	**-**
3	**Lecture** Design of clinical studies, Case Reports/Case Series	**1**	**1**	**-**	**-**	**-**
	Practical session Preclinical ethical application form	**1**	**-**	**1**	**-**	**-**
4	**Lecture** -Observational Studies (Case control, Cohort) **Formative assessment (quiz1)**	**2**	**1**	**-**	**-**	**-**
	Practical session Relative Risk (Risk Ratio)	**1**	**-**	**1**	**-**	**-**
5	**Lecture** - Important terms, Experimental studies	**1**	**1**	**-**	**-**	**-**
	Practical session Odds Ratio	**1**	**-**	**1**	**-**	**-**
6	**Lecture** Quasi Experiment, Systematic review, meta-analysis	**1**	**1**	**-**	**-**	**-**

	Practical session Absolute Risk Reduction (ARR) / Risk Difference (RD)	**1**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** Pharmacological Screening and Standardization	**1**	**1**	**-**	**-**	**-**
	Practical session Number Needed to Treat (NNT)	**1**	**-**	**1**	**-**	**-**
9	**Lecture** Types of Bioassays	**1**	**1**	**-**	**-**	**-**
	Practical session Animal models for human disease	**1**	**-**	**1**	**-**	**-**
10	**Lecture** -After Screening via Bioassay	**1**	**1**	**-**	**-**	**-**
	Practical session - Animal behavioral assays + Assay in epilepsy	**1**	**-**	**1**	**-**	**-**
11	**Lecture** - Animal behavioral assays **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Assays in Parkinsonism and Grave's disease	**1**	**-**	**1**	*****	**-**
12	**Lecture** Animal behavioral assays	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**1**	**-**	**1**	*****	**-**
13	**Lecture** - Assays in Parkinsonism and Grave's disease + Analgesic assays	**1**	**1**	**-**	**-**	**-**
	Practical session Analgesic assays	**1**	**-**	**1**	**-**	**-**
14	**Lecture** General discussion and revision	**1**	**1**	**-**	**-**	**-**
	Practical session Practical Exam	**1**	**-**	**1**	**-**	**-**
15	**Final written exam**					

***** As part of a self-learning activity in Biological Standardization course, a part of practical session in week 11 was specified for the explanation of activity guidelines, rules and assessment rubric. Also, practical sessions in week 12 were facilitated for students to present their survey Research on the various activity self-learning topics according to the announced student distribution on topics. Supervisors engaged students in a discussion to evaluate the key skills acquired, findings, and conclusions they reached. The activity was formally evaluated against a set of established criteria to ensure a rigorous and consistent assessment.

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Weeks 14	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Survey Research (**Self & Problem Solving-based learning Activity**)	Weeks 12	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,11	-	-
8	Other (Mention)	-	-	-

7-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)	Student book and practical notes of "Biological standardization" approved by the Pharmacology and Toxicology department 2025-2026.
	Other References	1. WHO expert committee on biological standardization (2024) 2. Bioassay Techniques for Drug Development; Atta-ur-Raham, Iqbal Choudhary M. and Thomson W.J.; Hardwood academic (2001).

		3. Target identification and validation in drug discovery (third edition) (2025)
	Electronic Sources (Links must be added)	Aquilina A. The extemporaneous compounding of pediatric medicines at Mater Dei Hospital. Journal of the Malta College of Pharmacy Practice.Issue 19, 28 – 30, 2013. http://canadianpharmacistsletter.therapeuticresearch.com/ce/ceCourse.asp https://www.worldlifeexpectancy.com/country-health-profile/egypt https://clinicaltrials.gov/ https://www.ekb.eg/ www.Pubmed.Com and www.sciencedirect.com
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy-Zagaig University for students**	http://phstudent.eps.zu.edu.eg/Views/StudentViews/StudentLogin
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	White board, Data show, computer
	Supplies	-
	Electronic Programs	1. Microsoft office 2. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator
Prof. Dr. Islam Ahmed

Name and Signature
Head of Department
Prof. Dr. Islam Ahmed

COURSE SPECIFICATIONS

Bioinformatics

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	**Bioinformatics**			
Course Code (according to the bylaw)	MD E 07			
Department/s participating in delivery of the course	**Microbiology and Immunology Department & Biochemistry Department.**			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hr/week	1 hr/week	-	2hrs/week
Course Type	Faculty Requirements (elective course)			
Academic level at which the course is taught	Level 5 -Semester 10			
Academic Program	Bachelor of Pharmacy-Pharm D			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof Dr. Amira El-Ganiny			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

On completion of the course, the student will be able to understand the basics of bioinformatics, genomic sequences, sequence alignment, molecular phylogeny and evolution, human variation and disease, linking genes and disease, sequence variation, comparative genomics, personalized medicine, and multiple testing. In addition, students will be able to utilize tools to perform BLAST, Multiple sequence alignment, mRNA and gene expression analysis. Students will also develop critical thinking skills, communication skills, in addition to group working.

