وحدة ضمان الجودة

كليـة الصيدلة
FACULTY OF PHARMACY

Courses Specifications
Faculty of Pharmacy

Bachelor of pharmacy

(Pharm D – Clinical Pharmacy)

Program

Elective courses

2025-2026

وحدة ضمان الجودة

كليـة الصيدلة
FACULTY OF PHARMACY

Elective courses	
Course Name	**Page no.**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Advanced Pharmaceutical

Analysis Spectroscopy

PA E05

Fourth level –Semester 8

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Advanced Pharmaceutical Analysis Spectroscopy			
Course Code (according to the bylaw)	PA E05			
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-Clinical Pharmacy)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Heba Elsayed			
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.C2.4.1	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.	2C2.7.1	Explain principle and instrumentation of Fourier Transform Infrared (FTIR) Spectroscopy, Near Infrared Spectroscopy, Raman Spectroscopy, X-rays Diffraction and Mass Spectrometry.
		2C2.8.1	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.C2.3.1	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)

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	**Midterm exam**					
8	**Lecture** Introduction to X rays	**1**	**1**	**-**	**-**	**-**
	Practical session Evaluate method robustness using Microsoft excel	**2**	**-**	**1**	**-**	**-**
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 7	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 11,13,14	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 Pharmacy- Zagaig University for students	**https://shorturl.at/sar8D**
	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** **Prof. Dr. Heba Elsayed**	**Name and Signature** **Head of Department** **Prof. Dr. Aml El-Gendy**

COURSE SPECIFICATIONS

Quality Control of Natural Products

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Level 4- Semester 7

PG E 07

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Quality Control of Natural Products			
Course Code (according to the bylaw)	PG E 07			
Department/s participating in delivery of the course	Pharmacognosy			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 Hour/week	1 Hour/week		2 Hours/ week
Course Type	Faculty Requirements (elective course)			
Academic level at which the course is taught	Level 4/semester 7			
Academic Program	Bachelor of pharmacy (Pharm D - clinical pharmacy)			
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)

Provide students basic knowledge for quality control of herbal drugs according to WHO guidelines and pharmacopoeias standards. Introduce safe, effective and pure medicine. Analyze the herbal drugs by GC, HPLC and spectroscopy. Provide students basic concepts of microbial 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**	Describe the methods used for the evaluation of natural products and the different types of adulteration in natural products.
		1.C1.2.2	Explain the principles and parameters of quality assessment and standardization of natural products.
		1.C1.2.3	Discuss UV, IR, Mass and NMR Spectroscopies and their applications in structure elucidation of the natural products.
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 the practical applications of Gas Chromatography (GC), HPLC and other chromatographic techniques in drug evaluation.
		1.C1.9.2	Interpret chromatographic data obtained from GC, HPLC, and related analytical techniques
		1.C1.9.3	Evaluate the microbial quality of pharmaceutical and natural products using standard microbiological technique
2-2-1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/ natural pharmaceutical materials.	**2.C2.1.1**	Interpret TLC profiles of herbal drugs and compare them with reference standards to verify purity

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
2-2-2	Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.	**2.C2.4.1**	Perform microscopical examination to assess the purity and authenticity of herbal drugs and identify diagnostic microscopic characters used in the evaluation of herbal drugs.
		2.C2.4.2	Perform TLC profiling to assess the purity of herbal drugs against reference standards and Interpret TLC chromatograms and compare them with reference standards to verify the identity and purity of herbal drugs.
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.C2.8.1**	Interpret UV, IR, NMR and mass spectroscopic data to solve analytical problems.
		2.C2.8.2	Select proper GC and HPLC techniques in pharmaceutical and natural product analysis.
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**	Perform microscopical examination to assess the purity and authenticity of herbal drugs and identify diagnostic microscopic characters used in the evaluation of herbal drugs.
		2.C3.1.2	Perform TLC profiling to assess the purity of herbal drugs against reference standards and Interpret TLC chromatograms and compare them with reference standards to verify the identity and purity of herbal drugs.
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.3.1**	Perform a model for drug profiling and characterization, perform quality control of commercially available pharmaceutical product and solve general spectroscopy problems including identification of small molecules.

4. Teaching and Learning Methods

- Interactive lectures (data show, board)
- Practical sessions
- Co-operative learning (Activity)
- 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	**1**	**1**	-	-	-
	Practical session -Introduction of quality control of crude drugs (physical characters, analytical evaluation, biological screening ..)	**2**	**-**	**1**	**-**	**-**
2	**Lecture** -Evaluation of natural products (cont.)	**1**	**1**	**-**	**-**	**-**
	Practical session -Checking the purity of herbal drugs using microscopical examination	**2**	**-**	**1**	**-**	**-**
3	**Lecture** -Evaluation of natural products (Quality and standardization)	**1**	**1**	**-**	**-**	**-**
	Practical session -Checking the purity of herbal drugs using microscopical examination **Activity 1**: Model for drug profile.	**2**	**-**	**1**	**-***	Co-operative learning
4	**Lecture** -Evaluation of natural products (Types of adulteration)	**1**	**1**	**-**	**-**	**-**
	Practical session -Checking the purity of herbal drugs using TLC profiling against reference.	**2**	**-**	**1**	**-**	**-**

5	**Lecture** -Evaluation of natural products (Parameters for quality control.) **Formative assessment (Quiz 1)**	**1**	**1**	**-**	**-***	**-**
	Practical session -Checking the purity of herbal drugs using TLC profiling against reference. **Activity 2**: Quality control of commercially available pharmaceutical products.	**2**	**-**	**1**	**-***	Co-operative learning
6	**Lecture** -UV Spectroscopy	**1**	**1**	**-**	**-**	**-**
	Practical session -UV Spectroscopic problems	**2**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** -IR Spectroscopy	**1**	**1**	**-**	**-**	**-**
	Practical session -IR Spectroscopic problems	**2**	**-**	**1**	**-**	**-**
9	**Lecture** -Mass Spectroscopy	**1**	**1**	**-**	**-**	**-**
	Practical session -NMR Spectroscopic problems **Activity 3:** general spectroscopy problems including identification of small molecules	**2**	**-**	**1**	**-***	Co-operative learning
10	**Lecture** - NMR Spectroscopy **Formative assessment (Quiz 2)**	**1**	**1**	**-**	**-***	**-**
	Practical session - Mass Spectroscopy problems	**2**	**-**	**1**	**-**	**-**
11	**Lecture** -Applications of GC	**1**	**1**	**-**	**-**	

						-
	Practical session - Some applications of GC and HPLC	**2**	**-**	**1**	**-**	**-**
12	**Lecture** - Applications of HPLC and some other chromatographic techniques in drug evaluation	**1**	**1**	**-**	**-**	**-**
	Final Practical exam	**2**	**-**	**1**	**-**	**-**
13	**Lecture** -Microbial quality control.	**1**	**1**	**-**	**-**	**-**
	Final Practical exam	**2**	**-**	**1**	**-**	**-**
14	**Revision**	**1**	**1**	**-**	**-**	**-**
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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 (**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 12, 13**	**25**	**25%**
5	Final Oral Exam	**Week 15**	**10**	**10%**
6	Project (**co-operative & self-learning activity**	**Week 3,5,9**	**5**	**5%**
7	**Formative assessment** (Case based learning, Flipped Class)	**Week 5 &10**	**-**	**-**
8	Other (Mention)	**-**	**-**	**-**

*** The methods mentioned are examples, the organization may add and/or delete**

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 "Quality Control of Natural Products " approved by the pharmacognosy department 2025-2026.
	Other References	**1- Course Notes:** electronic student book of Quality Control of Natural Products submitted on the Faculty LMS. **2- Essential books:** - P. K. Mukherjee. Quality Control and Evaluation of Herbal Drugs. Published by Elsevier Science. India, 2019. - Simone Badal and Rupika Delgoda. Pharmacognosy: Fundementals, Applications and Sterategy. Academic Press is an imprint of Elsevier 2017. - K. Robards, P. E. Jackson, P. A. Haddad. Principles and Practice of Modern Chromatographic Methods. Published by Elsevier Academic Press. London, 2012. **3- Recommended books:** - H. Engelhardt. Practice of High Performance Liquid Chromatography: Applications, Equipment and quantitative analysis. Published by Springer - Verlag, 2012. - Peter Houghton and Pulok Mukherjee. Evaluation of Herbal Medicinal Products. Pharmaceutical Press, 2011.
	Electronic Sources (Links must be added)	- Wikipedia, the free encyclopedia and other related botanical and natural medicinal plants web sites. - Ethnopharmacology, Journal of Natural Products, Phytochemistry, Planta medica http: //www.elsevier.com/phytochem http: //www.elsevier.com/phytomed http: //www.wiley.co.uk. http: //www.sciencedirect.com
	Learning Platforms (Links must be added)	-
	Other	**-**

	(to be mentioned)	
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computers, Data show
	Supplies	Chemicals, glassware, microscopes, precoated TLC, digital balances, water bathes, oven.
	Electronic Programs	Microsoft office Microsoft team
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature
Course Coordinator

Prof. Dr. Wafaa Hassan Badr

Name and Signature
Program Coordinator

Prof. Dr. Amal Amin El-Gendy

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Chromatography and

Separation Techniques

PG E 08

Fourth level –Semester 8

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 8			
Academic Program	Bachelor of Pharmacy (Pharm D - Clinical Pharmacy)			
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, gel filtration and permeation, ion exchange and non-ion exchange manifestation and applications. High-pressure liquid chromatography, gas liquid chromatography 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
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.C1.1.1**	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

8. Lectures (data show, board)

9. Practical sessions

10. Self- learning (Activity)

11. Blended- learning (Activity)

12. 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	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - Con. classical chromatographic techniques (TLC and paper)	**1**	**1**	**-**	**-**	**-**
	Practical session Video on column chromatography	**2**	**-**	**1**	**-**	**-**
4	**Lecture** Non classical chromatographic techniques (HPLC chromatography) **Formative assessment (quiz1)**	**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	**1**	**1**	**-**	**-**	**-**
	Practical session Video on TLC	**2**	**-**	**1**	**-**	**-**
6	**Lecture** -Gas chromatography, principle, mobile phase, stationary phase	**1**	**1**	**-**	**-**	**-**
	Practical session Video and demonstration of HPLC in the Faculty analytical central lab	**2**	**-**	**1**	**-**	**-**
7	**Midterm 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 Video and demonstration of GC in the Faculty analytical central lab	**2**	**-**	**1**	**-**	**-**
10	**Lecture** -Ion exchange chromatography **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Video on the operation of gel and ion exchange chromatography	**2**	**-**	**1**	**-**	**-**
11	**Lecture** - Gel chromatography	**1**	**1**	**-**	**-**	**-**
	Practical session Video on the ion exchange chromatography	**2**	**-**	**1**	**-**	**-**
12	**Lecture** - Analysis of drugs in body fluids (Sample preparation and extraction **Formative assessment (quiz 3)**	**1**	**1**	**-**	**-**	**-**
	Practical session Videos on affinity chromatography	**2**	**-**	**1**	**-**	**-**

13	**Lecture** - Analysis of drugs in body fluids (Applications)	**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, 7 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 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 4,8,14	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 "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, V2020) .). 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**

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COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Analysis of food and flavors

PG E 09

Fourth level –Semester 8

2025-2026

Course Specification

(2025-2026)

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		2 hrs/ week
Course Type	Faculty Requirements (Elective Course)			
Academic level at which the course is taught	Level 4- semester 8			
Academic Program	Bachelor of pharmacy- Pharm D (clinical pharmacy			
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)

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 with 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.C2.8.1**	Select the appropriate method for food and flavors analysis.
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills	**4.C2.3.1**	Demonstrate good information technology skills as well as presentation skills.

