

Course Description Form

1. Course Name:	
Physiology II	
2. Course Code:	
PH2204	
3. Semester / Year:	
2 nd semester/ 2 nd year	
4. Description Preparation Date:	
2026–2025	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/week (theoretical), 2 hours/week (practical), total units = 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Karema mohamed Abuelfotouh soliman Email: Karema.mohammed@alayen.edu.eg	
8. Course Objectives	
Course Objectives	This Physiology course focuses on key systems of the human body, including the endocrine system, reproductive system, gastrointestinal system, and blood physiology. By the end of the course, students will be able to: 1– Understand System–Specific Functions a– Describe the hormonal regulation and functions of the endocrine system, including its role in growth, metabolism, and homeostasis. b– Explain the physiological processes of the reproductive system, including gametogenesis, hormonal control, and reproductive cycles. c– Analyze the functions of the gastrointestinal system, focusing on digestion, absorption, and motility. d– Understand the components, functions, and regulation of blood, including hematopoiesis, hemostasis, and immune responses. 2– Integrate Knowledge Across Systems

	a– Demonstrate an understanding of how these systems interact to maintain overall homeostasis and respond to internal and external changes. 3– Apply Physiological Principles a– Relate physiological mechanisms to clinical conditions and pathophysiological scenarios involving these systems. b– Analyze case studies and laboratory data to assess normal and abnormal functions. 4– Develop Critical Thinking Skills a– Solve problems related to system dysfunctions, such as endocrine disorders, blood abnormalities, or gastrointestinal diseases. b– Propose evidence–based solutions to maintain or restore normal physiological functions. 5– Foster Lifelong Learning a– Encourage further exploration of advances in physiology and their applications in healthcare and biomedical research. b– Appreciate the critical role of these systems in sustaining human health and responding to disease.
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9. Teaching and Learning Strategies

Strategy	1. Interactive Lectures • Present complex physiological systems (e.g., cardiovascular, renal, endocrine) using diagrams, animations, and flowcharts. • Engage students through Q&A sessions, mini–quizzes, and problem–solving during lectures. 2. Case–Based Learning (CBL) • Integrate clinical cases such as heart failure, renal failure, or endocrine disorders to apply theoretical knowledge. • Encourage analytical thinking and link physiology with pharmacy practice. 3. Laboratory Practicals and Experiments • Demonstrate experiments on blood pressure regulation, hormone assays, nerve conduction, and respiratory physiology.
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- Teach students data collection, interpretation, and reporting skills.

4. Demonstrations and Visual Aids

- Use anatomical models, videos, and simulations to visualize organ systems and dynamic physiological processes.
- Enhance understanding of complex physiological mechanisms like cardiac cycle or renal filtration.

5. Small Group Discussions and Tutorials

- Organize group discussions on physiological pathways and disease mechanisms.
- Promote collaboration, critical thinking, and peer learning.

6. Concept Mapping and Flow Diagrams

- Encourage students to create diagrams linking organ systems, hormones, and feedback mechanisms.
- Improve comprehension and memory retention of integrated physiological processes.

7. Quizzes, Polls, and Formative Assessments

- Conduct in-class quizzes, clicker questions, or online polls for immediate feedback.
- Help students identify gaps in understanding and reinforce learning.

8. Simulation and Virtual Labs

- Use computer simulations for cardiovascular dynamics, endocrine feedback, renal function, and respiratory physiology.
- Allow students to safely explore physiological responses under different conditions.

9. Self-Directed Learning and E-Learning Modules

- Assign pre-readings, online videos, or interactive modules before class.
- Encourage independent learning and preparation for advanced topics.

10. Peer Teaching and Presentations

- Assign topics for students to teach their peers or present mini-seminars.
- Reinforce knowledge, improve communication, and develop teaching skills.

11. Flipped Classroom Approach

- Provide lecture material online and dedicate class time for problem-solving, case analysis, and discussions.
- Promote active learning and application of theoretical concepts.

12. Clinical Integration Sessions

- Connect physiological knowledge with pharmacology and patient care scenarios.
- Enhance understanding of pathophysiology and therapeutic interventions.

10. Course Structure (Theory)

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	students will be able to: Define hormones and endocrine signaling Classify hormones based on chemical nature	Basic Concepts of Endocrine Regulation	smartboard/ Presentation slides/ discussion	oral questions and written exams
2	3	Explain the role of the hypothalamus in endocrine regulation Identify hypothalamic releasing and inhibiting hormones	Hypothalamic Regulation of Hormonal Function	smartboard/ Presentation slides/ discussion	oral questions and written exams

3	3	Distinguish between anterior and posterior pituitary Identify pituitary hormones and their target organs	The Pituitary Gland	smartboard/ Presentation slides/ discussion	oral questions and written exams
4	3	Differentiate between hypo- and hyperthyroidism Explain the role of thyroid hormones in growth and metabolism	Thyroid Gland	smartboard/ Presentation slides/ discussion	oral questions and written exams
5	3	Describe the adrenal response to stress Recognize disorders related to adrenal dysfunction	The Adrenal Medulla & Adrenal Cortex	smartboard/ Presentation slides/ discussion	oral questions and written exams
6	3	Describe functions of osteoblasts and osteoclasts Recognize disorders related to bone metabolism	Hormonal Control of Calcium & Phosphate Metabolism & the Physiology of Bone	smartboard/ Presentation slides/ discussion	oral questions and written exams
7	3	Explain hormonal regulation of ovulation Describe physiological	Reproductive Development & Function of the Female	smartboard/ Presentation slides/ discussion	oral questions and written exams

		changes during pregnancy (overview)	Reproductive System		
8	3	Explain the role of testosterone Describe development of male secondary sexual characteristics	Function of the male Reproductive System	smartboard/ Presentation slides/ discussion	oral questions and written exams
9	3	Differentiate between fed and fasting states Explain basic pathophysiology of diabetes mellitus	Endocrine Functions of the Pancreas & Regulation of Carbohydrate Metabolism	smartboard/ Presentation slides/ discussion	oral questions and written exams
10	3	Explain neural and hormonal regulation of digestion Describe coordination of GI activities Relate GI function to nutrient absorption	Overview of Gastrointestinal Function & Regulation	smartboard/ Presentation slides/ discussion	oral questions and written exams
11	3	Explain principles of balanced nutrition Relate digestion to energy metabolism	Digestion, Absorption & Nutritional Principles	smartboard/ Presentation Slides /discussion	oral questions and written exams
12	3	Describe neural control of GI motility	Gastrointestinal Motility	smartboard/ Presentation slides/	oral questions

		Explain swallowing and defecation reflexes Identify disorders related to abnormal motility		discussion	and written exams
13	3	Explain storage functions of the liver Relate liver function to systemic metabolism	Transport & Metabolic Functions of the Liver	smartboard/ Presentation Slides /discussion	oral questions and written exams
14	3	Describe components of blood Explain functions of plasma and blood cells Describe hemostasis and clotting mechanisms	Blood as a Circulatory Fluid	smartboard/ Presentation slides/ discussion	oral questions and written exams
15	3	Explain principles of blood flow and pressure Describe regulation of circulation	The Dynamics of Blood & Lymph Flow	smartboard/ Presentation slides/ discussion	oral questions and written exams