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.3.1**	Outline different types of biological data bases
		1.C1.3.2	Review the basic concepts of BLAST, multiple sequence alignment, molecular phylogeny
		1.C1.3.3	Summarize the principles of mRNA and gene expression analysis
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.C2.7.1**	Implement bioinformatics approaches together with computer-aided tools to support data analysis and research.
		2.C2.7.2	Recognize the available bioinformatics tools (software) and select the most suitable one for desired application (e.g. primer design software)
3.1.1	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	**3.C1.1.1**	Illustrate the concepts of Human variation and disease, and be able to Link gene variation and mutation to certain diseases

4. Teaching and Learning Methods

1. Lectures
2. Practical sessions
3. Blended learning (Internet search & bioinformatics tools and databases utilization) *
4. Self-learning (activity)

* Bioinformatics online tools were introduced and utilized during both the lectures and practical sessions. Additionally, students were required to apply them to complete assigned activities and tasks.

5. Course Schedule

umber 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	➢ **Lecture:** Introduction to Bioinformatics and biological data.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Bioinformatics applications, biological and structured databases.	**2**	**-**	**1**	**-**	**-**
2	➢ **Lecture:** Biological databases.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** NCBI, its role, difference between databases and tools and applications	**2**	**-**	**1**	**-**	**-**
3	➢ **Lecture:** Sequences and sequence alignment.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** •FASTA format	**2**	**-**	**1**	**-**	**-**

	•Accession number and GI.					
4	➢ **Lecture:** Multiple sequence alignment /BLAST. -**Formative assessment (quiz 1)**	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session** BLAST	**2**	**-**	**1**	**-**	**-**
5	➢ **Lecture** Introduction to Molecular phylogeny	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session** Phylogenetic analysis (Definition -Applications – Anatomy of the tree – Tree construction -Confidence of the tree).	**2**	**-**	**1**	**-**	**-**
6	➢ **Lecture** Primer design for PCR and qRT-PCR.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Orientation on activity	**2**	**-**	**1**	**-**	**-**
7	➢ **Lecture:** Array data interpretation	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Primer design	**2**	**-**	**1**	**-**	**-**
	Periodical exam					
9	➢ **Lecture:** Differential expression, normalization, visualization /clustering.	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** Quantitative Real-time PCR	**2**	**-**	**1**	**-**	**-**
10	➢ **Lecture:** Gene Pattern, Statistics for differential expression. ➢ **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session:** ORF Prediction	**2**	**-**	**1**	**-**	**-**
11	➢ **Lecture:** Characterizing eukaryotic genomes, Human variation and disease, Linking genes and disease.	**1**	**1**	**-**	**-**	**-**

	➢ **Practical session:** Activity 1 Assignment (designing primers and evaluation of their specificity using primer BLAST tool).	**2**	**-**	**1**	**-**	**-**
12	➢ **Lecture:** Applications for bioinformatics ➢ **Formative assessment (quiz 3)**	**1**	**1**	**-**	**-**	**-**
	➢ **Practical revision and open discussion.**	**2**	**-**	**1**	**-**	**-**
13	➢ **Lecture:** Linking genes and diseases	**1**	**1**	**-**	**-**	**-**
	➢ **Practical exam**	**2**	**-**	**1**	**-**	**-**
14	**Lecture** General discussion and revision	**1**	**1**	**-**	**-**	**-**
	➢ **Practical session** Activity 2 Gene Pattern, Statistics for differential expression, Present and discuss the data of assignment.	**2**	**-**	**1**	**-**	**-**
15	**Final written exam**					

6-Methods of students' assessment

No.	Assessment Methods	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Periodical Exam**)	Week 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Weeks 13	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Activity**)	Weeks 6,11,14	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,10,12	-	-
8	Other (Mention)	-	-	-

7-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)	-Student book of Bioinformatics approved by Biochemistry & Microbiology and Immunology department (2025-2026). -Practical book Bioinformatics approved by Biochemistry & Microbiology and Immunology department (2025-2026).

	Other References	⇒ **Recommended books and Periodicals** 1. Sharma, V., Bansal, P., Sheikh, I., Sharma, A., Kaur, D., Joshi, A., & Sharma, A. K. (2024). Fundamentals of bioinformatics. Bioinformatics: Drug Discovery, 41. 2. Ramsden, J. (2023). Bioinformatics: an introduction. Springer Nature. 3. Huang, R., Wang, Y., Deng, Y., & Shen, J. (2021). Detection of long noncoding RNA expression by real-time PCR. In Long Non-Coding RNAs: Methods and Protocols (pp. 35-42). New York, NY: Springer US. 4. Orvis, J., Gottfried, B., Kancherla, J. et al. (2021). gEAR: Gene Expression Analysis Resource portal for community-driven, multi-omic data exploration. Nat Methods 18, 843–844. 5. McDermaid A, Monier B, Zhao J, Liu B, Ma Q. (٢٠١9). Interpretation of differential gene expression results of RNA-seq data: review and integration. Brief Bioinform. 20(6):2044-2054.
	Electronic Sources (Links must be added)	https://www.ekb.eg/ www.Pubmed.Com www.sciencedirect.com https://www.wiley.com/ https://www.springernature.com/gp
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagazig University for students**	**https://phstudent.eps.zu.edu.eg/Views/StudentViews/StudentLogin**
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching	**Devices/Instruments**	whiteboard, data show and computer.
	Supplies	Comprehensive bioinformatics software packages (open-source and licensed), institutional access to biological and scientific databases.