4. Teaching and Learning Methods

- Interactive lectures (data show, board)
- Practical sessions
- Co-operative (Activity)
- Field visit (Activity)
- 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	**2**	**-**	**1**	**-**	**-**

	Challenges of analyses methods of food, food additives and flavors					
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 methods and	**1**	**1**	**-**	**-**	**-**

	recent analytical techniques (HPLC, LC-MS, GC-MS, etc).					
	Practical session Application on analysis of carbohydrates	**2**	**-**	**1**	**-**	**-**
7	**Midterm 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
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 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)	-	-	-

*** The methods mentioned are examples, the organization may add and/or delete**

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	• Food chemistry Lillian Hoagland MEYE1987 • 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),2010. • S. Suzanne Nielsen, Food Analysis (Food Science Text

		Series),4th ed.2010 • Morten C. Meilgaard, B. Thomas Carr, Gail Vance Civille : Sensory Evaluation Techniques, Fourth Edition,2006. • N.A.Michael Eskin, F. P. Downes, Keith Ito.2001. Compendium of Method for the Microbiological Examination of Foods. IVth Edition. American PubHealth Association. • Dairy Chemistry and Biochemistry,Pearsons Chemical Analysis of food Harold Egan19 Biochemistry of Food. • Recent Advances In The Chemistry of food Alleen J. Baily1984. Diaryproducts, Lampert.
	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	3. Microsoft office 4. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature **Course Coordinator** **Prof. Dr. Wafaa Hassan Badr**	**Name and Signature** **Head of Department** **Prof. Dr. Amal Al-Gendy**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Aromatherapy and herbal cosmetics

Level 5- Semester 10

PG E 10

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Aromatherapy and Herbal Cosmetics			
Course Code (according to the bylaw)	PG E 10			
Department/s participating in delivery of the course	Pharmacognosy			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 Hour/week	1 Hour/week		2 Hours/ 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- clinical pharmacy)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof Dr. Azza El-Shafae			
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 principles of aromatherapy and its applications in health and healthcare. Identify the use of essential oils, recognize their therapeutic properties and safety and ethical considerations in the use of essential oils and natural products, recall the methods of their extraction from plants. In addition, the student will be able to apply knowledge practically in various situations to manage conditions such as pain, anxiety, nausea, and fatigue using essential oils. Also, the student will be able to gain expertise on different herbs and natural products used in cosmetics, including their sources, and the main active ingredients. In addition, the student will be able to differentiate between plant extracts used in cosmetics of body care products and their application based on the site of application. Finally, the student will be able to prepare, identify, and evaluate natural components in cosmetic preparations and adhere to safety standards and guidelines for the use of natural products in cosmetics.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.2.1**	Explain the principles of aromatherapy and essential oils.
		1.C1.2.2	Outline the principles of herbal cosmetics and natural cosmetic formulations.
		1.C1.7.1	Describe the therapeutic applications of essential oils in health care.
		1.C1.7.2	Explain the principles of blending essential oils and selecting suitable application methods.
		1.C1.7.3	Discuss the role of natural products in complementary medicine and wellness.
		1.C1.7.4	Illustrate the dermatological and cosmetic uses of botanical compounds and herbal ingredients.

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**	Identify the pharmaceutical applications of essential oils and natural products.
		1.C1.9.2	Explain the analytical approaches used for evaluation of natural ingredients and cosmetic preparations.
2.2.1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/ natural pharmaceutical materials.	**2.C2.1.1**	Analyze natural ingredients used in aromatherapy and herbal cosmetics.
		2.C2.1.2	Apply suitable analytical and quality-control methods for natural products and cosmetic preparations.
3.2.3	Provide evidence-based information about safe use of complementary medicine including phytotherapy, aromatherapy, and nutraceuticals.	**3.C2.4.1**	Recommend appropriate essential oils based on evidence-based information.
		3.C2.4.2	Assess safety aspects associated with the use of natural products in cosmetics and aromatherapy.
		3.C2.4.3	Evaluate practical cases involving aromatherapy and herbal cosmetic applications.
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.C1.1.1**	Work effectively as a member of a team.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.3.1**	Write reports, present scientific information, and develop communication skills through case studies and product presentations.

4. Teaching and Learning Methods

- Interactive lectures (data show, board)
- Practical sessions
- Co-operative learning (Activity)
- Field visit (Activity)
- Self-learning (Activity)
- Case based learning (**Formative assessment)**
- Flipped Class (**Formative assessment)**

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 on Aromatherapy	**1**	**1**	-	-	-
	Practical session Introduction for Aromatherapy	**2**	**-**	**1**	**-**	**-**
2	**Lecture** - The Healing Power of Essential Oils - Aromatherapy and How Does It Work? - Tips For Using Essential Oils	**1**	**1**	**-**	**-**	**-**
	Practical session Essential Oils for Ailments: 1-Baby Care 2- Cold and Flu 3- Cuts, Burns, and Bruises	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - Blending of Essential Oils - Choosing the Appropriate Application Method - Nature's Pharmacy	**1**	**1**	**-**	**-**	**-**
	Practical session Continuing: Essential Oils for Ailments: 4- Dry, Itchy, or Sunburned Skin 5- Foot Care 6- Headaches 7- Liver Cleanse **- Activity on Aromatherapy.**	**2**	**-**	**1**	**-***	Co-operative learning Case based learning Field visit
4	**Lecture** - Introduction on Herbal Cosmetics	**1**	**1**	**-**	**-**	**-**

	Practical session 8- Muscle Pain 9- Upset Stomach Essential Oils for Enhanced Well-Being: 1- Calm 2- Depression	**2**	**-**	**1**	**-**	**-**
5	**Lecture** - Herbal Cosmetics for Skin. **Formative assessment (Quiz 1)**	**1**	**1**	**-**	**-**	Case based learning Flipped Class
	Practical session Essential Oils for Enhanced Well-Being: **Cont.** 3- Moodiness 4- Stress 5- Uplifting **- Activity on Aromatherapy.**	**2**	**-**	**1**	**-***	Co-operative learning Case based learning Field visit
6	**Lecture** - Herbal Cosmetics for Hair and Nail	**1**	**1**	**-**	**-**	**-**
	Practical session Aromatherapy Cases	**2**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** - Herbal Cosmetic Formulations	**1**	**1**	**-**	**-**	**-**
	Practical session Monographs of Herbal Principles: Chamomile, Cinnamon, Olive, Pomegranate, Rosemary, Grape	**2**	**-**	**1**	**-**	**-**
9	**Lecture** - Botanical Compounds and Their Dermatologic and Cosmetic Uses	**1**	**1**	**-**	**-**	**-**

	Practical session Monographs of Herbal Principles: **Cont.** Hop, Lemon balm, Marula, Savory, Baobab tree, Boswellia	**2**	**-**	**1**	**-**	**-**
10	**Lecture** - Ayurvedic Ingredients in Cosmetics **Formative assessment (Quiz 2)**	**1**	**1**	**-**	**-**	Case based learning Flipped Class
	Practical session Analysis of Natural ingredients in cosmetics .	**2**	**-**	**1**	**-**	**-**
11	**Lecture** - Safety Aspects for Using Natural Products in Cosmetics.	**1**	**1**	**-**	**-**	**-**
	Practical session Revision	**2**	**-**	**1**	**-**	**-**
12	**Lecture** - Analysis of Natural ingredients	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Analysis of Natural ingredients cont.	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**
14	**Revision**	**1**	**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 (**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 12, 13**	**25**	**25%**
5	Final Oral Exam	**Week 15**	**10**	**10%**
6	Project (**co-operative & self-learning activity**	**Week 3,5**	**5**	**5%**
7	**Formative assessment** (Case based learning, Flipped Class)	**Week 5 &10**	-	-
8	Other (Mention)	-	-	-

*** The methods mentioned are examples, the organization may add and/or delete**

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 "Aromatherapy and Herbal Cosmetics " approved by the pharmacognosy department 2025-2026.
	Other References	• Press, S., Essential Oils and Aromatherapy, An Introductory Guide: More Than 300 Recipes for Health, Home and Beauty. 2014: Arcas Publishing. • Press, A., Essential oils for beginners: The guide to get started with essential oils and aromatherapy. 2013: Callisto Media Inc. • Worwood, V.A., The complete book of essential oils and aromatherapy, revised and expanded: over 800 natural, nontoxic, and fragrant recipes to create health, beauty, and

		safe home and work environments. 2016: New World Library. • A.C. Kozlowski. Primer on Formulating Natural Products. Allured Books (2012). • D. Nava. K., Lambros. Formulating, packaging, and marketing of natural cosmetic products. John Wiley & Sons, Inc., Hoboken, New Jersey. (2011). • K. Ballamwar, S. Sahasra buddhe and K.Chafle. International Journal of Scientific and Research Publications, Review: The hurdle technology-Self-preservation technology in cosmetics,10(8) 820 (2020) • M. Lukic, I. Pantelic and S. Savic. An Overview of Novel Surfactants for Formulation of Cosmetics with Certain Emphasis on Acidic Active Substances.Tenside Surf. Det. 53 (2016). • Van Smeden J, Bouwstra JA. Curr. Probl. Dermatol. Stratum Corneum Lipids: Their Role for the Skin Barrier Function in Healthy Subjects and Atopic Dermatitis Patients.; 49:8-26 (2016). • W. C. Evans; Trease and Evans Pharmacognosy .16th International Ed (2009).
	Electronic Sources (Links must be added)	• B. Burlando, L. Verotta, L.Cornara, E. Bottini-Massa.Herbal Principles in Cosmetics: Properties and Mechanisms of Action. CRC Press. (2010).
	Learning Platforms (Links must be added)	-
	Other (to be mentioned)	**-**
Supportive facilities & equipment for	**Devices/Instruments**	Computers, Data show
	Supplies	water bath, digital balances and glassware) and Chemicals.
	Electronic Programs	Microsoft office

teaching and learning *		Microsoft team
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