11. Course Evaluation

Midterm Exam 15 marks

Quizzes and activities 5 marks

Practical 20 marks

Final Exam 60 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Guyton and Hall Textbook of Medical Physiology
Main references (sources)	Ganong's Review of Medical Physiology
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	



Course Description Form

1. Course Name:						
Biochemistry II						
2. Course Code:						
PH3204						
3. Semester / Year:						
Second /Third						
4. Description Preparation Date:						
2025-2026						
5. Available Attendance Forms:						
In-person attendance						
6. Number of Credit Hours (Total) / Number of Units (Total)						
4 units						
7. Course administrator's name (mention all, if more than one name)						
Dr. Rand Salah						
8. Course Objectives						
Course Objectives				- Learning of the fundamentals of cellular lipids, and amino acids and their associati diseases. - Providing students with the necessary techn biochemistry.		
9. Teaching and Learning Strategies						
Strategy				- Presentation and recitation - Interactive discussions		
				- Brainstorming - Research and induction		
10. Course Structure						
Week	Hours	Required Learning Outcomes	Unit	Learning method	Evaluation method	

1	1	The application of the laws of thermo- dynamics in biological systems, the relationship between endothermic and exothermic reactions, the function of adenosine triphosphate as the “energy currency” for cells.	Bioenergetics: The Role of ATP	Lectures, Discussions, and Reports	Exam and classroom activities
1	2	Explain what is meant by anabolic, catabolic and combined metabolic pathways; A description of the metabolic process at the tissue, organ, and subcellular levels; Methods of regulating of the flow of metabolites through metabolic pathways; How to provide metabolic fuel supply in both the fed and the fasting states.	Overview of metabolism and the provision of metabolic fuels		
2	3	Description of the pathway of glycolysis, its regulation, and the possibility of its occurrence under anaerobic conditions.	Glycolysis and the oxidation of pyruvate		

		The differences between the roles of glucokinase and hexokinase in glycolysis; Description of the pyruvate dehydrogenase reaction and its regulation.			
3	3	Description of the citric acid cycle reactions, its regulation, and emphasizing the reactions that lead to the production of reducing equivalents; Explain the importance of vitamins in citric acid cycle; Explain how the cycle provides a pathway for amino acid catabolism and a pathway for their synthesis.	The citric acid cycle		
4	3	Description of the four protein complexes involved in the transfer of electrons through the respiratory chain; How electron transfer through the respiratory chain generates ATP through the process of oxidative phosphorylation; List	The respiratory chain and oxidative phosphorylation		

		examples of the common toxins that interfere with electron transport or oxidative phosphorylation and identify their sites of action.			
5	3	Description of the structure of glycogen and its importance as a carbohydrate store; The synthesis and catabolism of glycogen and how the two processes are regulated; Description of the different types of glycogen storage diseases.	Metabolism of glycogen		
6	3	The importance of gluconeogenesis in glucose homeostasis; the pathway of gluconeogenesis, and how glycolysis and gluconeogenesis are mutually regulated; how plasma glucose concentration is maintained within certain limits in the fed and the fasting states.	Gluconeogenesis and the control of blood glucose		
8	3	The pentose phosphate pathway and its importance;	The Pentose Phosphate Pathway and other		

		the uronic acid pathway and its importance; the consequences of consuming large amounts of fructose; the structure and physiological importance of galactose; the consequences of genetic defects of glucose-6-phosphate dehydrogenase deficiency, the uronic acid pathway, and fructose and galactose metabolism.	pathways of hexose metabolism		
9	1	Indicate the intermediate compounds of the citric acid cycle and glycolysis that are precursors of certain amino acids; the key role of transaminases in amino acid metabolism; Explain the process by which 4-hydroxyproline, 5-hydroxylysine and selenocysteine are formed in some proteins;	Biosynthesis of the nutritionally nonessential amino acids		

		the synthesis of some amino acids through the assimilation of free ammonia; the synthesis of some amino acids using other amino acids.			
9	2	Description of protein metabolism, its functions, its speed determinants, and cellular protein catabolism pathways; the central roles of transaminases, glutamate dehydrogenase, and glutaminase in nitrogen metabolism; description of the cycle of urea synthesis, its regulation, and its metabolic defects.	Catabolism of proteins and of amino acid nitrogen		
10	1	Illustration of the catabolic pathways of amino acids' carbon skeletons and their major metabolic fates; the clinically important metabolic disorders in this regard.	Catabolism of the carbon skeletons of amino acids		
10	1	The involvement of amino acids as precursors in the	Conversion of amino acids to		

		biosynthesis variety of biological molecule other than proteins.	specialized products		
10	1	The structure and nomenclature of porphyrins; the pathway of heme synthesis and its catabolism; the causes and general clinical features of different porphyrias.	Porphyrins and bile pigments		
11	3	Fatty acids transportation in the blood; activation of fatty acids and their transportation into mitochondria for oxidation; the beta oxidation pathway; ketone bodies formation and the pathological conditions that accompany their excessive formation.	Oxidation of fatty acids		
12	3	Description of the acetyl-CoA acetylase reaction and the mechanisms of regulating its activity to control the rate of fatty acid synthesis;	Biosynthesis of fatty acids and eicosanoids		

		the synthesis of long-chain fatty acids and required cofactors; the synthesis of polyunsaturated fatty acids.			
13	3	The catabolism of triacylglycerols and the fate of the resulting metabolites; the synthesis of triacylglycerols, inositol phosphoglycerols, cardiolipin, triacylglycerols, plasmogens, and platelet-activating factor; the role of different phospholipases in the degradation and remodeling of phospholipids; the synthesis of sphingolipids.	Metabolism of acylglycerols and sphingolipids		
14	3	Description of the four main plasma lipoproteins and their structure; the transport of lipoproteins to and from the liver and the role of the liver in their metabolism; the metabolism of lipoproteins in the blood and the	Lipid transport and storage		

		delivery of cholesterol from the liver to extrahepatic tissues; the mechanisms by which cholesterol is delivered from extrahepatic tissues and returned to the liver by the reverse cholesterol transport; the processes by which fatty acids are released from triacylglycerol stored in adipose tissue and the role of brown adipose tissue in generating body heat.			
15	3	The importance of cholesterol as a basic structural component in the body, and its pathological role; the pathway of cholesterol biosynthesis and its regulation; the role of plasma lipoproteins in transporting cholesterol among tissues.	Cholesterol synthesis, transport, and excretion		

11.Course Evaluation

Mid-term examination (15 marks)

Quiz and homework (5 marks)

Practical work (20 marks)

Final examination (60 marks)

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)

Harper's Illustrated Biochemistry, 32 ed.