and learning		
	Electronic Programs	1. Microsoft office 2. Microsoft teams 3. Online Database (NCBI) 4. BLAST tool (NCBI) 5. Multiple Sequence Alignment 6. Oligo Evaluator™ (Sigma) 7. Oligo Architect™ (Sigma) 8. Primer Blast 9. Primer3 10. PrimerStat
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	Videos

Name and Signature
Course Coordinator
Prof Dr. Amira El-Ganiny

Name and Signature
Head of Department

Ass.Prof. Dr. Momen Ezz-Elarab

COURSE SPECIFICATIONS

Oncology

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Oncology			
Course Code (according to the bylaw)	E 08 PP			
Department/s participating in delivery of the course	Pharmacy practice department			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hr/week	1 hr/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 5- semester 9			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Professor Dr. Maher Eiadrous			
Course Specification Approval Date	25/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Council of Quality assurance unit			

2. Course Overview (Brief summary of scientific content)

On completion of the course, Students will be able to explain the etiology, pathogenesis, genetics, clinical features, diagnosis of different types of tumors as well as their treatments.

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.7.1.**	Outline the principle of cancer disease including the basics of oncogenesis & molecular biology of cancer.
		1.C1.7.2.	Describe epidemiology, pathology, clinical signs and symptoms of cancer, etiology, risk factors and consequence of cancer development.
		1.C1.7.3.	Define prognostic factors, diagnosis & staging of various tumor types.
1.1.7	Identify and critically evaluate medication related analyze newly emerging issues	**1.C1.15.1.**	Analyse emerging practice guidelines, theories and technologies that affects patient health outcome
2.4.1	Ensure safe handling/ use of poisons to avoid their harm to individuals and communities	**2.C4.1.1.**	Advise patients and other health care professionals about the safe and effective use of chemotherapeutics.
2.5.3	Contribute in planning and conducting research studies using appropriate methodologies.	**2.C5.5.1**	Write & present reports.
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.	**3.C1.4.1**	Evaluate the selected drug therapy based on the patient`s progress and laboratory results.

4. Teaching and Learning Methods

1. Lectures
2. Practical session
3. Case study
4. Class activity

5. Course Schedule

Number of 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	**Lecture** -Basic concepts -Environmental determinants of cancer.	**2**	**1**	**-**	**-**	**-**
	Practical session -Anti-Cancer treatment part I	**2**	**-**	**1**	**-**	**-**
2	**Lecture** -Hallmarks of cancer.	**2**	**1**	**-**	**-**	**-**
	Practical session -Anti-Cancer treatment part II	**2**	**-**	**1**	**-**	**-**
3	**Lecture** -Diagnosis of cancer. -Oncological emergencies.	**2**	**1**	**-**	**-**	**-**
	Practical session -Alkylating Agents.	**2**	**-**	**1**	**-**	**-**
4	**Lecture** -Principles of Cancer Treatment. -Response assessment & Adverse effects **Formative assessment (quiz1)**	**2**	**1**	**-**	**-**	**-**

	Practical session -Antitumor Antibiotics.	**2**	**-**	**1**	**-**	**-**
5	**Lecture** -Breast Cancer. -Lung Cancer. -Mesothelioma. -Esophageal Cancer. -Gastric Cancer.	**2**	**1**	**-**	**-**	**-**
	Practical session -Anti-Metabolites.	**2**	**-**	**1**	**-**	**-**
6	**Lecture** -Colorectal Cancer. -Anal Cancer. -Pancreatic Cancer. -Hepatobiliary Cancer. -Ovarian Cancer. -Endometrial Cancer. -Cervical Cancer.	**2**	**1**	**-**	**-**	**-**
	Practical session -Miotic spindle agents.	**2**	**-**	**1**	**-**	**-**
7	**Lecture** -Testicular Cancer. -Prostate Cancer. -Renal Cancer. -Bladder Cancer. -Thyroid Cancer.	**2**	**1**	**-**	**-**	**-**
	Practical session - Topoisomerase Inhibitors	**2**	**-**	**1**	**-**	**-**
8	**Midterm exam**					
9	**Lecture** -Head & Neck Cancer. -Sarcoma. -Skin Cancer.	**2**	**1**	**-**	**-**	**-**
	Practical session -Hormonal treatment. -Targeted Therapy.	**2**	**-**	**1**	**-**	**-**
10	**Lecture** -CNS Tumours. -Neuroendocrine Tumours. -Hodgkin's Lymphoma. **Formative assessment (quiz 2)**	**2**	**1**	**-**	**-**	**-**
	Practical session -Breast Cases.	**2**	**-**	**1**	**-***	**-**

11	**Lecture** -Non-Hodgkin's Lymphoma. -Multiple Myeloma. -Leukemia.	**2**	**1**	**-**	**-**	**-**
	Practical session -Lung Case. -Colon Case.	**2**	**-**	**1**	**-**	**-**
12	**Lecture** -Childhood cancers. **Formative assessment (quiz 3)**	**2**	**1**	**-**	**-**	**-**
	Practical session -Ovary Case. -Lymphoma Cases.	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Metastatic disease.	**2**	**1**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-**	**-**
14	**Lecture** Revision	**2**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
15	**Final written exam**					

***** As part of a self-learning activity in oncology, a part of practical session in week 10 was specified for the explanation of activity guidelines, rules and assessment rubric. Also, practical session in week 14 was facilitated for students to present their reports on the various activity self-learning topics according to the announced student distribution on topics. Supervisors engaged students in a discussion to evaluate the key skills acquired findings, and conclusions they reached. The activity was formally evaluated against a set of established criteria to ensure a rigorous and consistent assessment.