* The list mentioned is an example, the institution may add and/or delete depending on the nature of the course

Name and Signature **Course Coordinator** **Prof. Dr. Azza El-Shafae**	**Name and Signature** **Program Coordinator** **Prof. Dr. Amal Amin El-Gendy**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Biotechnology of Medicinal

Plants

PG E 11

Fifth level –Semester 10

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Biotechnology of Medicinal Plants			
Course Code (according to the bylaw)	PG E 11			
Department/s participating in delivery of the course	Pharmacognosy			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 Hour/week	1 Hour/week		2 Hours/ 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 (clinical pharmacy			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof Dr. Maged Abu-Hashem			
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:

Demonstrate comprehensive understanding of the basic principles and applications of plant tissue culture, biotransformation, and genetic engineering techniques.

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 biotechnology in medicinal plants and tissue cultures.
1-1-7	Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.	**1.C1.19. 1**	Identify newly emerging issues related to pharmaceutical plant biotechnology and biotransformation.
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.C2.6.1**	Adopt good handling and distribution techniques for sterilization for tissue culture and demonstrate of different equipment used in plant tissue culture lab.
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 natural wastes in an appropriate way avoiding any environmental hazards.
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.3.1**	Demonstrate good information technology skills as well as presentation skills in plant molecular biology and biotechnology.

4. Teaching and Learning Methods

- Interactive lectures (data show, board)
- Practical sessions
- Problems solving (Activity)
- Self-learning (Activity)
- Blended-learning (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 to plant tissue culture - Plasticity and totipotency. - The culture enlivenment. - Plant cell culture media	**1**	**1**	-	-	-
	Practical session - Lab safety -Introduction to tissue culture techniques.	**2**	**-**	**1**	**-**	**-**
2	**Lecture** - Plant growth regulators - Culture types - Plant regeneration	**1**	**1**	**-**	**-**	**-**
	Practical session - Sterilization for tissue culture. -Demonstration of different equipments used in plant tissue culture lab - Component of tissue cultured media.	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - Micropropagation.	**1**	**1**	**-**	**-**	**-**
	Practical session - Micropropagation. -Production of callus from leaves. **- Activity.**	**2**	**-**	**1**	**-***	-
4	**Lecture** - Introduction to plant biotransformation - Biotransformation using plant cells and organ culture. - Pathway transformation.	**1**	**1**	**-**	**-**	**-**

	Practical session - *In Vitro* culture of carrot root (Production of callus).	**2**	**-**	**1**	**-**	**-**
5	**Lecture** - Biotransformation using immobilized cell culture. -Genetic engineering approach towards transformation. - Biotransformation using plant enzymes. - Biotransformation of selected secondary metabolites. **Formative assessment (Quiz 1)**	**1**	**1**	**-**	**-**	-
	Practical session -Production of callus from seeds (fenugreek)	**2**	**-**	**1**	**-**	**-**
6	**Lecture** - Introduction of plant genetics - A natural vehicle for introducing new gene into plant.	**1**	**1**	**-**	**-**	**-**
	Practical session -**Activity**: Study of different metabolic pathways that could be used in biotransformation.	**2**	**-**	**1**	**-***	**-**
7	**Lecture** - Horizontal gene transformation - The Ti plasmid and plant genetic engineering	**1**	**1**	**-**	**-**	**-**
	Practical session - Introduction of plant molecular biology and biotechnology. -Extraction of strawberry DNA.	**2**	**-**	**1**	**-**	**-**
8	**Midterm exam**					

9	**Lecture** - The role of organisms in genetic engineering. - Application and purpose of plant genetic engineering	**1**	**1**	**-**	**-**	**-**
	Practical session - DNA extraction from leaf.	**2**	**-**	**1**	**-**	**-**
10	**Lecture** - Genetic engineering of biosynthetic enzymes for natural products - Genetically engineered plant fats **Formative assessment (Quiz 2)**	**1**	**1**	**-**	**-**	-
	Practical session - Electrophoresis of isolated DNA sample.	**2**	**-**	**1**	**-**	**-**
11	**Lecture** - Production of candidate vaccines in plant tissue. - Genetic markers for plant breeding (DNA polymorphism).	**1**	**1**	**-**	**-**	**-**
	Practical session - Detection of food chromosome by PCR.	**2**	**-**	**1**	**-**	**-**
12	**Lecture** -Authentication of components from a mixture of herbal materials by genetic engineering techniques.	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**
13	**Lecture** - Other purposes of genetic engineering	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**
14	**Revision**	**1**	**1**	**-**	**-**	**-**
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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 (**Midterm exam**)	**Week 8**	**10**	**10%**
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	**Week 15**	**50**	**50%**
4	Final **Practical**/Clinical/... Exam	**Week 12, 13**	**25**	**25%**
5	Final Oral Exam	**Week 15**	**10**	**10%**
6	Project (**self-learning activity & Problems solving)**	**Week 3,6**	**5**	**5%**
7	**Formative assessment**	**Week 5 &10**	-	-
8	Other (Mention)	-	-	-

* The methods mentioned are examples, the organization may add and/or delete

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 "Biotechnology of Medicinal Plants" approved by the pharmacognosy department 2025-2026.
	Other References	**Essential Books:** • SRIVASTAVA, Vikas; MEHROTRA, Shakti; MISHRA, Sonal (ed.). Hairy Roots: An Effective Tool of Plant Biotechnology. Springer, 2018. • ORHAN, Ilkay Erdogan (ed.). Biotechnological production of plant secondary metabolites. Bentham science publishers, 2012. • CHAWLA, H_S_. Introduction to Plant Biotechnology (3/e). CRC Press, 2011. • ARORA, Rajesh, et al. (ed.). Medicinal plant biotechnology. CABI, 2010.

		• Davis, J. M. Basic Cell Culture. Published by IRL Press, 1994. • Hammond, J., McGarvey, P. and Yusibov Eds. Plant Biotechnology. Published by Springer, 2000. • Crommmlin, J. A. and Sindelar, R. D. Pharmaceutical Biotechnology. Published by Taylor and Francis, 2002. • Schuler, M. A and Zialinski, R. E. Methods in Plant Molecular Biology. Published by Academic Press. Inc., 1989. **Recommended Books** • Rajeev K. Varshney, Manish K. Pandey, Annapurna Chitikineni, 'Plant Genetics and Molecular Biology', springer 2018. • VASIL, Indra K.; THORPE, Trevor A. (ed.). Plant cell and tissue culture. Springer Science & Business Media, 2013. • ANIS, Mohammad; AHMAD, Naseem (ed.). Plant Tissue Culture: Propagation, Conservation and Crop Improvement. Singapore: Springer, 2016. • Plant Gene Isolation; Foster, G. D. Twell, D; John Wiley& Sons (1996) • Genetics; Weaver, F. R and Hedrick, P. W. 3rd Ed.WCB (1996). • Biotechnology; Smith, J. E. 3rd, Cambridge University Press (1996) • Genetics; P.K. Gupta 3rd Ed Rakish Kumar (2004).
	Electronic Sources (Links must be added)	• Plant Biotechnology, J. Molecular Biology, Plant Molecular Biology, Plant

		Cell Physiology, Die Pharmazie; Planta medica, Phytochemistry, J. of Natural Products and Fitoterapia. • http:// www.elsevier.com/phytochem • http:// www.elsevier.com/phytomed • http:// www.wiley.co.uk. • http:// bioweb@cellbiol.com
	Learning Platforms (Links must be added)	-
	Other (to be mentioned)	**-**
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computers, Data show
	Supplies	MS media, Agar, Plant growth regulators, sod. hypochloride (chlorox), ethanol, glassware, jar with a cap, beaker, sterile petri-dishes, callus initiation medium plates, Para film, aluminum foil, Forceps, digital balances and flame, water bathes, Autoclaves, Laminar flow hood and incubators.
	Electronic Programs	Microsoft office Microsoft team
	Skill Labs/ Simulators	**-**
	Virtual Labs	**-**
	Other (to be mentioned)	**-**

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature **Course Coordinator** **Prof Dr. Maged Abu-Hashem**	**Name and Signature** **Program Coordinator** **Prof. Dr. Amal Amin El-Gendy**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Biological standardization

PO E 08

Fourth level –Semester 7

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 08			
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 - Clinical Pharmacy)			
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,

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**
			Parkinsonism, Grave's disease, and pain.
		1.C1.7.1	Explain the foundational principles of clinical research methodology.
1.1.6	Utilize scientific literature and collect and interpret information to enhance professional decision.	**1.C1.16.1.**	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.C2.8.1.**	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.**	Prepare a complete, succinct research plan report incorporating ethical guidelines and professional standards.
		2.C5.6.1.	Prepare clear, well-structured research reports that adhere to scientific writing conventions and meet standards suitable for publication.
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.C2.3.1**	Demonstrate effective use of information technology and presentation tools to communicate pharmacological research outcomes.