Main references (sources)

Lippincott Illustrated Reviews:
Biochemis
Lehninger Principles of Biochemistry,
8th e

Recommended books and references (scientific journals, reports...)

Electronic References, Websites

Course Description Form

1. Course Name:					
Computer Sciences II					
2. Course Code:					
PH2106					
3. Semester / Year:					
First semester / Second level					
4. Description Preparation Date:					
2025-2026					
5. Available Attendance Forms:					
-Full-time and official attendance hours					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3/2					
7. Course administrator's name (mention all, if more than one name)					
Name: Redhaa Fadhil Sabri Namaa Email: Redhaa.Fadhil@alayen.edu.iq					
8. Course Objectives					
Course Objectives			1- Utilize the computer for fundamental tasks. 2- Identify and discuss the hardware components of the computer system. 3- Creating documents using a word processor and creating presentations. 4- Conducting research on the internet. 5- An introduction to Artificial Intelligence.		
9. Teaching and Learning Strategies					
Strategy		1-lectures included multimedia lectures 2- PowerPoint presentation 3- practical work 4- open discussion 5- class activity			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	What is a network? Types of networks and basic components of a network.	Security and Computer Networking	1-lectures included multimedia lectures	1-written exam 2- Quiz 3-midterm exam
2	3	Concept of E-Commerce, online banking, ATM, and Mobile banking.	E- Commerce		

3	3	What is AI? History of AI, AI techniques.	Introduction to AI	2- PowerPoint presentation 3- open discussion 5- class activity 6-Self learning	4- final exam
4-5	6	AI- Mobile-driven technology, virtual assistant, adaptive learning and real-time translation.	The Role of AI in Modern Smartphones		
6-9	9	Applications in various industries, healthcare and education, and Marketing, robotics and automation.	Applications and tools of AI		
10	3	How AI affects social, AI and international relationships, and AI and the future of humanity	AI and Society		
11	3	AI ethics, Privacy, and the impact of AI on the job market	Ethical challenges in AI		
12	3	The future of AI, research.	The Future of AI		

11. Course Evaluation

Written exam 70 marks
Midterm 20 marks
Coursework 10 marks
Total =100 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020).
Main references (sources)	Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology in Action Complete ", 16th Edition (2020).
Recommended books and references (scientific journals, reports...)	Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024).
Electronic References, Websites	Microsoft Office 2019 step by step 1st Edition by Curtis Frye & Joan Lambert.

Course Description Form

1.Course Name:	
Medical microbiology I	
2.Course Code:	
PH2102	
3.Semester / Year:	
First semester /second year	
4.Description Preparation Date:	
2025-2026	
5.Available Attendance Forms:	
Full-time and official attendance hours	
6.Number of Credit Hours (Total) / Number of Units (Total)	
3x15= 45 hrs (theoretical) 2x15=30 hrs (practical) /number of units = 4	
7.Course administrator's name (mention all, if more than one name)	
Name: Fatma Mostafa Kamel Email: Fatima.Mustafa@alayen.edu.iq	
8.Course Objectives	
Course Objectives	The Medical Microbiology 1 course introduces pharmacy students to the fundamental concepts of microbiology, emphasizing the role of microorganisms in health and disease. It covers bacterial anatomy, physiology, genetics, sterilization, antibiotics, and microbial interactions with the human body. The course also develops essential laboratory skills, fostering a comprehensive understanding of medical microbiology and its clinical applications.
9.Teaching and Learning Strategies	
Strategy	• PowerPoint and Multimedia presentation

- Class discussion.
- Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams

11.Course Structure

Course Structure (Theory)

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student will be able to explain the importance of microbiology in medicine and pharmacy and describe the historical milestones in the development of microbiology.	Introduction: Importance of microbiology, History of microbiology	smartboard/ Presentation slides/ discussion	oral questions and written exams
2	2	The student will be able to describe the structural components of bacterial cells and relate structure to function.	Anatomy of bacteria	smartboard/ Presentation slides/ discussion	oral questions and written exams
3	3	The student will learn the physical and chemical factors affecting bacterial growth, growth curves, and methods of bacterial reproduction.	Bacterial physiology: Physical and chemical growth determinate, growth and growth curves, bacterial reproduction	smartboard/ Presentation slides/ discussion	oral questions and written exams
4	2	The student will be able to explain genetic elements, mutations, and mechanisms of	Genetics: Definition of genetic, element, mutation	smartboard/ Presentation slides/	oral questions and written

		gene transfer including transformation, conjugation, and transduction.	(spontaneous, Ger transfer, transformation, conjugation, and gene transduction)	discussion	exams
5	1	The student will understand the principles and applications of recombinant DNA technology in medicine and pharmacy.	Recombinant DNA biotechnology	smartboard/ Presentation slides/ discussion	oral questions and written exams
6	1	The student will be able to describe the processes of bacterial sporulation and germination and their clinical significance.	Sporulation and germination	smartboard/ Presentation slides/ discussion	oral questions and written exams
7	2	The student will learn different sterilization methods and select appropriate techniques for microbial control.	Sterilization (chemical + physical Methods)	smartboard/ Presentation slides/ discussion	oral questions and written exams
8	3	The student will be able to explain antimicrobial chemotherapy and interpret antibiotic sensitivity tests.	Chemotherapy and sensitivity test	smartboard/ Presentation slides/ discussion	oral questions and written exams
9	3	The student will be able to identify Staphylococcus species and explain their pathogenicity and clinical importance.	Staphylococci species	smartboard/ Presentation slides/ discussion	oral questions and written exams
10	3	The student will learn the classification, virulence factors, and diseases caused by Streptococcus	Streptococcus species	smartboard/ Presentation slides/ discussion	oral questions and written exams

		species.			
11	2	The student will be able to describe Bacillus species and differentiate between pathogenic and non-pathogenic strains.	Aerobic Spore-forming bacteria Bacillus species (B. anthracis, B. subtilis, B. cereus)	smartboard/ Presentation Slides /discussion	oral questions and written exams
12	3	The student will learn the characteristics, toxins, and diseases caused by Clostridium species.	Clostridium perfringens; Clostridium tetani; Clostridium botulinum	smartboard/ Presentation slides/ discussion	oral questions and written exams
13	2	The student will be able to explain the pathogenic mechanisms and prevention of diphtheria.	Corynebacterium diphtheriae	smartboard/ Presentation Slides /discussion	oral questions and written exams
14	2	The student will learn the role of these bacteria in human disease and their clinical relevance.	Propionibacterium acnes, Listeria	smartboard/ Presentation slides/ discussion	oral questions and written exams
15	2	The student will be able to describe the pathogenesis, diagnosis, and control of tuberculosis and leprosy.	Mycobacterium tuberculosis; M. leprae	smartboard/ Presentation slides/ discussion	oral questions and written exams
16	6	The student will learn the classification and medical importance of Enterobacteriaceae.	Enterobacteriaceae		
17	6	The student will be able to identify major Gram-negative pathogens and explain their diseases and transmission.	Vibrio, Pseudomonas, Helicobacter pylori, Neisseria spp., Brucella, Proteus		