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 8	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Week 13	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Week 14	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,10,12	-	-
8	Other (Mention)	-	-	-

7-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. Basics of Clinical Oncology approved by Clinical Oncology department 2025-2026 2. Practical notes of Oncology approved by Clinical Oncology department 2025-2026
	Other References	1. Manual of clinical oncology (8th edition) by Bartosz Chmielowski & Mary Territo, Lippincott Williams & Wilkins (2017). 2. The Washington Manual of oncology (3rd edition) by Ramaswamy Govindan & Daniel Morgensztern, Wolters Kluwer (2015).
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	**https://shorturl.at/sar8D**

	Electronic platform of Faculty of Pharmacy- Zagaig University for students	
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board
	Supplies	-
	Electronic Programs	1. Microsoft office 2. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator
Prof Dr. Maher Eiadrous

Name and Signature
Head of Department
Assist. Prof. Dr Esraa Naguib

COURSE SPECIFICATIONS

Pediatrics & Geriatric

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Pediatrics and geriatrics			
Course Code (according to the bylaw)	PP E 09			
Department/s participating in delivery of the course	Pharmacy Practice department (Faculty of Pharmacy), Pediatrics department (Faculty of Medicine)			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	2 hrs/week	1 hrs/week	-	3 hrs/ week
Course Type	Elective course			
Academic level at which the course is taught	Level 5 - semester 10			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator				
Course Specification Approval Date	25/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Quality Assurance Unit Council			

2. Course Overview (Brief summary of scientific content)

On completion of the course, students will be able to provide the students with the knowledge that enable them to identify the normal growth and development (physical and mental), and it's clinical application from birth through adolescence. Also, to enable the students to provide basic health care for individuals in the Pediatric age group (neonates, infants, children, and adolescents).

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.7.1**	Demonstrate foundational principles of pharmacy practice to ensure safe, effective, and patient-centered pharmacotherapy for pediatric diseases.
1.1.2	Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice	**1.C1.8.1**	Emphasize and interpret essential pharmaceutical and medical terms, including those related to general examinations and specific pediatric disease states.
1.1.4	Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations	**1.C1.11.1**	Illustrate principles of pharmacology and pharmacotherapy to correctly choose medications (optimal drug selection) for managing various pediatric diseases.
		1.C1.12.1	Evaluate the suitability of medicines for individual patients with pediatric diseases, considering factors like disease cause, progression, medical history, potential drug interactions, and age.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.6	Utilize scientific literature, and collect and interpret information to enhance professional decision	**1.C1.16.1**	Develop the ability to gather and interpret patient information to provide precise advice and recommendations to prescribers regarding medication choices and dosages for pediatric conditions.
2.4.1	Ensure safe handling/ use of poisons to avoid their harm to individuals and communities	**2.C4.1.1**	Provide clear and accurate guidance to patients and healthcare professionals regarding the safe and effective application of medicines in pediatrics, including asthma, diabetes, pneumonia, or seizures, and the handling of malnutrition that could relate to many diseases.
3.1.4	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.	**3.C1.6.1**	Formulate comprehensive therapeutic plans for various diseases and infections, integrating knowledge of their epidemiology, etiology, pathophysiology, laboratory diagnosis, and clinical features.
		3.C1.7.1	Assess the effectiveness of selected drug therapies for pediatric diseases by tracking patient progress and interpreting relevant laboratory results.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.C1.5.1**	Apply problem-solving skills to identify health issues and collaboratively design effective management plans with other healthcare professionals.

4. Teaching and Learning Methods

1. Lectures (data show, board)
2. Practical sessions
3. Problem solving (Practical)
4. Self-learning (Activity)
5. Blended- learning (Activity)

5. 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	**Lecture** Diarrhea	**2**	**2**	**-**	**-**	**-**
	Practical session Safety guidelines Dehydration	**2**	**-**	**1**	**-**	**-**
2	**Lecture** Bronchial asthma	**2**	**2**	**-**	**-**	**-**
	Practical session Jaundice	**2**	**-**	**1**	**-**	**-**
3	**Lecture** Heart failure	**2**	**2**	**-**	**-**	**-**
	Practical session Lymphadenopathy	**2**	**-**	**1**	**-**	**-**
4	**Lecture** Anemias **Formative assessment (quiz1)**	**2**	**2**	**-**	**-**	**-**
	Practical session Vaccinations	**2**	**-**	**1**	**-**	**-**
5	**Lecture** Diabetes Mellitus	**2**	**2**	**-**	**-**	**-**
	Practical session Shock	**2**	**-**	**1**	**-**	**-**
6	**Lecture** Pneumonias	**2**	**2**	**-**	**-**	**-**
	Practical session Edema	**2**	**-**	**1**	**-**	**-**
7	**Lecture** Rheumatic fever	**2**	**2**	**-**	**-**	**-**
	Practical session Bleeding disorders	**2**	**-**	**1**	**-**	**-**
8	**Midterm exam**					