4. Teaching and Learning Methods

Lectures (data show, board)

Practical sessions

Problem solving- based learning (Practical)

Self- Learning (Activity)

Blended- learning (Activity)

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	**1**	**-**	**1**	**-**	**-**

	Absolute Risk Reduction (ARR) / Risk Difference (RD)					
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	5. Microsoft office 6. 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

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Veterinary Pharmacology

PO E 09

Fourth level –Semester 8

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 09			
Department/s participating in delivery of the course	Pharmacology and Toxicology Department			
Number of credit hours/points of the course (according to the bylaw)	**Theoretical**	**Practical**	**Other (specify)**	**Total**
	1 hrs/week	1hrs/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Fourth year /semester 8			
Academic Program	Bachelor of Pharmacy (Pharm D -Clinical Pharmacy)			
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	Integrate knowledge from basic and applied pharmaceutical and clinical sciences to standardize materials, formulate and manufacture products, and deliver population and patient-centered care.	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	Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	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	Articulate knowledge from fundamental sciences to explain drug actions and evaluate their appropriateness, effectiveness and safety in individuals and populations	1.C1.12.1	State legal aspects related to the treatment of animals.
2.4.1	Ensure safe handling/ use of poisons to avoid their harm to individuals and communities.	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	Relate etiology, epidemiology, pathophysiology, laboratory diagnosis and clinical features of infections/ diseases and their pharmacotherpeutic approaches.	3.C1.6.1	Select the appropriate medication therapy for a given disease based on its etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/ diseases.
3.2.4	Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.	3.C2.5.1	Counsel community pharmacists and animal owners about toxic profiles of drugs and other toxic substances.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
4.2.1	Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care team, patients and communities.	4.C2.1.1	Demonstrate effective oral communication skills with the community.
		4.C2.2.1	Write and present activities using advanced information technology skills

4. Teaching and Learning Methods

Interactive Lectures (data show, board)

Practical sessions

Self- Learning (Activity)

Problem-based learning (Activity)

Blended learning (Activity)

Open discussion, case study, team-based and collaborative learning.

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 **Practical sessions** Course orientation & introduction to veterinary physiology	**2**	**1**	1	**-**	**-**
2	**Lecture**		**1**	1	**-**	**-**

	species differences in pharmacokinetics and pharmacodynamics, Drug delivery systems and routes of drug administration in domestic animals **Practical sessions** Case studies of species differences in pharmacokinetics and pharmacodynamics	**2**				
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 **Practical sessions** Case studies of the effect of pharmacogenomics in different species	**2**	**1**	1	**-**	**-**
4	**Lecture** Pharmacotherapy of Parasitic Disease **Practical sessions** Case studies of the use of human OTC in animals	**2**	**1**	**1**	**-**	**-**
5	**Lecture** Pain Management in Veterinary Species **Practical sessions** Case studies of the pharmacotherapy of Parasitic Disease	**2**	**1**	1	**-**	**-**
6	**Lecture** Behavioral Pharmacotherapeutics **Practical sessions** Pain Management in Veterinary Species	**2**	**1**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** Dermatologic Pharmacotherapeutics **Practical sessions** Case studies on Pain Management in Veterinary Species	**2**	**1**	1	**-**	**-**

9	**Lecture** Ophthalmic Pharmacotherapeutics **Practical sessions** Behavioral Pharmacotherapeutics	**2**	**1**	1	-	-
10	**Lecture** Equine Pharmacotherapy **Practical sessions** Case studies on Behavioral Pharmacotherapeutics	**2**	**1**	**1**	-	-
11	**Lecture** Food Animal Pharmacotherapy **Practical sessions** Case studies on Equine Pharmacotherapy	**2**	**1**	1	-	-
12	**Lecture** Pharmacotherapeutics for Nontraditional Pets **Practical sessions** Veterinary pharmacy questionnaire	**2**	**1**	1	-	-
13	**Lecture** Counseling for Owners of Veterinary Patients **Practical exam**	**2**	**1**	1	-	-
14	**Revision** **Practical** **Activity (PowerPoint presentation of case study)**	**2**	**1**	**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 13	25	25 %
5	Final Oral Exam	Week 15	10	10 %
6	Project (**Self-learning Activity**)	Week 12,14	5	5%
7	Assignment (**Formative assessment**)	Week 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 of "Veterinary Pharmacology" approved by the pharmacology and toxicology department 2025-2026. - Practical notes approved by the pharmacology and toxicology department 2025-2026.
	Other References	15. Pharmacotherapeutics for Veterinary Dispensing, Katrina L. Mealey (2019) 16. Comparative and Veterinary Pharmacology; Cunningham, Fiona, Elliott, Jonathan, Lees, Peter (2010) 17. Veterinary Pharmacology and Therapeutics 10th edition; Jim E. Riviere, Mark G. Papich (2017) 18. Handbook of Veterinary Pharmacology; Walter H. Hsu (2008)
	Electronic Sources (Links must be added)	- Annual Review of Pharmacology and Toxicology https://www.annualreviews.org/content/journals/pharmtox -EKB (https://www.ekb.eg/en/web/researchers/home) -PubMed (https://pubmed.ncbi.nlm.nih.gov/) -ScienceDirect (https://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 boards, data show, air-conditioned classroom, Software, Videos, Screens.
	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

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Teratogenic drugs

PO E 10

Fifth level –Semester 10

2025-2026

Course Specification

2025-2026

1. Basic Information

Course Title (according to the bylaw)	Teratogenic drugs			
Course Code (according to the bylaw)	PO E 10			
Department/s participating in delivery of the course	Pharmacology and Toxicology 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 10			
Academic Program	Bachelor of pharmacy – Pharm D (Clinical Pharmacy)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Ass. Prof. Dr. Nesreen Elkomy			
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 effectively identify mechanisms of teratogenic medications, evaluate and interpret teratogenic hazards in therapeutic regimens, use of literature evaluation and evidence-based practice to support rational and safe medication use, explore the symptoms of teratogenicity associated with the clinical use of different medication classes, and the systematic approach to Patients Needing Medication During Pregnancy.

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**	Define the principles of teratology and drug use during pregnancy
1.1.4	Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.	**1.C1.10.1**	Describe the teratogenic adverse effects and the underlying mechanisms of antibiotics, antivirals, antiretrovirals, cardiovascular, neurologic, psychiatric, respiratory, oncology, musculoskeletal, rheumatic, genitourinary, gastrointestinal, endocrine, and miscellaneous medications.
		1.C1.11.1	Apply pharmacological and toxicological principles in the proper selection of drugs during pregnancy.
		1.C1.12.1	Asses the appropriateness of medicines for a given disease during pregnancy.
1.1.6	Utilize scientific literature, and collect and interpret information to enhance professional decision	**1.C1.16.1**	Provide necessary advice or recommendations to the prescriber on medicine therapy during pregnancy.

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**
2-1-1	Perform responsibilities and authorities in compliance with the legal and professional structure and role of all members of the health care professional team.	**2.C1.2.1**	Collaborate with other health-care providers to optimize the use of medication and promote health during pregnancy.
2-1-3	Recognize own personal and professional limitations and accept the conditions of referral to or guidance from other members of the health care team	**2.C1.7.1**	Work with patients and other health care professionals to determine which treatments will best meet the patient's therapeutic needs during pregnancy
2-5-2	Retrieve, interpret, and critically evaluate evidence-based information needed in pharmacy profession	**2.C5.2.1**	Retrieve accurate and up-to-date information from computerized databases and online platforms relevant to medications and patient care.
		2.C5.3.1	Demonstrate the ability to make well-informed, timely, and evidence-based clinical recommendations.
3-1-3	Monitor and control microbial growth and carry out laboratory tests for identification of infections/ diseases.	**3.C1.5.1**	Identify the degree of monitoring required by a patient according to the health risks posed by the patient's medication during pregnancy
3.2.2	Apply the principles of clinical pharmacology and pharmacovigilance for the rational use of medicines and medical devices.	**3.C2.2.1**	Apply the principles of clinical pharmacology and pharmacovigilance to avoid adverse events with medication and improve the safe use of medicines.
3.2.5	Educate and counsel patients, other health care professionals, and communities about safe and proper use of medicines including OTC preparations and medical devices.	**3.C2.6.1.**	Advises patients, the public and other healthcare professionals on the safe use of medicines the contraindications and side effects of non-prescription and prescription medicines.

Program Outcomes(NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.,	**4.C1.4.1**	Retrieve accurate and up-to-date information from computerized databases and online platforms relevant to medications and patient care.
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**	Use appropriate communication skills with patients and other health care professionals.

4. Teaching and Learning Methods

Interactive Lectures (data show, board)

Practical sessions

Self- learning (Activity)

E-learning

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 teratology and drug use during pregnancy	**1**	**1**	**-**	**-**	**-**
	Practical session Introduction of teratogenicity	**2**	**-**	**1**	**-**	**-**
2	**Lecture** FDA rating system for the teratogenic effects of drugs	**1**	**1**	**-**	**-**	**-**
	Practical session FDA Drug labeling system	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - Mechanisms of teratogenic drugs	**1**	**1**	**-**	**-**	**-**
	Practical session - Flipped class room - Mechanisms of teratogenic drugs	**2**	**-**	**1**	**-**	**-**
4	**Lecture** - Antibiotics, antiviral, and antiretroviral **Formative assessment (quiz 1)**	**1**	**1**	**-**	**-**	**-**
	Practical session **Activity (Presentation)**	**2**	**-**	**1**	**-**	**-**
5	**Lecture** Cardiovascular medications	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of antibiotics, antiviral, and antiretroviral	**2**	**-**	**1**	**-**	**-**
6	**Lecture** Neurologic medications	**1**	**1**	**-**	**-**	**-**

	Practical session Case studies on teratogenic effects of cardiovascular medications	**2**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** Psychiatric Medications	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of neurologic medications	**2**	**-**	**1**	**-**	**-**
9	**Lecture** Respiratory and oncology medications **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of psychiatric medications	**2**	**-**	**1**	**-**	**-**
10	**Lecture** Musculoskeletal and rheumatic medications	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of respiratory and oncology medications	**2**	**-**	**1**	**-**	**-**
11	**Lecture** Genitourinary medications	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of musculoskeletal and rheumatic medications	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Gastrointestinal and endocrine medications **Formative assessment (quiz 3)**	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of genitourinary medications	**2**	**-**	**1**	**-**	**-**

13	**Lecture** Miscellaneous medications	**1**	**1**	**-**	**-**	**-**
	Practical session Case studies on teratogenic effects of gastrointestinal and endocrine medications	**2**	**-**	**1**	**-**	**-**
14	**Lecture** Revision and Open discussion	**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 , cooperative 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 teratology and drug use during pregnancy approved by pharmacology department 2025
	Other References	1. Little, B. B. (2022). Drugs and pregnancy: A handbook (2nd ed.). CRC Press. 2. Gupta, R. C. (Ed.). (2022). Reproductive and developmental toxicology (3rd ed.). Elsevier. 3. Briggs, G. G., Freeman, R. K., & Towers, C. V. (2022). Drugs in pregnancy and lactation: A reference guide to fetal and neonatal risk (12th ed.). Wolters Kluwer. 4. Mattison, D. R. (2022). Clinical pharmacology during pregnancy (2nd ed.). Elsevier. 5. Alfirevic, Z., Suresh, S., & Hyett, J. (Eds.). (2023). Fetal medicine: Basic science and clinical practice. Cambridge University Press. 6. Tsamantioti, E. S., & Hashmi, M. F. (2024). Teratogenic medications. In StatPearls. StatPearls Publishing.
	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	**Devices/Instruments**	White board, Data show, computer
	Supplies	-
	Electronic Programs	7. Microsoft office 8. Microsoft teams

and learning *	**Skill Labs/ Simulators**	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature **Course Coordinator** **Ass .Prof. Dr. Nesreen Elkomy**	**Name and Signature** **Head of Department** **Prof . Dr . Islam Ahmed**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Applied Industrial Pharmacy

PT E 09

Fifth level –Semester 9

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 09			
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 - Clinical Pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Ass. 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.C1.19.1.**	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.C2.7.1.**	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.C2.3.1.**	Demonstrate good information technology skills as well as presentation skills.