12.Course Evaluation	
Midterm Exam 15 marks Quizzes and activities 5 marks Practical 20 marks Final Exam 60 marks	
13.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1. "Microbiology: An Introduction" by Gerard J. Tortora, Berdell R. Funke, and Christine L. Case: 2. "Medical Microbiology" by Patrick R. Murray, Ken S. Rosenthal, and Michael A. Pfaller: 3. "Brock Biology of Microorganisms" by Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, and David A. Stahl: 4. "Prescott's Microbiology" by Joanne Willey, Linda Sherwood, and Christopher J. Woolverton: 5. "Clinical Microbiology Made Ridiculously Simple" by Mark Gladwin, William Trattler, and C. Scott Mahan:
Main references (sources)	1. "Medical Microbiology" by Patrick R. Murray, Ken S. Rosenthal, and Michael A. Pfaller: 2. "Brock Biology of Microorganisms" by Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, and David A. Stahl: 3. "Clinical Microbiology Made Ridiculously Simple" by Mark Gladwin and Bill Trattler: 4. "Microbiology: An Introduction" by Gerard

	J. Tortora, Berdell R. Funke, and Christine L. Case: 5. "Principles of Virology" by S. Jane Flint, Vincent R. Racaniello, Glenn F. Rall, and Anna Marie Skalka: 6. Electronic databases and scientific journals: such as PubMed and ScienceDirect,
Recommended books and references (scientific journals, reports...)	C/N H. Roldos de la Sovera, Montevideo 1. Journal of Clinical Microbiology: publishes research on microbiological diagnosis, epidemiology, and treatment. 2. Clinical Microbiology Reviews: Provides comprehensive reviews on various topics in clinical microbiology. 3. Microbes and Infection: Focuses on the relationship between microorganisms and human and animal diseases. 4. Infection and Immunity: Covers research on interactions between pathogens and host defense systems. Reference Books: 1. "Principles of Virology" by S. Jane Flint, Vincent R. Racaniello, Glenn F. Rall, Anna Marie Skalka: An in-depth reference on viruses and their mechanisms of action. 2. "Mims' Medical Microbiology and Immunology" by Richard Goering, Hazel Dockrell, Mark Zuckerman, Peter L. Chiodini: 1. Centers for Disease Control and Prevention (CDC) – Microbiology: Provides information and updates on microbiological topics and infectious diseases. 2. World Health Organization (WHO) –

	Infectious Diseases: Provides reports and guidance on the prevention and control of infectious diseases. 3. PubMed: A database of medical publications and research. 4. ScienceDirect: A source for accessing scientific research and articles in various fields of science including microbiology.
Electronic References, Websites	© 2018 UpToDate. Lexicomp

Course Description Form

1.Course Name:	
Medical microbiology II	
2.Course Code:	
PH2202	
3.Semester / Year:	
second semester /second year	
4.Description Preparation Date:	
2025-2026	
5.Available Attendance Forms:	
Full-time and official attendance hours	
6.Number of Credit Hours (Total) / Number of Units (Total)	
3x15= 45 hrs (theoretical) 2x15=30 hrs (practical) /number of units = 4	
7.Course administrator's name (mention all, if more than one name)	
Name: Fatma Mostafa Kamel Email: Fatima.Mustafa@alayen.edu.iq	
8.Course Objectives	
Course Objectives	Studying the methods of parasites, especially those that cause epidemic diseases, and limiting their spread. In addition, studying the internal structure of pathogens and their characteristics, classifying them according to their component genome, as well as studying the factors affecting them, whether physical or chemical, and the extensive study of parasitic diseases, and using the best effective drugs according to the location of the effect of the pathogen's life cycle, how to control and prevent the spread of diseases, and following the best ways to control the sources of pollution resulting from the presence of these pathogens in the resources

used by humans as sources of food and drink.

9. Teaching and Learning Strategies

Strategy	• PowerPoint and Multimedia presentation • Class discussion. • Visual aids: Utilize visual aids such as pictures, charts, graphs, diagrams
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11. Course Structure

Course Structure (Theory)

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	The student will know general information about paracytology	Introduction	smartboard/ Presentation slides/ discussion	oral questions and written exams
2	4	The student will learn the morphology, life cycle, and diseases caused by intestinal protozoa.	Intestinal and tissue protozoa (Amoeba (pathogenic and non pathogenic), Balantidium, Giardia, Trichomonas Chilomastix)	smartboard/ Presentation slides/ discussion	oral questions and written exams
3	4	The student will be able to describe blood protozoa and the diseases they cause.	Haemoflagellates: Leishmania spp.; Trypanosome spp	smartboard/ Presentation slides/ discussion	oral questions and written exams

4	3	The student will learn the life cycle and clinical features of malarial parasites and Toxoplasma.	Sporozoa: Malarial parasites of human; Toxoplasma	smartboard/ Presentation slides/ discussion	oral questions and written exams
5	8	The student will be able to classify helminths and explain their life cycles and diseases.	Helminthes: Classification, Cestodes (Hymenolepis nana, Taenia spp.), Echinococcus (Hydatid cyst). Hepatic flukes, Trematodes (Blood Flukes: Schistosoma spp). Nematods: Ascaris, Entrobilus. Trichuris, Ancylostoma, Necator americans	smartboard/ Presentation slides/ discussion	oral questions and written exams
6	5	The student will understand viral structure, replication, and differences between viruses and bacteria.	Virology: Introduction, Comparison between viruses and Bacteria and other microbes; origin of viruses, reproduction, one step growth curve, type of mutations	smartboard/ Presentation slides/ discussion	oral questions and written exams
7	5	The student will be able to classify viruses and	Classification of viruses; RNA	smartboard/ Presentation	oral questions

		recognize important RNA and DNA viruses.	viruses: Orthomyxo viruses; Paramyxo viruses; Retro viruses; Hepato viruses; Oncogenic viruses. DNA viruses: Herpes viridae; poxviradeae, adenoviredeae, parvoviruses	slides/ discussion	and written exams
8	10	The student will learn innate and adaptive immunity, hypersensitivity, and tumor immunity.	Immunology: introduction, innate and adaptive immunity, complement, MHC molecule and autoimmune diseases, hypersensitivity, tumor immunity	smartboard/ Presentation slides/ discussion	oral questions and written exams
9	5	The student will be able to explain immunodeficiency disorders and laboratory immunological techniques.	Immunodeficiency, and immunological methods	smartboard/ Presentation slides/ discussion	oral questions and written exams