9	**Lecture** Convulsions	**2**	**2**	**-**	**-**	**-**
	Practical session Neonatal resuscitation	**2**	**-**	**1**	**-**	**-**
10	**Lecture** Hematuria **Formative assessment (quiz 2)**	**2**	**2**	**-**	**-**	**-**
	Practical session Respiratory distress in newborns (RDS)	**2**	**-**	**1**	**-***	**-**
11	**Lecture** Infant feeding	**2**	**2**	**-**	**-**	**-**
	Practical session Short statue	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Parasitic infections **Formative assessment (quiz 3)**	**2**	**2**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Tuberculosis (T.B)	**2**	**2**	**-**	**-**	**-**
	Practical session Total parenteral nutrition Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
14	**Lecture** General discussion and revision	**2**	**2**	**-**	**-**	**-**
	Practical session Diabetic ketoacidosis (DKA) Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
15	**Final written exam**					

***** As part of a self-learning activity in Pediatrics and geriatrics course, a part of practical session in week 10 was specified for the explanation of activity guidelines, rules and assessment rubric. Also, practical sessions in weeks 13 and 14 were facilitated for students to present their reports on the various activity self-learning topics according to the announced student distribution on topics. Supervisors engaged students in a discussion to evaluate the key skills acquired, findings, and conclusions they reached. The activity was formally evaluated against a set of established criteria to ensure a rigorous and consistent assessment.

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (**Mid-term Exam**)	Week 8	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Week 14	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Weeks 10,13,14	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,10,12	-	-
8	Other (Mention)	-	-	-

7-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)	Student book and practical notes of "Pediatrics and geriatrics" approved by the Pediatrics department and Pharmacy Practice department 2025-2026.
	Other References	**1. Essential (textbooks): Nelson**
	Electronic Sources (Links must be added)	http://en.wikipedia.org/ www.Pubmed.Com and www.sciencedirect.com

	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagaig University for students**	**https://shorturl.at/sar8D**
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board
	Supplies	-
	Electronic Programs	1. Microsoft office 2. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator

Name and Signature
Head of department
Assist. Prof. Dr Esraa Naguib

COURSE SPECIFICATIONS

Cosmetic Preparations

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Cosmetics			
Course Code (according to the bylaw)	PT E 012			
Department/s participating in delivery of the course	Pharmaceutics Department			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	21 hr/week	1 hr/week	--	2 hrs/week
Course Type	Faculty requirement (Elective)			
Academic level at which the course is taught	Level 4			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty: Pharmacy			
University/Academy	University: Zagazig			
Name of Course Coordinator	Prof. Hanan Elnahas			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Pharmaceutics department council			

2. Course Overview (Brief summary of scientific content)

Definition and concepts, classification of skin types, hair structure and color, skin care products, shaving preparations, hygiene products, bath preparations, baby cosmetics, hair preparations, make up preparations,, fragrance preparations, antiperspirant and deodorants, Sunscreens and sunblock, skin whitening products and antiaging products, quality control test of cosmetic products.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1-1-1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.2.1**	Outline the structure and properties of skin and hair as well as their problems.
		1.C1.2.2	Illustrate different ingredients used in formulations of skin care and hair products according to their chemistry and function, and the preparation of different cosmetic preparations.
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.C2.2.1**	Apply different methods for preparation of different cosmetic preparations including skin and hair products.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
2-3-1	Handle, identify, and dispose biologicals, synthetic/natural materials, biotechnology-based and radio-labeled products, and other materials/products used in pharmaceutical field.	**2.C3.1.1**	Handle and dispose chemicals safely
2-3-2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products.	**2.C3.2.1**	Apply GLP guidelines for safe handling and disposal of pharmaceuticals .
4-1-2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team	**4.C1.4.1**	Retrieve and evaluate information from different sources

4. Teaching and Learning Methods

1. Lectures
2. Practical session
3. Self-learning: activity as report preparation about pharmacokinetics of certain drugs

5. 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	**Lecture:** Definition and Classifications of cosmetics. Skin, functions, structure. Glands, Skin types and Skin color	**1**	**1**	-	-	-
	Practical: Cold cream preparation	**1**	-	**1**	-	-
2	**Lecture:** - Hair structure and color, Creams. uses, classification	**1**	**1**	-	-	-
	Practical: Cleansing cream preparation	**1**	-	**1**	-	-
3	**Lecture:** Skin cleansing creams: Cold cream, Sorbitan fatty acid ester cream, Acid containing cleansing cream, Detergent cleansing cream, Antibacterial cleansing cream	**1**	**1**	-	-	-
	Practical: Vanishing cream preparation	**1**	-	**1**	-	-
	Formative assessment					
4	**Lecture:** Vanishing and foundation - creams Shaving preparations: Preshaving preparation, Shaving creams and gels: brushless shaving creams lather shaving creams, soap, foaming shaving products, shaving gels.	**1**	**1**	-	-	-
	Practical:	**1**				

	Shaving cream preparation		-	**1**	-	-
5	**Lecture:** Commonly used additives - added to creams Past: types, preparation, difference between past and ointment.	**1**	**1**	-	-	-
	Practical: Acne Cream Formula	**1**	-	**1**	-	-
6	**Lecture:** Tooth paste Hair care products (Hair shampoo, hair conditioner, styling aid, hair dyes , hair tonic and depilatories)	**1**	**1**	-	-	-
	Practical: Shampoo preparation	**1**	-	**1**	-	-
	Formative assessment					
7	**Midterm**					
8	**Lecture:** - Bath preparations and baby cosmetics Cosmetics for nails, nail Lacquers and Removers; Basic components	**1**	**1**	-	-	-
	Practical: Sunscreen Cream preparation	**1**	-	**1**	-	-
9	**Lecture:** Colour cosmetic and Face makeup(toilet powder, lip sick, mascara, eye liner and eye shadow)	**1**	**1**	-	-	
	Practical: Eye Shadow preparation	**1**	-	**1**	-	
10	**Lecture:** Antiperspirant & Deoderant materials and formulations,	**1**	**1**	-	-	