4. Teaching and Learning Methods

Lectures (data show, board)

Practical sessions (Tutorials)

Problem solving (Practical)

Self-learning (Activity)

Blended- learning (Activity)

Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .....)	Training (Practical/Clinical/ .....)	Self-learning (Tasks/ Assignments / Projects/ ...)	Other (to be determined)
1	**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	**Midterm exam**					
8	**Lecture** - **Quality management:** Quality control and assurance	**2**	**2**	**-**	**-**	**-**
	Practical session - Quality management: Quality control and assurance "Tutorial"	**2**	**-**	**1**	**-**	**-**
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 manufacturing practice "Tutorial" - Orientation on Activity	**2**	**-**	**1**	**-***	**-**
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.

5. 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 10,14	5	5%
7	Assignment (**Formative assessment**)	Weeks 4,10	-	-
8	Other (Mention)	-	-	-

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course** (must be written in full according to the scientific documentation method)	Student book and practical notes of "Applied Industrial Pharmacy" approved by the Pharmaceutics Department 2025-2026.
	Other References	19. Lachman, L., Lieberman, H. A., & Kanig, J. L. (1976). The theory and practice of industrial pharmacy (pp. 210-212). Philadelphia: Lea & Febiger. **20.** Nally, J. D. (2016). Good manufacturing practices for pharmaceuticals. CRC Press. 21. John, C., & Morten, C. (2002). The Science of Dosage Form Design. Aulton: Modified release peroral dosage forms (2nd ed.) Churchill Livingstone, 290-300. **22.** Allen, L., & Ansel, H. C. (2013). Ansel's pharmaceutical dosage forms and drug delivery systems. Lippincott Williams & Wilkins.
	Electronic Sources	https://www.ekb.eg/ www.pubmed.com www.sciencedirect.com
	Learning Platforms **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	9. Microsoft Office 10. 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. Dr. Shereen Sabry**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Good Manufacturing Practice

PT E 10

Fourth level –Semester 7

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Good Manufacturing Practice			
Course Code (according to the bylaw)	PT E 10			
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 4- Semester 7			
Academic Program	Bachelor of Pharmacy (Pharm D - Clinical Pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Mahmoud AbdelGhany			
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 guidelines for the manufacturing of dosage forms and the good practices that should be followed during sampling, packaging, storing, and labeling of different dosage forms.

3. Course Learning Outcomes CLOs

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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		**Course Learning Outcomes** Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
1.1.1	Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.	**1.C1.2.1.**	Outline the principles of drug design and good manufacturing practice.
1.1.7	Identify newly emerging issues related to pharmaceutical industry	**1.C1.19.1.**	Identify newly emerging issues related to the pharmaceutical industry.
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.**	Describe appropriate techniques for safe and efficient formulation, compounding, manufacturing, packaging, labeling, storing, dispensing, and distributing various pharmaceutical dosage forms while adhering to good manufacturing practice (GMP) guidelines.
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. Teaching and Learning Methods

Lectures (data show, board)

Practical sessions (Tutorials)

Problem solving (Practical)

Self-learning (Activity)

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 for the pharmaceutical industry and GMP	**1**	**1**	**-**	**-**	**-**
	Practical session Introduction of various definitions and abbreviations concerning GMP	**2**	**-**	**1**	**-**	**-**
2	**Lecture** History of GMP development	**1**	**1**	**-**	**-**	**-**
	Practical session Implementation of GMP toward examples of product quality defects "Tutorial"	**2**	**-**	**1**	**-**	**-**
3	**Lecture** Therapeutic good regulators	**1**	**1**	**-**	**-**	**-**
	Practical session Premises and cleaning guidelines "Tutorial"	**2**	**-**	**1**	**-**	**-**
4	**Lecture** Storage areas **Formative assessment (quiz1)**	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion about keeping premises and equipment cleanliness	**2**	**-**	**1**	**-**	**-**
5	**Lecture** Introduction of quality control	**1**	**1**	**-**	**-**	**-**
	Practical session Design and types of airlocks in pharmaceuticals "Tutorial"	**2**	**-**	**1**	**-**	**-**
6	**Lecture** Documentation and sampling in quality control	**1**	**1**	**-**	**-**	**-**
	Practical session	**2**	**-**	**1**	**-**	**-**

	Types of isolators and airflow systems "Tutorial"					
7	**Midterm exam**					
8	**Lecture** Testing and storage in quality control	**2**	**2**	**-**	**-**	**-**
	Practical session Personnel, sanitation and hygiene "Tutorial"	**2**	**-**	**1**	**-**	**-**
9	**Lecture** Storage duration and conditions, and an ongoing stability program	**1**	**1**	**-**	**-**	**-**
	Practical session Starting materials and sampling tools "Tutorial"	**2**	**-**	**1**	**-**	**-**
10	**Lecture** Premises and ancillary areas **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Examples of different sheets of sampling plans "Tutorial" - Orientation on Activity	**2**	**-**	**1**	**-***	**-**
11	**Lecture** Fundamentals of quality assurance	**1**	**1**	**-**	**-**	**-**
	Practical session Description of quality management "Tutorial"	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Validation and qualification	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion about differences between quality control and quality assurances	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Complaints, Recalls and Product quality review	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**

14	**Lecture** Revision and open discussion	**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 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 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 "Good Manufacturing Practice" approved by the Pharmaceutics Department 2025-2026.
	Other References	23. Brendan Cooper. 2017, The GMP Handbook: A Guide to Quality and Compliance. ISBN-13 :978-1548370251. 24. The Inspection and Standards Division of the Medicines and Healthcare products Regulatory Agency, Rules and Guidance forPharmaceutical Manufacturers and Distributors (the "OrangeGuide"), Pharmaceutical Press, 2007. 25. Gero Beckmann; WilfriedBellack; Helmut Bender; and others, GMPMANUAL; Good Manufacturing Practice & Implementation, Maas &Peither AG – GMP Publishing, 2007. 26. World Health Organization, Quality Assurance of Pharmaceuticals; A compendium of guidelines and related materials; Volume 2, 2nd updated edition; Good manufacturing practices and inspection, WHO Press, 2006. 27. WHO Expert Committee on Specifications for Pharmaceutical Preparations, WHO Technical Report Series 937, WHO Press, 2006 28. Gillian Chaloner-Larsson; Roger Anderson; Anik Egan; Manoel Antonio da Fonseca Costa Filho; Jorge F. Gomez Herrera, A WHO guide to good manufacturing practice (GMP) requirements; Part 1: Standard operating procedures and master formulae, World Health Organization; Global Programme for Vaccines and Immunization, 1997. 29. Office of Women's Health, FDA Milestones in Women's Health: Looking Back as We Move into the New Millennium (FDA, Rockville, MD, 2000), 30. FDA History: FDA Commissioners and Their Predecessors, U.S. Food and Drug Administration, Rockville, MD, rev. 6 April 2000, 31. "Jonas Salk, MD — Biography" (American Academy of Achievement, 2000), 32. Code of Federal Regulations, Food and Drugs, "Current Good Manufacturing Practice in Manufacturing, Processing, Packing, or Holding

		of Drugs," revised April 2000, Title 21 Part 210–211 (U.S. Printing Office, Washington, DC).
	Electronic Sources (Links must be added)	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**	**https://shorturl.at/sar8D**
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board
	Supplies	-
	Electronic Programs	11. Microsoft Office 12. Microsoft Teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator
Prof. Dr. Mahmoud AbdelGhany

Name and Signature
Head of Department
Prof. Dr. Shereen Sabry

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Protein Pharmaceuticals

PT E 11

Fifth level –Semester 9

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Protein Pharmaceuticals			
Course Code (according to the bylaw)	PT E 11			
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 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-Clinical Pharmacy)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Nagia El-Megrab			
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 will provide an in-depth overview of different types of protein as adaptor, carrier, Transport chromosomal, complex, designer, factitious, fibrous, fluorescent, fusion, housekeeping, hydrophobic, hypothetical, immunoglobulin Ig, luxury, membrane transport, heat shock, and Finger proteins. Growth factors, drug targets, checkpoint control proteins.

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 protein pharmaceutics, their production, and classification.
1.1.7	Identify newly emerging issues related to pharmaceutical industry.	**1.C1. 19.1**	Identify newly emerging issues related to the delivery systems of therapeutic proteins.
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. 8.1**	Choose the appropriate methods for synthesis and analysis of different protein pharmaceuticals.
4.1.1	Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.	**4.C1. 3.1**	Manage time as evidenced by the ability to plan and implement efficient mode of working.
4.2.2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2. 3.1**	Demonstrate good information technology skills as well as presentation skills.