12.Course Evaluation

Midterm Exam 15 marks

Quizzes and activities 5 marks

Practical 20 marks

Final Exam 60 marks

13.Learning and Teaching Resources

Required textbooks (curricular books,

if any)	
Main references (sources)	1– Medical Microbiology, twentyeighth edition E.Jawetz, J.L. Melnick, E.A. Adel 2019 2– Medical Virology Thirteen edition By Phillip Rose 2012 3– HumanParasitology, 4th edition, Burton J. BOGITSH, Clint E. Carter, Thomas N. Oeltmann. 2013
Recommended books and references (scientific journals, reports...)	1. Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy handbook 11th Edittion. 2–Chisholm–Burns, Marie A., Patrick M. Malone, Terry L. Schwinghammer, Jill M. Kolesar, Barbara G. Wells, and Joseph T. DiPiro. Pharmacotherapy principles & practice. 6th edition. 3. Pharmacotherapy casebook: a patient focused approach, McGraw Hill. 4–Roger Walker, Clive Edwards (eds), Clinical Pharmacy Therapeutics 6th &edition.
Electronic References, Websites	Journal of Clinical pharmacy and therapeutics International journal of clinical pharmacy

Course Description Form

1. Course Name:	
organic Chemistry II	
2. Course Code:	
PH2101	
3. Semester / Year:	
First semester / Second level	
4. Description Preparation Date:	
2025-2026	
5. Available Attendance Forms:	
Full-time and official attendance hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3x15= 45 hrs (theoretical) 2x15=30 hrs (practical) /number of units = 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Ranza Ahmed Abdo Hassan Email: Ranza.ahmed@alayen.edu.iq	
8. Course Objectives	
Course Objectives	• Understand the structure and stability of benzene and other aromatic compounds • Studying the basics of organic chemistry for some chemical groups that are considered the foundations of the study of pharmacy and to introduce students to the foundations of organic chemistry by focusing on predict and explain patterns in shape, structure, nomenclature system, bonding, hybridization, formal charge, stability, acidity, basicity, solubility, and reactivity for :benzene and its derivatives, aldehydes, ketones, carboxylic acids and their derivatives, amines and their derivatives , phenols
9. Teaching and Learning Strategies	
Strategy	1-lectures included multimedia lectures 2- power point presentation 3- practical work 4- open discussion

		5– class activity 6–Self learning			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	–Understand the structure and stability of benzene and other aromatic compounds. –Explain the mechanism of electrophilic aromatic substitution reactions. –Identify and describe the properties and reactions of arenes and their derivatives.	Introduction Aromatic Hydrocarbons (includes benzene, electrophilic aromatic substitution, arenes and their derivatives).	1–lectures included multimedia lectures 2– power point presentation 3– open discussion 5– class activity 6–Self learning	1–written exam
2.	9				2– Quiz
3.					3–midterm exam
4					4– final exam
5.	6	–Describe the physical and chemical properties of carboxylic acids. –Understand the acidity of carboxylic acids and factors affecting it. –Explain the common reactions	Carboxylic acids: properties and reactions.		
6					

		of carboxylic acids, including esterification and reduction.			
7	6	Identify and describe the structure and properties of esters, amides, anhydrides, and acyl chlorides. Understand the synthesis and reactions of these derivatives	Functional derivatives of carboxylic acids.		
8					
9	6	Classify amines and understand amine's structure and nomenclature. Describe the basicity of amines and factors affecting it. Explain the synthesis and reactions of amines, including their role in organic synthesis.	Amines I and II.		
10					

11	9	–Understand the structure, nomenclature, and properties of aldehydes and ketones.	Aldehydes and ketones (include also aldol and Claisen condensation); Classification, reactions and properties.		
12		–Explain the mechanisms of key reactions such as nucleophilic addition, aldol condensation.			
13		–Describe the synthesis and applications of aldehydes and ketones in organic chemistry.			
14	6	Describe the structure, properties, and acidity of phenols. Understand the reactions of phenols, including electrophilic substitution and oxidation.	Phenols		
15					

11. Course Evaluation

Written exam 60 marks

Midterm 10 marks

Practical exam 10 marks

Collective Theo practical exam 10 marks

Course work 10 marks

Total =100 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	ORGANIC CHEMISTRY BY Subrata Sen Gupta
Main references (sources)	ORGANIC CHEMISTRY BY SMITH – McGraw Hill – Copyright: 2023
Recommended books and references (scientific journals, reports...)	Scientific journals in basic specializations
Electronic References, Websites	Websites of Arab and foreign universities and pharmaceutical companies

Course Description Form

1. Course Name:	
organic Chemistry III	
2. Course Code:	
PH 2201	
3. Semester / Year:	
First semester / Second level	
4. Description Preparation Date:	
2025–2026	
5. Available Attendance Forms:	
Full–time and official attendance hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2x15= 30 hrs (theoretical) 2x15=30 hrs (practical) /number of units = 3	
7. Course administrator's name (mention all, if more than one name)	
Name: Ranza Ahmed Abdo Hassan Email: Ranza.ahmed@alayen.edu.iq	
8. Course Objectives	
Course Objectives	1. Studying the fundamental principles of heterocyclic chemistry, focusing on nitrogen–, sulfur–, and oxygen–containing rings that form the basis of pharmaceutical studies, such as pyrrole, furan, thiophene, pyridine, quinoline, and isoquinoline, including their properties, nomenclature, reactions, and methods of preparation. 2. Studying the methods used for the qualitative identification of various heterocyclic compounds, including pharmaceuticals and organic compounds. 3. Studying the significance of heterocyclic compounds, which have numerous applications in pharmaceutical chemistry and play essential roles in biochemical functions. Many heterocyclic compounds are widely used in medicine for the treatment of various diseases and injuries.
9. Teaching and Learning Strategies	

Strategy		1–lectures included multimedia lectures 2– power point presentation 3– practical work 4– open discussion 5– class activity 6–Self learning			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	–Understand the classification of heterocyclic systems. –Describe the general structures and properties of heterocyclic compounds. –Identify the occurrence of heterocyclic compounds in nature and medicinal products.	Introduction	1–lectures included multimedia lectures 2– power point presentation 3– open discussion 5– class activity 6–Self learning	1–written exam 2– Quiz 3–midterm exam 4– final exam
2	4		Heterocyclic system: Classes of heterocyclic systems;		
3			general structures; properties; Occurrence in nature and in medicinal products.		
4	2	Study the structure and properties of pyrrole, furan, and thiophene.	Five–membered ring heterocyclic compounds: pyrrole; furan and thiophen.		
5	2	Understand the natural sources of pyrrole, furan and thiophene.	Source of pyrrole, furan and thiophen.		