	Fragrance preparations (Perfumes)					
	Practical: Lipstick preparation	**1**	**-**	**1**	**-**	
11	**Lecture:** - Sunscreen, sun block and sun protection factors, Sun Tanning, Sunless tanning	**1**	**1**	**-**	**-**	
	Practical: Deodorant stick preparation	**1**	**-**	**1**	**-**	
12	**Lecture:** Skin whiting product	**1**	**1**	**-**	**-**	
	Practical: Activity (report)	**1**	**-**	**1**	**-**	
13	**Lecture:** Antiaging & Antiwrinkles and Antiacne products	**1**	**1**	**-**	**-**	
	Practical Exam	**1**	**-**	**1**	**-**	
14	**Lecture:** - Comparison between Facial Masks and Facial Packs. - Quality Control Test For Cosmetics	**1**	**1**	**-**	**-**	
	Practical: Open discussion	**1**	**-**	**1**	**-**	
15	**Final exam**					

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (midterm exam)	**Week 7**	**10**	**10%**
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	**Week 15**	**50**	**50%**
4	Final Practical/Clinical/… Exam	**Week 13**	**25**	**25%**
5	Final Oral Exam	**Week 15**	**10**	**10%**
6	Project (self learning activity)	**Week 12**	**5**	**5%**
7	Assignments	**Week 3,6**	-	-
8	Other (Mention)	-	-	-

7-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)	Student book of Cosmetics approved by pharmaceutics department 2025-2026
	Other References	- Textbook on Cosmetic Science and Technology ***(2024)***, ***Authors****: Debaprasad Ghosh, Kiran Sharma, Ashu Mittal, Tejesvi Mishra,* ***Publisher****: Brillion Publishing* - Textbook of Cosmetic Formulation ***(2024)***, ***Authors****: Preeti Singh, Gunjan Singh, Amrish Chandra,* ***Publisher****: How Academics* - Introduction to Cosmetic Formulation and Technology *(2nd Edition,* ***2023***), **Author**: Gabriella Baki, **Publisher**: Wiley - Cosmetic Products and Industry – New Advances and Applications

		(2023), **Editors**: Usama Ahmad, Juber Akhtar, **Publisher**: IntechOpen
	Electronic Sources (Links must be added)	
	Learning Platforms (Links must be added)	**www.emedicine.com** **www.sciencedirect.com** **www.pubmed.com**
	Other (to be mentioned)	-**Semisolid Dosage** (Special Issue Book), Publisher: MDPI Books, **2021** **Handbook of Pharmaceutical Manufacturing Formulations: Semisolid Products (3rd Ed.),** Editor: Sarfaraz K. Niazi, Publisher: CRC Press, **2022**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	
	Supplies	
	Electronic Programs	
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

Name and Signature

Course Coordinator

Prof. Hanan ELnahas

Name and Signature

Program Coordinator

Prof. Shereen A. Sabry

COURSE SPECIFICATIONS

Applied Industrial Pharmacy

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Applied Industrial Pharmacy			
Course Code (according to the bylaw)	PT E 013			
Department/s participating in delivery of the course	Pharmaceutics Department			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hrs/week	1 hrs/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 5- Semester 9			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Assoc. Prof. Sherif Emam			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

The course provides students with information about the principles and techniques of manufacturing, development, and distribution of drug products, and skills required to pursue a position in formulation development, process development, manufacturing, or quality control.

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**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.2.1.**	Outline the principles of pilot plant scale-up, technology transfer, quality management, and drug regulatory affairs.
1.1.7	Identify newly emerging issues related to pharmaceutical industry	**1.C1.16.1.**	Identify different emerging techniques for pilot plant scale-up, technology transfer, quality management, and drug regulatory affairs.
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.C2.2.1.**	Explain the appropriate manufacturing equipment and procedures based on the principles of pilot plant scale-up, technology transfer, quality management, and drug regulatory affairs.
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.C1.3.1**	Perform a task within specified time.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.2.1.**	Demonstrate good information technology skills as well as presentation skills.