4. Teaching and Learning Methods

Lectures (data show, board)

Practical sessions

Self-learning (activity and 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** - Importance of proteins and their numbers in human body, advantages, disadvantages and classification	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about proteins used in diagnosis of diseases	**1**	**-**	**1**	**-**	**-**
2	**Lecture** - Adaptor proteins and Carrier proteins (role, application)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about proteins approved as therapy	**1**	**-**	**1**	**-**	**-**
3	**Lecture** - Complex Protein and Factitious Protein (role, application)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about challenges for oral delivery of proteins	**1**	**-**	**1**	**-**	**-**
4	**Lecture** -Fibrous Proteins and Fluorescence Protein (role, application) -Assignment (**Formative assessment**)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about nanocarriers for proteins delivery	**1**	**-**	**1**	**-**	**-**
5	**Lecture** -Housekeeping Proteins and Fusion protein (role, application)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about nasal protein delivery	**1**	**-**	**1**	**-**	**-**
6	**Lecture** -Hypothetical Protein and Immunoglobulins (role, application)	**1**	**1**	**-**	**-**	**-**

	Practical session -Presentation thermal ablation for proteins delivery	**1**	**-**	**1**	**-**	**-**
7	**Midterm**					
8	**Lecture** -Membrane Transport Protein and Heat shock Protein (role, application)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about iontophoresis technology for proteins delivery	**1**	**-**	**1**	**-**	**-**
9	**Lecture** - Zinc Finger proteins and Growth Factor Protein (role, application)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about microneedle technology for proteins delivery	**1**	**-**	**1**	**-**	**-**
10	**Lecture** - Production of protein therapeutics, delivery systems -Assignment (**Formative assessment**)	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about application of proteins in various diseases (cancer)	**1**	**-**	**1**	**-**	**-**
11	**Lecture** - Classification of protein therapeutics according to FDA	**1**	**1**	**-**	**-**	**-**
	Practical session - Presentation about application of proteins in various diseases (viral) -Activity student (Report)	**1**	**-**	**1**	**-***	**-**
12	**Lecture** - Pharmacokinetics of protein therapeutics	**1**	**1**	**-**	**-**	**-**
	Practical session - Revision	**1**	**-**	**1**	**-**	**-**
13	**Lecture** - Protein therapeutics drug delivery systems and routes of administration	**1**	**1**	**-**	**-**	**-**

	Practical exam	**1**	**-**	**1**	**-**	**-**
14	**Lecture** -Revision	**1**	**1**	**-**	**-**	**-**
	Practical session -Activity student (Report) discussion	**-**	**-**	**-**	**-***	**-**
15	**Final written exam**					

* As part of a self-learning activity in protein pharmaceuticals 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 11 and 12 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 11,14	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 "Protein Pharmaceuticals" approved by the pharmaceutics department 2025-2026.
	Other References	1. Oxender, D. L., & Post, L. E. (Eds.). (2013). Novel therapeutics from modern biotechnology: from laboratory to human testing (Vol. 137). Springer Science & Business Media. 2. Meyer, B. K., & Shameem, M. (2012). Commercial therapeutic protein drug products. In Therapeutic Protein Drug Products. Woodhead Publishing. 3. van der Walle, C. F., & Olejnik, O. (2011). An overview of the field of peptide and protein delivery. Peptide and protein delivery, 1-22. 4.Vhora, I., Patil, S., Bhatt, P., & Misra, A. (2015). Protein–and peptide–drug Conjugates: An emerging drug delivery technology. Advances in protein chemistry and structural biology, 98, 1-55.
	Electronic Sources (Links must be added)	- https://pubmed.ncbi.nlm.nih.gov/25819275/ - https://www.sciencedirect.com/science/article/abs/pii/B9781907568183500014 - https://pubmed.ncbi.nlm.nih.gov/20047032/ - https://www.sciencedirect.com/science/article/abs/pii/S0939641115001459
	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	**Devices/Instruments**	Computer, board, data show
	Supplies	Black (white) boards, data show
	Electronic Programs	13. Microsoft office 14. Microsoft teams

and learning *	**Skill Labs/ Simulators**	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature **Course Coordinator** **Prof. Dr. Nagia El-Megrab**	**Name and Signature** **Head of Department** **Prof. Dr. Sehreen Ahmed Sabry**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Drug metabolism and transport

PT E 12

Fifth level –Semester 10

2025-2026

Course Specification

(2025 - 2026)

1. Basic Information

Course Title (according to the bylaw)	Drug metabolism and transport			
Course Code (according to the bylaw)	PT E 12			
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 hr/week	1hr/week	-	2 hrs/week
Course Type	Faculty Requirements			
Academic level at which the course is taught	Level 4 or 5- semester 8 or 10			
Academic Program	Bachelor of Pharmacy (PharmD - clinical pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig University			
Name of Course Coordinator	Prof. Dr/ Nagia Ahmed Elmegrab			
Course Specification Approval Date	18/8/2025			
Course Specification Approval (Attach the decision/minutes of the department /committee/ ....)	Department council			

2. Course Overview (Brief summary of scientific content)

On completion of the course, the student will be able to recognize the drug metabolizing enzymes which can oxidize, reduce, hydrolyze or conjugate compounds, characteristic of phase I and phase II. Also, linear and nonlinear metabolic clearance kinetics, drug-drug interaction mechanisms and kinetics, metabolite kinetics, in vitro-in vivo predictions, pharmacogenetics and other sources of inter-individual variability will be studied. Students will acquire advance knowledge of the physico-chemical and biological concepts underlying in vivo transport and delivery of drugs, distribution of drugs within the body and factors affecting distribution of drugs through cancer tissues, CNS and placental. Students will be able to understand drug-protein binding and its effects on the transport or distribution of drugs.

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 and mechanisms of drug metabolism, drug transport, drug distribution with in the body, and drug-protein binding
		1.C1.2.2	Identify and describe the major phase I and phase II metabolic reactions.
		1.C1.2.3	Predict the clinical significance of drug metabolism and drug transport
1-1-4	**Articulate knowledge from fundamental sciences to explain drug actions and evaluate their appropriateness, effectiveness and safety in individuals and populations**	1.C1.10.1	Describe enzyme inhibition and induction their effect in drug- drug interactions and adverse effects.

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.C1.12.1	Summarize different factors in drug metabolism and drug transport in specialized tissues like cancer tissues, the central nervous system (CNS), and the placenta
4-2-2	**Use contemporary technologies and media to demonstrate effective presentation skills**	4.C2.3.1	Exhibit good presentation and information technology abilities

4. Teaching and Learning Methods

Lectures
Practical (tutorial)
General Discussion
Self –learning
Blended-learning

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 Drug Metabolism	1	1	-	-	-
	Practical (Tutorial) : Revision about pharmacokinetics	2	-	1		
2	**Lecture:** Phase I Metabolic Reactions Phase II Metabolic Reactions:	1	1		-	-
	Practical (Tutorial): Some example of drug metabolism mechanisms: phase I and phase II	2	-	1	-	-
3	**Lecture:** Enzymes Involved in Drug Metabolism	1	1		-	-
	Practical (Tutorial) : A case-based tutorial on predicting and understanding clinically significant of drug metabolism	2	-	1	-	-
4	**Lecture:** Factors Affecting Drug Metabolism: pharmacogenetics and other sources of inter-individual variability. drug-drug interaction mechanisms and kinetics **Formative assessment (quiz1)**	1	1		-	-
	Practical (Tutorial) : Predicting the impact of drug-drug interaction on drug therapeutic efficacy / toxicity	2	-	1	-	-
5	**Lecture:** First-Pass Metabolism and Bioavailability.	1	1	-	-	-
	Practical (Tutorial) : Examples about some drugs extensively metabolized by First-Pass Metabolism	2	-	1	-	-

6	**Lecture:** Metabolite kinetics In Vitro and In Vivo Methods for Studying Drug Metabolism. Drug Metabolism in Drug Discovery and Development.	**1**	**1**		**-**	**-**
	Practical (Tutorial): Problem-solving exercises involving interpretation of PK graphs. Case-based discussions requiring application of knowledge of drug metabolism in patient care	**2**	**-**	**-**	**-**	**-**
7	Midterm exam					
8	**Lecture:** Metabolism of Specific Drug Classes (Examples may be included). Clinical Significance of Drug Metabolism.	**1**	**1**		**-**	**-**
	Practical(Tutorial) : Critical evaluation of data : interpreting data from metabolic study and draw conclusion	**2**	**-**	**1**	**-**	**-**
9	**Lecture:** Principles and mechanisms of drug transport across biological membranes	**1**	**1**		**-**	**-**
	Practical (Tutorial) : Case studies illustrating the role of drug transporters.	**2**	**-**	**1**	**-**	**-**
10	**Lecture:** - Distribution of drugs within the body - Major drug transporter families **Formative assessment (quiz2)**	**1**	**1**		**-**	**-**
	Practical (Tutorial) : Case studies on how transporters influence a drug's oral bioavailability, tissue distribution, and elimination	**2**	**-**	**1**	**-**	**-**
11	**Lecture:** Factors affecting distribution of drugs through cancer tissues, CNS and placental.	**1**	**1**			
	Practical (Tutorial) :	**2**	**-**	**1**		

	Case studies on how transporters influence a drug's bioavailability, tissue distribution, and elimination					
12	**Lecture:** Drug-protein binding and its effects on the transport or distribution of drugs.	**1**	**1**	**-**	**-**	**-**
	Practical (Tutorial) : Case studies on how protein binding influence a drug's bioavailability, tissue distribution, and elimination	**2**	**-**	**1**		
13	**Lecture:** Clinical Significance of drug transport and Applications	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**2**	**-**	**1**	**-**	**-**
14	**Lecture:** General discussion and revision	**1**				
	Practical: Activity and Oral Presentation in selected topics	**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 13	25	%25
6	Final Oral Exam	Week 15	10	%10
7	Project **(Self-learning Activity)**	Weeks 14	5	%5
8	Assignment (Formative assessment)	Weeks 4 & 10	-	-
	Other (Mention)	-		

*** The methods mentioned are examples, the organization may add and/or delete**

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 handout approved by pharmaceutics department (20255-2026).
	Other References	• Basic & Clinical Pharmacology. By, Katzung, B. G., Trevor, A. J., & Masters, S. B. (2024). (16th ed.). McGraw Hill Education. • Rang & Dale's Pharmacology. By, H. P. Rang and M. Maureen Dale (2023). (10th ed.). Elsevier. • Shargel and Yu's Applied biopharmaceutics and pharmacokinetics. By, Ducharme, M. P., & Shargel, L. (2022). (8th ed.). McGraw Hill.
	Electronic Sources (Links must be added)	https://www.ekb.eg/ Susa ST, Hussain A, Preuss CV. Drug Metabolism. [Updated 2023 Aug 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK442023/
	Learning Platforms (Links must be added)	Electronic ***platform*** of faculty of pharmacy - zagazig university
	Other (to be mentioned)	
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Black (white) boards, computer data show, air conditioned classroom
	Supplies	
	Electronic Programs	1. Microsoft office **2.** Microsoft teams
	Skill Labs/ Simulators	
	Virtual Labs	
	Other (to be mentioned)	