6	4	Explain the mechanisms of electrophilic substitution in pyrrole, furan, and thiophene, focusing on their reactivity and orientation.	Electrophilic substitution in pyrrole, furan and thiophen: Reactivity and orientation.				
7							
8	4	Describe the structure and reactions of pyridine. Understand the properties and applications of pyridine in organic synthesis.	Six-membered ring heterocyclic compounds: Structure & reactions of pyridine.				
9							
10	6	Study the structure, properties, and reactions of saturated five-membered heterocyclic compounds.	Saturated five-membered heterocyclic compounds.				
11							
12							
13	6	-Understand the structure and properties of five- and six-membered heterocyclic compounds containing two or three heteroatoms.	Heterocyclic of five & six member rings with two & three heteroatoms.				
14							
15							

		-Explain the synthesis and reactions of these compounds.			
11. Course Evaluation					
Written exam 60 marks Midterm 10 marks Practical exam 10 marks Collective Theo practical exam 10 marks Course work 10 marks Total =100 marks					
12. Learning and Teaching Resources					
Required textbooks (curricular books, if any)			ORGANIC CHEMISTRY BY Subrata Sen Gupta		
Main references (sources)			ORGANIC CHEMISTRY BY SMITH – McGraw Hill – Copyright: 2023		
Recommended books and references (scientific journals, reports...)			Scientific journals in basic specializations		
Electronic References, Websites			Websites of Arab and foreign universities and pharmaceutical companies		

Course Description Form

1. Course Name:	
Pharmacognosy I	
2. Course Code:	
PH2210	
3. Semester / Year:	
Second year / Second semester	
4. Description Preparation Date:	
2026-2025	
5. Available Attendance Forms:	
Full-time and official attendance hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/week (theoretical), 2 hours/week (practical), total units = 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Hussein hamed hayal	
Email: hussein.hamed@alayen.edu.iq	
8. Course Objectives	
Course Objectives	1- Understanding the scientific foundations and basic concepts of botany and plant application to pharmaceutical compounds. 2- Explaining the importance of studying the phytochemical reactions of chemical compounds in designing and developing drugs. 3- Introducing students to biological functional groups and analyzing their impact on the biological activity of drugs. 4- Providing students with the knowledge necessary to understand the Extraction methods.
9. Teaching and Learning Strategies	
Strategy	1-lectures included multimedia lectures 2- power point presentation 3- practical work 4- open discussion 5- class activity 6-Self learning

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	1. Define Pharmacognosy and describe its scope in pharmacy. 2. Explain the importance of Pharmacognosy in drug discovery and quality control. 3. Identify natural sources of drugs (plant, animal, mineral, microbial). 4. Describe the principles of classification of crude drugs. 5. Classify crude drugs based on source, morphology, chemical constituents, and pharmacological action.	General introduction and classification	1-lectures included multimedia lectures 2- power point presentation 3- open discussion 5- class activity 6-Self learning	1-written exam 2- Quiz 3-midterm exam 4- final exam
2	3	1. Classify natural products into reserved food materials and by-products. 2. Identify reserved food materials (starch, mucilage, proteins, fixed oils, fats, and waxes) and state their pharmaceutical importance. 3. Recognize plant by-products and differentiate calcium oxalate from calcium carbonate in crude drug identification.	The Natural Products a-Reserved Food Materials 1- Starch 2- Mucilage 3- Protein 4- Fixed oil, Fats and Wax b- By-Products 5- Calcium oxalate Calcium carbonate		
3	3	1. Classify active constituents of crude drugs. 2. Identify major classes (alkaloids, volatile oils, glycosides, tannins, resins, gums, oleo-gums, oleo-gum-resins,	c-Active Constituents 1- Alkaloids, Volatile oils,		

		balsams, bitter principles) and their general significance	Glycosides, Tannins, Resins, Gum, Oleo-gum, Oleo-gum-resin, Balsams,Bitter principles		
4	3	1. Describe the main steps in crude drug production: collection, preparation and curing, drying, and storage. 2. Explain adulteration of crude drugs and identify basic methods for its detection	The production of crude drugs: 1- Collection 2- Preparing and curing of drugs 3- Drying 4- Storage Adulteration of drugs and methods for detection		
5	3	1. Describe the basic morphology and anatomy of leaves relevant to crude drug identification. 2. Identify and differentiate Squill and Peppermint leaves based on their key morphological and anatomical features.	1- Introduction (morphology and anatomy of leaves) <i>Squill, Peppermint</i>		
6	3	1. Identify Egyptian Stramonium as a leaf crude drug of pharmacognostic importance. 2. Recognize key morphological and anatomical characters used in its identification. 3. Relate Stramonium to its active constituents and pharmaceutical significance.	Stramonium, Egyptian and		
7	3	1. Identify Senna and Buchu leaves as important crude drugs.	Senna, Buchu,		

		2. Describe key morphological and anatomical features for their identification. 3. Relate each leaf to its active constituents and pharmaceutical use.			
8	3	1. Identify the listed leaves as important crude drugs in Pharmacognosy. 2. Describe key morphological and anatomical features for each leaf. 3. Relate each leaf to its active constituents and pharmaceutical applications	Tea, Coca, Hamamelis, Jaborandi, Uva-ursi, , Henna		
9	3	1. Identify Boldo and Eucalyptus leaves as important crude drugs. 2. Describe their key morphological and anatomical features for proper identification. 3. Relate each leaf to its active constituents and therapeutic applications	Boldo, Eucalyptus,		
10	3	1. Identify Rosemary and Sweet Basil leaves as crude drugs. 2. Describe key morphological and anatomical features for identification. 3. Relate each leaf to its active constituents and pharmaceutical uses.	Rosemary, Sw basil		
11	3	1. Identify Peppermint leaves as a crude drug. 2. Describe key morphological and anatomical features for identification. 3. Relate Peppermint to its active constituents and pharmaceutical uses.	, Peppermint,		
12	3	1. Identify Sweet Marjoram leaves as a crude drug. 2. Describe key morphological and anatomical features for proper identification. 3. Relate Sweet Marjoram to its active constituents and pharmaceutical uses	Sweet marjoram		

13	3	1. Identify Digitalis and Squill as important crude drugs. 2. Describe key morphological and anatomical features for identification. 3. Relate each drug to its active constituents and therapeutic uses.	Digitalis, Squill		
14	3	1. Identify European Henbane as a crude drug. 2. Describe key morphological and anatomical features for identification. 3. Relate European Henbane to its active constituents and therapeutic uses	European henbane		
15	3	1. Identify Belladonna as a crude drug. 2. Describe key morphological and anatomical features for proper identification. 3. Relate Belladonna to its active constituents and therapeutic uses	Belladonna		

11. Course Evaluation

Written exam 60 marks

Midterm 15 marks

Practical 25 marks

Total = 100 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Essential Books (Text Books) 1–Trease, G.E. and Evans, W.C. “Trease and Evans’ Pharmacognosy” WB Saunders Co. Ltd., London, Philadelphia, Toronto, Sydney, Tokyo (1994, 2005). 2– Wallis, T.A. “Textbook in Pharmacognosy” CBS publisher & Distributers, First Indian edition (1985). 3– Mahran, G.H., “Medicinal Plants” 1st Ed.(1967). 4–Saber, A.H., “Practical Pharmacognosy” El-Shaab Printing House, 4th Ed. (1966).
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	5-Jackson, B.P. and Snowdon D.W., "Atlas of microscopy of medicinal plants, herbs and spices" Belhaven Press, Printer Publishers, London. (1990).
Main references (sources)	1-Indian Pharmacopoeia, Egyptian Pharmacopoeia. 2-De Smet, P.A., Keller, K., Hausel, R. and Chandler, R.F., "Adverse effects of herbal drugs", Springer Verlag, Berlin, Heidelberg, New York, London, Paris, Tokyo, Hong Kong, Vol. I (1993). 3-Weiss R.F. and Fintelmann V. "Herbal Medicine", Thieme, Stuttgart, New York, 2nd Ed. (2000).
Recommended books and references (scientific journals, reports...)	Scientific journals in basic specializations
Electronic References, Websites	Websites of Arab and foreign universities and pharmaceutical companies