4. Teaching and Learning Methods

1. Lectures (data show, board)
2. Practical sessions (Tutorials)
3. Problem solving (Practical)
4. Self-learning (Activity)
5. Blended- learning (Activity)

5. 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	**Lecture** - **Pilot plant scale-up techniques:** An introduction to pilot plant scale-up	**1**	**1**	**-**	**-**	**-**
	Practical session - Tutorial about pilot plant scale-up	**2**	**-**	**1**	**-**	**-**
2	**Lecture** - **Pilot plant scale-up techniques:** Contract manufacturing	**1**	**1**	**-**	**-**	**-**
	Practical session - Contract manufacturing “Tutorial”	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - **Pilot plant scale-up techniques:** Pilot plant scale-up techniques for different dosage forms	**1**	**1**	**-**	**-**	**-**
	Practical session - Pilot plant scale-up techniques for different dosage forms “Tutorial”	**2**	**-**	**1**	**-**	**-**

4	**Lecture** - **Pilot plant scale-up techniques:** Scale-up and post-approval changes (SUPAC) guidelines **Formative assessment (quiz1)**	**1**	**1**	**-**	**-**	**-**
	Practical session - Scale-up and post-approval changes (SUPAC) guidelines "Tutorial	**2**	**-**	**1**	**-**	**-**
5	**Lecture** - **Technology Development and Transfer:** An introduction to quality risk management and technology development and transfer	**1**	**1**	**-**	**-**	**-**
	Practical session - An introduction to quality risk management and technology development and transfer "Tutorial"	**2**	**-**	**1**	**-**	**-**
6	**Lecture** - **Technology Development and Transfer:** Technology transfer protocols	**1**	**1**	**-**	**-**	**-**
	Practical session - Technology transfer protocols "Tutorial"	**2**	**-**	**1**	**-**	**-**
7	**Lecture** - **Quality management:** Quality control and assurance	**2**	**2**	**-**	**-**	**-**
	Practical session - Quality management: Quality control and assurance "Tutorial"	**2**	**-**	**1**	**-**	**-**
8	**Midterm exam**					
9	**Lecture** - **Quality management:** Aspects of quality management	**1**	**1**	**-**	**-**	**-**
	Practical session - Aspects of quality management "Tutorial"	**2**	**-**	**1**	**-**	**-**
10	**Lecture** - **Quality management:** Good manufacturing practice **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session - Quality management: Good	**2**	**-**	**1**	**-***	**-**

	manufacturing practice “Tutorial” - Orientation on Activity					
11	**Lecture** - **Quality management:** Total quality management	**1**	**1**	**-**	**-**	**-**
	Practical session - **Quality management:** Total quality management “Tutorial”	**2**	**-**	**1**	**-**	**-**
12	**Lecture** - **Drug regulatory affairs:** An introduction to drug regulatory affairs	**1**	**1**	**-**	**-**	**-**
	Practical session - Drug Regulatory Affairs “Tutorial”	**2**	**-**	**1**	**-**	**-**
13	**Lecture** - **Drug regulatory affairs:** The types of drug approval applications	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**
14	**Lecture** - **Drug regulatory affairs:** Review procedures	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
15	**Final written exam**					

***** As part of a self-learning activity in pharmaceutical analytical chemistry II course, a part of practical session in week 10 was specified for the explanation of activity guidelines, rules and assessment rubric. Also, practical sessions in week 14 were facilitated for students to present their reports on the various activity self-learning topics according to the announced student distribution on topics. Supervisors engaged students in a discussion to evaluate the key skills acquired, findings, and conclusions they reached. The activity was formally evaluated against a set of established criteria to ensure a rigorous and consistent assessment.

6-Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of Total Course Marks
1	Exam 1written (**Mid-term Exam**)	Week 8	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Week 13	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Weeks 10,14	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,10	-	-
8	Other (Mention)	-	-	-

7-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)	Student book and practical notes of "Applied Industrial Pharmacy" approved by the Pharmaceutics Department 2025-2026.
	Other References	1. Lachman, L., Lieberman, H. A., & Kanig, J. L. (1976). The theory and practice of industrial pharmacy (pp. 210-212). Philadelphia: Lea & Febiger. **2.** Nally, J. D. (2016). Good manufacturing practices for pharmaceuticals. CRC Press. 3. John, C., & Morten, C. (2002). The Science of Dosage Form Design. Aulton: Modified release peroral dosage forms (2nd ed.) Churchill Livingstone, 290-300. **4.** Allen, L., & Ansel, H. C. (2013). Ansel's pharmaceutical dosage forms and drug delivery systems. Lippincott Williams & Wilkins.
	Electronic Sources (Links must be added)	https://www.ekb.eg/ www.Pubmed.Com and www.sciencedirect.com
	Learning Platforms	**https://shorturl.at/sar8D**

	(Links must be added) **Electronic platform of Faculty of Pharmacy- Zagaig University for students**	
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board
	Supplies	-
	Electronic Programs	1. Microsoft Office 2. Microsoft Teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator

Assoc. Prof. Sherif Emam

Name and Signature
Head of Department

Prof. Shereen A. Sabry

COURSE SPECIFICATIONS

Clinical Nutrition

2025-2026

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Clinical nutrition			
Course Code (according to the bylaw)	PB E 05			
Department/s participating in delivery of the course	Biochemistry Department			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1hr/week	1hr/week	-	2 hrs/week
Course Type	Faculty requirement (Elective)			
Academic level at which the course is taught	Level five/ semester ten			
Academic Program	Bachelor of Pharmacy (Pharm D)			
Faculty/Institute	Pharmacy			
University/Academy	Zagazig			
Name of Course Coordinator	Ass.Prof.Sally Kamel hammad			
Course Specification Approval Date	18-8-2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)	Department Council			

2. Course Overview (Brief summary of scientific content)

On completion of the course, students will be able to explain the principles of clinical nutrition, pathophysiology, diet therapy and management of different diseases.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.5	Retrieve information from fundamental sciences to solve therapeutic problems	1.C1.13.1	Recognize patients complains and interpret clinical and nutritional knowledge to help make suitable therapeutic decisions.
3.1.1	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	3.C1.1.1	Analyze biochemical and nutritional data to assess and manage different medical conditions.
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	4.C1.2.1	Demonstrate the ability to work in a team to collect data from different resources to help establish a complete therapeutic plan.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills	4.C2.2.1	Develop effective presentation skills.