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature
Course Coordinator
Prof. Dr/ Nagia Ahmed Elmegrab

Name and Signature
Head of department
Prof. Dr/ Shreen Ahmed Sabry

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Cosmetic Preparations

PT E 13

Fourth level –Semester 8

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Cosmetic Preparations			
Course Code (according to the bylaw)	**PT E 13**			
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 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 - clinical pharmacy)			
Faculty/Institute	**Faculty of Pharmacy**			
University/Academy	**Zagazig University**			
Name of Course Coordinator	**Prof. Hanan Elnahas**			
Course Specification Approval Date	**8/18/2025**			
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.
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

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
2-3-2	Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products.	**2.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

Lectures
Practical session
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	-	1	-	-

	Shaving cream preparation					
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:**	**1**	**1**	**-**	**-**	

	Antiperspirant & Deoderant materials and formulations, 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%**
	Final Practical/Clinical/... Exam	**Week 13**	**25**	**25%**
	Final Oral Exam	**Week 15**	**10**	**10%**
	Project (self learning activity)	**Week 12**	**5**	**5%**
	Assignments	**Week 3,6**	**-**	**-**
	Other (Mention)	**-**	**-**	**-**

*** The methods mentioned are examples, the organization may add and/or delete**

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)	

*** The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

Name and Signature **Course Coordinator** **Prof. Hanan ELnahas**	**Name and Signature** **Program Coordinator** **Prof. Shereen A. Sabry**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Quality improvement in

healthcare

PP E 16

Fifth level –Semester 9

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	**Quality improvement in healthcare**			
Course Code (according to the bylaw)	PP E 16			
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	Others	Total
	1 hr./week	1 hr./week	---	2hr/week
Course Type	Faculty Requirements (**Elective**)			
Academic level at which the course is taught	level 5/ semester 9			
Academic Program	Bachelor of Pharmacy (Pharm D) clinical pharmacy			
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)

Upon completion of this course, students will be able to understand the principles and concepts of healthcare quality management, including Total Quality Management (TQM) philosophies and frameworks. The course covers quality improvement cycles, quality measurement and assessment, and the application of quality control and improvement tools and techniques to enhance healthcare services and patient outcomes. Students will also gain practical knowledge of monitoring, evaluating, and continuously improving quality in healthcare organizations.

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**
1-1-2	Utilize the proper pharmaceutical and medical terms, abbreviations and symbols	1.C1.8.1	Apply appropriate quality management terminology, tools, frameworks, and performance indicators in healthcare quality improvement practice.
2-6-1	Apply the principles of business administration and management to ensure rational use of financial and human resources	2.C6.2.1	Apply principles of strategic planning, resource utilization, and risk management in healthcare quality improvement.
		2.C6.3.1	Recognize quality as a fundamental principle of healthcare management and service delivery.
4-1-2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	4.C1.5.1	Develop problem-solving skills to identify quality-related issues and design improvement plans in collaboration with healthcare professionals.

4. Teaching and Learning Methods

- Lectures (data show, board)
- Practical sessions
- Self-learning (Activity)
- Co-operative Learning (Activity)
- Flipped Class (Practical sessions)

5. Course Schedule

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 Healthcare Quality and Patient Safety**	**1**		**-**	**-**	**-**
	Practical **Identifying Quality and Safety Issues in Healthcare Settings**		**2**			
2	**Lecture** **Concepts and Principles of Total Quality Management (TQM)**	**1**		**-**	**-**	**-**
	Practical **Applying TQM Principles in Healthcare Case Studies**		**2**			
3	**Lecture** **Quality Assurance and Quality Improvement in Healthcare**	**1**		**-**	**-**	**-**
	Practical **Comparing Quality Assurance vs Quality Improvement**		**2**			

4	**Lecture** **Healthcare Quality Standards and Accreditation Systems** **- Formative assessment (quiz 1)**	**1**		**-**	**-**	**-**
	Practical **Evaluating Healthcare Institutions Against Accreditation**		**2**			
5	**Lecture** **Quality Improvement Models and Cycles (PDSA, PDCA)**	**1**		**-**	**-**	**-**
	Practical **Designing a PDSA Cycle for Clinical Improvement**		**2**			
6	**Lecture** **Performance Measurement and Quality Indicators**	**1**		**-**	**-**	**-**
	Practical **Measuring Healthcare Performance Indicators**		**2**			
7	Mid-term Exam					
8	**Lecture** **Tools and Techniques for Quality Assessment and Improvement**	**1**		**-**	**-**	**-**
	Practical **Using Quality Improvement Tools**		**2**			
9	**Lecture** **Risk Management and Patient Safety Strategies** **- Formative assessment (quiz 2)**	**1**		**-**	**-**	**-**
	Practical **Risk Identification and Safety Planning**		**2**			

10	**Lecture** **Root Cause Analysis and Problem-Solving Methods**	**1**		**-**	**-**	**-**
	Practical **Root Cause Analysis cases**		**2**			
11	**Lecture** **Leadership, Teamwork, and Interprofessional Collaboration in Quality Improvement**	**1**		**-**	**-**	**-**
	Practical **Team-Based Simulation Exercise**					
12	**Lecture** **Strategic Planning and Continuous Quality Improvement Programs**	**1**		**-**	**-**	**-**
	Practical **Practical exam**					
13	**Lecture** **Implementation and Evaluation of Quality Improvement Projects in Healthcare**	**1**		**-**	**-**	**-**
	Practical **Evaluation of the Activity**		**2**			
14	**Lecture** **General discussion and revision**	**1**	**Evaluation of the Activity**	**-**	**-**	**-**
	Practical **Evaluation of the Activity**		**2**			
15	**Final written exam**					

6. Methods of students' assessment

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

7. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	**The main (essential) reference for the course**	Course handbook and lecture notes prepared by the course instructors (2025–2026)
	Other References	**2- Essential Books:** • Introduction to Health Care Quality Management. • The Healthcare Quality Book: Vision, Strategy, and Tools. • Juran's Quality Handbook. • Relevant WHO and healthcare quality management guidelines and publications. **3- Recommended References:**

		• Publications and reports of World Health Organization on quality of care and patient safety. • Accreditation and quality standards manuals from Joint Commission International. • Selected recent review articles and case studies in healthcare quality improvement. **5- Supportive Facilities:** • Lecture halls equipped with audiovisual facilities. • Computer and internet access for literature search and project work. • Faculty library and electronic database services. • Small-group discussion rooms for quality improvement projects and presentations.
	Electronic Sources	www.pubmed.ncbi.nlm.nih.gov ; www.sciencedirect.com ; www.who.int ; www.ihi.org ; www.jointcommissioninternational.org
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagaig University for students**	**https://shorturl.at/sar8D**
Supportive facilities & equipment for teaching	**Devices/Instruments**	Computer, data show projector, white board, internet access.
	Supplies	- Printed handouts, worksheets, quality improvement case studies.

and learning *	**Electronic Programs**	- Microsoft office
	Skill Labs/ Simulators	- N/A
	Virtual Labs	- N/A
	Other (to be mentioned)	- Student presentations and case discussions

Name and Signature **Course Coordinator**	**Name and Signature** **Head of Department** **Ass. Prof. dr. Esraa Zakaria**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Drug Design

PC E 04

Fifth level –Semester 10

2025-2026

Course Specification

(2025-2026)

1. Basic Information

Course Title (according to the bylaw)	Drug Design			
Course Code (according to the bylaw)	PC E 04			
Department/s participating in delivery of the course	Medicinal chemistry 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 (Elective Course)			
Academic level at which the course is taught	Level 5- semester 10			
Academic Program	Bachelor of Pharmacy (Pharm D- Clinical pharmacy)			
Faculty/Institute	Faculty of pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof.Dr./ Abdallah Ahmed Elshanawany			
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 provide students with basic knowledge of the process of drug discovery and development from the identification of new target macromolecules to the introduction of new chemical entities into the drug market. The following topics will be addressed: lead identification, lead optimization, and drug action at receptors. Drug action on enzymes, prodrug design and applications, as well as structure-based and computer-aided drug design methods. Also, drug metabolism and quantitative structure activity relationship (QSAR).

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.**	Identify the concepts of drug discovery, drug development, drug targets, bioisosterism, Prodrugs, drug metabolism, Drug-receptor interactions, CADD, and QSAR.
1-1-2	Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.	**1.C1.8.1.**	Utilize accurate terms and abbreviations relevant to drug discovery and development processes, including target identification, lead optimization, drug-receptor interactions, prodrugs strategies, metabolism, CADD, and QSAR.
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.**	Use pharmaceutical principles to guide the design, development, and evaluation of drug molecules, focusing on targets, prodrugs, metabolism, structure-activity relationships, and computational approaches.

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	**Text**	**Code**	**Text**
2-2-1	Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/ natural pharmaceutical materials.	**2.C2.11.1.**	Employ computational methods for molecular modeling to interpret protein-ligand interactions in 2D and 3D poses.
4-1-2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.C1.5.1.**	Develop problem solving skills including problem identification and design of management plan.
4-2-2	Use contemporary technologies and media to demonstrate effective presentation skills.	**4.C2.3.1.**	Demonstrate proficiency in using simulation software to discuss insights from molecular docking simulations and protein-drug interactions.

4. Teaching and Learning Methods

Lectures (data show, board)

Practical sessions

Simulation based learning.