Course Description Form

1. Course Name:	
Physical pharmacy 1	
2. Course Code:	
PH2103	
3. Semester / Year:	
First semester/2 nd year	
4. Description Preparation Date:	
2026–2025	
5. Available Attendance Forms:	
Full–time and official attendance hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/week (theoretical), 2 hours/week (practical), total units = 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecturer Dr. Ahmed Hassan Email: ahmed.hassan@alayen.edu.iq	
8. Course Objectives	
Course Objectives	1) Understand the states of matter, molecular interactions, and phase equilibria, including the phase rule and thermal analysis techniques. 2) Analyze the properties of non–electrolyte solutions, including colligative behavior and methods for molecular weight determination. 3) Study the behavior of electrolyte solutions, applying theories of dissociation, ionic strength, and colligative property expressions. 4) Explore solubility and distribution phenomena, focusing on solute–solvent interactions and partitioning between immiscible phases. 5) Apply principles of ionic equilibria, acid–base theories, pH calculations, and the effect of ionic strength on solution behavior. 6) Understand the formulation and function of buffered and isotonic solutions in maintaining pH and physiological compatibility
9. Teaching and Learning Strategies	

Strategy	1– Lectures and presentation 2– Class discussion 3– Laboratory experiments				
10. Expected learning outcomes					
Weeks	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Develop an understanding of the various binding forces and assess their relevance to different molecular systems.	Stats of matter: Binding forces between molecules. the gaseous state	– Lectures –White board –Data show –Power point –Explanatory diagrams –laboratory experiments	oral questions and written exams Laboratory reports
2	3	An understanding of the properties of matter in the gaseous and liquid states	Stats of matter: Liquid and solid state		
3	3	Explain the characteristics of the solid state, including crystallinity, solvates, and polymorphism, and understand phase equilibria and transitions between solid, liquid, and gaseous states.	Stats of matter: The liquid crystalline state The supercritical fluid state Phase equilibria and phase rule		

4-5	6	Develop an understanding of the properties of nonelectrolyte solutions and distinguish between ideal and real solutions based on Raoult's law. Recognize and describe the four colligative properties exhibited by nonelectrolytes in solution.	Nonelectrolytes: Physical properties of substances Types of solutions Concentration expressions		
6-7	6	Develop an understanding of electrolyte solutions and analyze the similarities and differences in colligative behavior between electrolytic and nonelectrolytic solutions.	Electrolytes solution		
8	3	–Understand Solvent–solute interactions, Factors affecting solubility – Classification of solvents & their mechanism of action	Solubility and distribution phenomena,		

9–10	6	–Explain the factors that affect the solubility of liquids and the ideal solubility of solids, as well as the variables influencing the solubility behavior of various solid substances. –Poor aqueous solubility and Measuring solubility	Solubility: Solubility of liquid in liquid and solid in liquid		
11	3	Understand the phenomena of extraction and preservation	Distribution of solutes between immiscible solvents		
12–13	6	Explain the Brønsted–Lowry and Lewis electronic theories, and recognize and define the four types of solvents. Acid–base equilibria Calculation of pH and acidity constants	Ionic equilibria, modern theories of acids and bases, acid–base equilibria,		
14–15	6	–Apply the buffer equation as the Henderson–Hasselbalch equation, for a weak acid or base and its salt – Determination of buffer capacity	Buffered solutions		

		- Buffers in pharmaceutical and biological systems			
11. Course Evaluation					
Mid term Exam 15 marks					
Quizzes and activities 5 marks					
Practical 20 marks					
Final Exam 60 marks					
12. Learning and Teaching Resources					
13.Required textbooks (curricular books, if any)		1–Martin’s physical pharmacy and pharmaceutical sciences, Patrick J. Sinko . Wolters Kluwer. Lippincott Williams &Wilkins. Philadelphia. 2011. 2–Lab manual for physical pharmacy adopted by the department			
Main references (sources)		Pharmaceutical Dosage forms and drug delivery Edited By Ram I. Mahato, Ajit S. Narang by Taylor & Francis Group, LLC Third Edition			
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites					

Course Description Form

1. Course Name:	
Physical pharmacy II	
2. Course Code:	
PH2203	
3. Semester / Year:	
Second semester/2 nd year	
4. Description Preparation Date:	
2026–2025	
5. Available Attendance Forms:	
Full-time and official attendance hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/week (theoretical), 2 hours/week (practical), total units = 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Lecturer Dr. Ahmed Hassan Ibrahim Email: Ahmed.Hassan@alayen.edu.iq	
8. Course Objectives	
Course Objective:	1) Understand complexation phenomena, classification of complexes, and methods used for their analysis. 2) Explore the principles of drug diffusion, including Fick's laws, diffusion through membranes, and factors affecting permeability. 3) Analyze chemical kinetics of drug degradation and perform stability studies using reaction rate laws and accelerated testing. 4) Study interfacial phenomena, surface tension, spreading, and the role of surfactants in wetting and formulation stability. 5) Examine the rheological properties of pharmaceutical systems, including thixotropy and methods of flow characterization.

	6) Learn about colloidal systems, micromeritics, and polymer science with focus on particle behavior, formulation impact, and pharmaceutical applications.				
9. Teaching and Learning Strategies					
Strategy	1– Lectures 2– Class discussion 3– Quizzes 4–Reports				
10. Course Structure (Theory)					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Develop a comprehensive understanding of complexation phenomena, the classification of complexes, and the analytical approaches used for their evaluation.	Complexation	– Lectures –White board –Data show –Power point –Explanatory diagrams –laboratory experiments	Written exams – Oral exams –Laboratory reports
2	3	–Understand the analytical approaches used for the complexation evaluation. –Explore the principles of drug diffusion	Complexation Diffusion		
3	3	Understand Fick’s laws, diffusion through membranes,	Diffusion		
4	3	–understand factors affecting permeability – Understand the reaction rate, reaction order, and molecularity	Diffusion chemical kinetics and stability		
5–6	6	Understand the concept of stability and expiration date of a medicament	chemical kinetics and stability		