4. Teaching and Learning Methods

- . Lectures
- Practical sessions
- Self-learning (Activity)

5. 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	**Lecture** -Types of nutrients of balanced diet (macronutrients, micronutrients)	**1**	**1**	**-**	**-**	**-**
	Practical session - Introduction to clinical nutrition - Calculation of BMR-TEE	**2**	**-**	**1**		**-**
2	**Lecture** - Energy requirement and energy expenditure - Diet and therapy - Nutritional assessment and food pyramids	**1**	**1**	**-**	**-**	**-**
	Practical session - Introduction to Obesity - Determination of body mass index - Suggestion of life style modification	**2**	**-**	**1**		**-**
3	**Lecture** - Obesity (Definition, assessment, factors affecting obesity)	**1**	**1**	**-**	**-**	**-**
	Practical session - Case studies for obesity -Formative assessment	**2**	**-**	**1**	**-**	**-**

	quiz 1					
4	**Lecture** - Management of obesity - Drugs of choice for treatment of obesity	**1**	**1**	-	-	-
	Practical sessions - Metabolic syndrome - Case study - Calculation of atherogenic index	**2**	-	**1**	-	-
5	**Lecture** - Diabetes mellitus (DM) -Nutrition therapy and recommendation for DM - Drug of choice for treatment of DM	**1**	**1**	-	-	-
	Practical session - Diabetes: definition, types, pathogenesis and diagnosis -Formative assessment quiz 2	**2**	-	**1**	-	-
6	**Lecture** - Definition and types of cardiovascular diseases (CVD) - Risk factors for CVD - Drug of choice for treatment of CVD - Nutritional management of CVD	**1**	**1**	-	-	-
	Practical session - Case study on diabetes	**2**	-	**1**	-	-

7	**Lecture** **-**Diet for hypertensive patients - Drugs of choice for treatment of hypertension	**1**	**1**	**-**	**-**	**-**
	Practical session Introduction to CVD	**2**	**-**	**1**	**-**	**-**
8	**Midterm**					
9	**Lecture** Nutrition in pregnancy and lactation.	**1**	**1**	**-**	**-**	**-**
	- **Practical session** Case study for hypertension	**2**	**-**	**1**	**-**	**-**
10	**Lecture** Nutrition in infants, toddlers and preschool children.	**1**	**1**	**-**	**-**	**-**
	Practical session Case study for myocardial infarction	**2**	**-**	**1**	**-**	**-**
11	**Lecture** Nutrition in school-age children and adolescents.	**1**	**1**	**-**	**-**	**-**
	Practical session **-** Cancer and case studies	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Nutritional challenges in infants, children and adolescents.	**1**	**1**	**-**	**-**	**-**
	Practical session **- Activity discussion and presentation**	**2**	**-**	**1**	**-**	**-**
13	**Lecture** -Nutrition in older adults.	**1**	**1**	**-**	**-**	**-**

	-Nutrition and early origins of adult disease.					
	Practical Exam	**2**	**-**	**1**	**-**	**-**
14	Revision & Open discussion	**1**	**1**	**-**	**-**	**-**
15	Final exam					

6. Methods of students' assessment

No.	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (Midterm exam)	**8**	**10**	**10%**
2	Exam 2……(semester work)	**-**	**-**	**-**
3	Final Written Exam	**15**	**50**	**50%**
4	Final **Practical**/Clinical/… Exam	**13**	**25**	**25%**
5	Final Oral Exam	**15**	**10**	**10%**
6	Project (Self learning activity)	**12**	**5**	**5%**
7	Assignments (Formative assessment)	**3,5**	**-**	**-**
8	Others	**-**	**-**	**-**

7. 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)	Student book and practical notes of clinical nutrition, approved by biochemistry department 2025-2026
	Other References	**Essential books:** • Advanced Nutrition and Human Metabolism, Sareen S. Gropper, Jack L. Smith, Timothy P. Carr, 8th edition, 2021. • Advanced Human Nutrition, Denis M Medeiros, Robert E.C.

		Wildman, 4th edition, 2019 • Public health nutrition, Buttriss, Judith; Kearney, John M.; Lanham-New, Susan; Welch, Ailsa, 2018 • Food and Nutrition : What Everyone Needs to Know, P. K. Newby, 2018 **Recommended books:** Integrative Nutrition: A Whole-Life Approach to Health and Happines,
	Electronic Sources (Links must be added)	**www.ekb.eg** **WWW.pubmed.com**
	Learning Platforms (Links must be added)	**https://shorturl.at/sar8D**
	Other (to be mentioned)	**-**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	**Computer and board**
	Supplies	**-**
	Electronic Programs	**1-Microsoft office** **2-Microsoft teams**
	Skill Labs/ Simulators	**-**
	Virtual Labs	**-**
	Other (to be mentioned)	**-**

Name and Signature **Course Coordinator** **Ass.Prof.Sally Kamel Hammad**	**Name and Signature** **Head of department** **Ass.Prof.Rana Gamal Eissa**