Self- learning (Activity)

Blended- learning (Activity)

Flipped Class room

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 discovery, drug development, drug targets, identifying a bioassay, lead identification	**1**	**1**	**-**	**-**	**-**
	Practical session - introduction to drug design	**2**	**-**	**1**	**-**	**-**
2	**Lecture** Lead optimization -	**1**	**1**	**-**	**-**	**-**
	Practical session Introduction to Molecular Operating Environment (MOE) Molecules Building and minimization	**2**	**-**	**1**	**-**	**-**
3	**Lecture** - Lead optimization - Drug-receptor interactions - Forces involved in drug receptor interaction.	**1**	**1**	**-**	**-**	**-**
	Practical session MOE: Steric measurements	**2**	**-**	**1**	**-**	**-**
4	**Lecture** -Nucleic acid as drug target and miscellaneous drug targets. **Formative assessment (quiz1)**	**1**	**1**	**-**	**-**	**-**
	Practical session MOE: Ligand Preparation MOE: Database Creation	**2**	**-**	**1**	**-**	**-**
5	**Lecture** - Quantitative structure-activity relationships	**1**	**1**	**-**	**-**	**-**

	- Electronic effects (□), Hansch equation - The Craig plot, The Topliss scheme					
	Practical session MOE: Protein Preparation	**2**	**-**	**1**	**-**	**-**
6	**Lecture** - Combinatorial synthesis and computer-aided drug design.	**1**	**1**	**-**	**-**	**-**
	Practical session MOE: Protein Preparation	**2**	**-**	**1**	**-**	**-**
7	**Midterm exam**					
8	**Lecture** -Application of drug development strategy in discovering new drugs	**1**	**1**	**-**	**-**	**-**
	Practical session MOE: Docking Process and Results Interpretation	**2**	**-**	**1**	**-**	**-**
9	**Lecture** -Application of drug development strategy in discovering new drugs (i.e.H2-blockers and cox-2 inhibitors -Bioisosterism.	**1**	**1**	**-**	**-**	**-**
	Practical session MOE: Docking Process and Results Interpretation - Orientation on Activity	**2**	**-**	**1**	**-**	**-**
10	**Lecture** -Receptor as drug target. **Formative assessment (quiz 2)**	**1**	**1**	**-**	**-**	**-**
	Practical session Ligand Surface Mapping	**2**	**-**	**1**	**-***	**-**
11	**Lecture** - Prodrugs and drug latentiation Bioprecursor prodrugs, chemical delivery systems.	**1**	**1**	**-**	**-**	**-**

	Practical session Flexible Alignment	**2**	**-**	**1**	**-**	**-**
12	**Lecture** - Drug metabolism **Formative assessment (quiz 3)**	**1**	**1**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-**	**-**
13	**Lecture** -Enzyme as drug target	**1**	**1**	**-**	**-**	**-**
	Practical exam	**2**	**-**	**1**	**-***	**-**
14	**Lecture** -Revision and open discussion	**1**	**1**	**-**	**-**	**-**
	Practical session Discussion and Assessment of activity	**2**	**-**	**1**	**-***	**-**
15	**Final written exam**					

* As part of a self-learning activity in Elective Drug Design course, a part of practical session in week 9 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 7	10	10%
2	Exam 2 ..... (Semester work)	-	-	-
3	Final Written Exam	Week 15	50	50%
4	Final **Practical**/Clinical/… Exam	Weeks 12 and 13	25	25%
5	Final Oral Exam	Week 15	10	10%
6	Project (**Self-learning Activity**)	Weeks 9,14	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 "Drug Design" approved by the Medicinal chemistry department 2025-2026.
	Other References	33. The Organic Chemistry of Drug Design and Drug Action 3rd edition; Richard B. Silverman and Mark W. Holladay (2014). 34. Wilson & Griswold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th edition; Charles Owens Wilson; Ole Griswold; John Marlowe Beale, and John H. Block (2011). 35. Foye's Principles of Medicinal Chemistry 8th edition; Victoria F Roche; S William Zito; Thomas L. Lemke; David A. Williams; William O. Foye, and Wolters Kluwer Health (2019). 36. B.p. & U.S Pharmacopeia (1988-2023) **37.** An Introduction to Medicinal Chemistry 7th edition; Patrick, Graham L, Oxford (2023**)**
	Electronic Sources (Links must be added)	http://www.rcsb.org http://www.ncbi.nlm.nih.gov/sites/entrez http://www.ekb.eg http://journals.tubitak.gov.tr/chem/index.php http://www.pharmacopoeia.co.uk/ www.Pubmed.Com www.sciencedirect.com
	Learning Platforms (Links must be added) **Electronic platform of Faculty of Pharmacy- Zagaig**	ı.eg/Views/StudentViews/StudentLogin?fbclid=IwY2xjawL6FF1leHRuA2Flb TkJETktxTE52Rm9nAR6zscxpvbG66rStVoyb6l8uGS6Z03ZZEIUMZ6- U8NQ_aem_gV2eGYHV6OFitgTMHUgIlA

	University for students	
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board.
	Supplies	-
	Electronic Programs	15. Microsoft office 16. Microsoft teams 17. MOE
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature
Course Coordinator
Prof.Dr./ Abdallah Ahmed Elshanawany

Name and Signature
Head of Department

Prof.Dr./ Hend Kothayer

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Infection Control

PM E 07

Fourth level –Semester 8

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 07**			
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 - Clinical Pharmacy			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig university			
Name of Course Coordinator	Prof. Dr. Hisham Abbas			
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	Handle, identify, and dispose biologicals, synthetic/ natural materials, biotechonolgy - based and radio/labelled products, and other materials/products used in pharmaceutical fields.	**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
3-1-2	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.C2.7.1**	Advise patients, the public, and healthcare professionals on the safe, effective, and rational use of antimicrobials, emphasizing correct usage, contraindications, storage, and management of side effects to mitigate antimicrobial resistance.

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.C2.7.2	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

Lectures
Practical sessions
Internet search and self-learning
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) • Activity (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 • Activity (case study)	**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. • Activity (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**	**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	**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	38. Australian Dental Association. ADA Guidelines for Infection Prevention and Control, 5th Edition, 2024. https://www.ada.org.au/ 39. 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 40. **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**	**http://phstudent.eps.zu.edu.eg/Views/StudentViews/StudentLogin**

	University for students	
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer, board, and Light microscopes
	Supplies	PPE
	Electronic Programs	18. Microsoft office 19. Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

Name and Signature **Course Coordinator** **Prof. Dr. Hisham Abbas**	**Name and Signature** **Head of Department** **Ass. Prof. Momen Askoura**

COURSE SPECIFICATIONS

Bachelor of Pharmacy

(Pharm D - Clinical Pharmacy)

Clinical nutrition

PB E 05

Fifth level –Semester 9

2025-2026

Course Specification

(2025- 2026)

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
	1 hr/week	1 hr/week	-	2 hrs/week
Course Type	Faculty requirement (Elective)			
Academic level at which the course is taught	Level 5 / semester 9			
Academic Program	Bachelor of Pharmacy (Pharm D-Clinical Pharmacy)			
Faculty/Institute	Faculty of Pharmacy			
University/Academy	Zagazig University			
Name of Course Coordinator	Prof. Dr/ Mohamed Elsweidy			
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**
3.1.1	Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.	**3.C1.2.1**	Evaluate different medical conditions and select appropriate nutritional approaches for the management of them.
4.1.2	Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.	**4.C1.4.1**	Review the information of the patients and provide recommendations for their management.
		4.C1.5.1	Collaborate with other health care professional teams in treatment of patients.
4.1.3	Demonstrate creativity and apply entrepreneurial skills within a simulated entrepreneurial activity.	**4.C1.7.1**	Demonstrate communication 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	**1**	**1**	**-**	**-**	**-**
	Practical session - Obesity - Case studies for obesity	**2**	**-**	**1**		**-**
3	**Lecture** - Diet and therapy - Nutritional assessment and food pyramids	**1**	**1**	**-**	**-**	**-**
	Practical session - Determination of body mass index - Suggestion of life style modification **-Formative assessment quiz 1**	**2**	**-**	**1**	**-**	**-**
4	**Lecture** - Obesity (Definition, assessment, factors affecting obesity)	**1**	**1**	**-**	**-**	**-**

	Practical session - Metabolic syndrome - Case study	**2**	**-**	**1**	**-**	**-**
5	**Lecture** - Management of obesity - Drugs of choice for treatment of obesity **-Formative assessment quiz 2**	**1**	**1**	**-**	**-**	**-**
	Practical session - Diabetes case studies	**2**	**-**	**1**	**-**	**-**
6	**Lecture** - Diabetes mellitus (DM)	**1**	**1**	**-**	**-**	**-**
	Practical session -Case study for diabetes	**2**	**-**	**1**	**-**	**-**
7	**Midterm**					
8	**Lecture** -Nutrition therapy and recommendation for DM - Drug of choice for treatment of DM	**1**	**1**	**-**	**-**	**-**
	Practical session **- Activity (report)**	**2**	**-**	**1**	**-**	**-**
9	**Lecture** - Definition and types of cardiovascular diseases (CVD) - Risk factors for CVD	**1**	**1**	**-**	**-**	**-**
	Practical session -Hypertension and case study	**2**	**-**	**1**	**-**	**-**
10	**Lecture** - Drug of choice for treatment of CVD	**1**	**1**	**-**	**-**	**-**

	- Management of CVD					
	Practical session - Myocardial infarction and case study	**2**	**-**	**1**	**-**	**-**
11	**Lecture** - Diet for hypertensive patients - Drugs of choice for treatment of hypertension	**1**	**1**	**-**	**-**	**-**
	Practical session Food allergy	**2**	**-**	**1**	**-**	**-**
12	**Lecture** Nutrition in cancer	**1**	**1**	**-**	**-**	**-**
	Practical session Cancer	**2**	**-**	**1**	**-**	**-**
13	**Lecture** Life cycle nutrition	**1**	**1**	**-**	**-**	**-**
	Practical Exam	**1**	**-**	**1**	**-**	**-**
14	Revision & Open discussion	**1**	**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 (Midterm exam)	**7**	**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)	**8**	**5**	**5%**
7	Assignments (Formative assessment)	**3,5**	**-**	**-**
8	Others	**-**	**-**	**-**

* The methods mentioned are examples, the organization may add and/or delete

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 **3- Recommended books:** • Integrative Nutrition: A Whole-Life Approach to Health and Happines, Joshua Rosenthal, 2018 • Nutrition in the prevention and treatment of abdominal obesity, Ronald Watson, 2018 • Nutrition in Lifestyle Medicine, James M. Rippe, 2017
	Electronic Sources (Links must be added)	www.ekb.eg WWW.pubmed.com

	Learning Platforms (Links must be added)	https://adminph.eps.zu.edu.eg/Views/AdminViews/Login?AspxAutoDetectCookieSupport=1
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	**Devices/Instruments**	Computer and white board
	Supplies	-
	Electronic Programs	1-Microsoft office 2-Microsoft teams
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

* The list mentioned is an example, the institution may add and/or delete depending on the nature of the course

Name and Signature **Course Coordinator** **Prof. Dr/ Mohamed Elsweidy**	**Name and Signature** **Head of department** **Ass.Prof.Rana Gamal Eissa**