7	3	Understand classification of interfaces, liquid interfaces, surface and interfacial tensions, surface free energy, measurement of interfacial tension, spreading coefficient adsorption at liquid interfaces surface active agents, systems of Hydrophile–Lipophile classification and adsorption at solid interfaces	Interfacial Phenomena		
8	3	–Understand the solid gas interface, the solid liquid interface, wetting and wetting agents, applications of surface–active agents, foam and antifoaming agents And electric properties of interfaces – Understand Newtonian systems and Non–Newtonian systems ⁹	Interfacial Phenomena Rheology		
9	3	Examine the rheological properties of pharmaceutical systems including thixotropy and methods of flow characterization.	Rheology		
10	3	–Understand Viscoelasticity Pharmaceutical areas in which rheology is Significant –understand disperse systems and Types of colloidal systems	Rheology Colloids		

11	3	Understand Optical properties of colloids kinetic properties of colloids and electrical properties of colloids	Colloids		
12	3	–Understand solubilization using colloids Pharmaceutical applications of colloids – Understand Particle size and size distribution and Methods of determining particle size and Particle shape and surface area	Colloid Micrometrics		
13–14	6	–Understand methods for determining surface area Derived properties of powders (porosity, packing arrangements, densities of particles, bulkiness and flow properties) –Understand Copolymers and polymer blends and thermoplastic and thermoset polymers	Micrometrics Pharmaceutical polymer		
15	3	Understand polymer properties (crystalline and amorphous polymers, thermal transitions, glass transition temperature, plasticized polymers, molecular weight, mechanical properties, Polymers for pharmaceutical applications Polymers in drug delivery	Pharmaceutical polymer		

11. Course Evaluation

Midterm Exam 15 marks

Quizzes and activities 5 marks

Practical 20 marks

Final Exam 60 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1–Martin’s physical pharmacy and pharmaceutical sciences, Patrick J. Sinko . Wolters Kluwer. 2–Lab manual for physical pharmacy adopted the department
Main references (sources)	Aulton's Pharmaceutics: The Design and Manufacture of Medicines, Third Edition, Michael E. Aulton (Author) Churchill, Livingstone–Elsevier
Recommended books and references (scientific journals, reports...)	Pharmaceutical Dosage forms and drug delivery Edited By Ram I. Mahato, Ajit S. Narang by Taylor & Francis Group, LLC Third Edition
Electronic References, Websites	

Course Description Form

1. Course Name:	
Physiology I	
2. Course Code:	
PH2104	
3. Semester / Year:	
1 st semester/ 2 nd year	
4. Description Preparation Date:	
2025-2026	
5. Available Attendance Forms:	
Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/week (theoretical), 2 hours/week (practical), total units = 4	
7. Course administrator's name (mention all, if more than one name)	
Name: Karema mohamed Abuelfotouh soliman Email: Karema.mohammed@alayer.edu.eg	
8. Course Objectives	
Course Objectives	Course Objectives for Physiology The Physiology course aims to provide students with a comprehensive understanding of the functions and mechanisms of the human body. By the end of this course, students should be able to: 1- Understand Fundamental Concepts: - a- Explain the physiological principles underlying the functioning of different organ systems. - b- Describe the homeostatic mechanisms that maintain internal balance within the body. 2- Analyze Organ System Interactions

	a– Demonstrate knowledge of the interdependence and integration organ systems.
9. Teaching and Learning Strategies	
Strategy	1 –Interactive Lectures Deliver core concepts with clear explanations using slides, diagrams, and flowcharts. Encourage student participation through questions and short quizzes to reinforce understanding. 2. Problem–Based Learning (PBL) Present clinical or physiological scenarios and have students work in small groups to solve problems. Develop critical thinking and apply theoretical knowledge to practical situations. 3. Laboratory Practicals Conduct experiments to demonstrate physiological mechanisms (e.g., muscle contraction, nerve conduction, cardiovascular responses). Teach students hands–on skills, observation, and data recording for accurate analysis. 4. Demonstrations and Visual Aids Use models, charts, and videos to illustrate complex processes like respiration, renal function, and neurophysiology. Enhance understanding of dynamic physiological processes. 5. Case Studies and Clinical Correlations Integrate real–life clinical scenarios with theoretical concepts (e.g., hypertension, diabetes). Help students connect physiology with pharmacy practice and patient care. 6. Small Group Discussions Encourage collaborative learning and discussion of key physiological mechanisms. Foster peer–to–peer learning and problem–solving skills.

7. Concept Mapping

Use concept maps to link physiological processes, organ systems, and regulatory mechanisms.

Improve comprehension and memory retention of complex topics.

8. Quizzes and Formative Assessments

Conduct short quizzes and interactive polls during lectures.

Provide immediate feedback to reinforce learning and identify weak areas.

9. Simulation and Virtual Labs

Use computer-based simulations for cardiovascular, respiratory, and renal physiology.

Allow students to manipulate variables safely and understand cause-effect relationships.

10. Self-Directed Learning

Assign pre-readings, online modules, or video lectures before class.

Encourage students to research, summarize, and present key physiological concepts.

11. Peer Teaching

Assign students to explain a concept or physiological pathway to their classmates.

Reinforce knowledge through teaching and improve communication skills.

12. Flipped Classroom Approach

Provide lecture material online and use classroom time for active problem-solving and discussion.

Encourage active learning and better application of theoretical knowledge.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Describe the structural components of the cell Explain functions of major organelles	Information about the cell composition	smartboard Presentation slides/ discussion	oral questions and written exams
2	3	Describe the structure of the cell membrane Explain membrane transport mechanisms	Body cells and cell membrane, ion channels	smartboard Presentation slides/ discussion	oral questions and written exams
3	3	Describe the structure and properties of mixed nerves Identify types and functions of glial cells	Properties of mixed nerves, glia, neurotrophins	smartboard Presentation slides/ discussion	oral questions and written exams
4	3	Describe phases of the action potential Explain factors affecting nerve impulse conduction	Nerve functions graded potential action potential	smartboard Presentation slides/ discussion	oral questions and written exams
5	3	Compare smooth and cardiac muscle structure Explain mechanisms of contraction in each muscle type	Smooth muscle cardiac muscle	smartboard Presentation slides/ discussion	oral questions and written exams
6	3	Interpret basic EEG patterns	Alert behavior, sleep and electrical activity	smartboard Presentation slides/	oral questions

		Explain neural control of posture and movement	of the brain, control of posture and movement	discussion	and written exams
7	3	Describe organization of the autonomic nervous system Differentiate between sympathetic and parasympathetic systems	Autonomic nervous system	smartboard Presentation slides/ discussion	oral questions and written exams
8	3	Describe the role of pulmonary surfactant Explain regional differences in ventilation and blood flow	Surfactants, differences in ventilation and blood flow in different parts of the lung	smartboard Presentation slides/ discussion	oral questions and written exams
9	3	Describe oxygen transport in blood Explain hemoglobin-oxygen dissociation curve	Gas transport between the lung and tissue	smartboard Presentation slides/ discussion	oral questions and written exams
10	3	Explain respiratory responses to exercise Define hypoxia and its types	Respiratory adjustment in health and disease, hypoxia, emphysema, asthma	smartboard Presentation slides/ discussion	oral questions and written exams
11	3	Identify factors affecting GFR Explain clinical significance of GFR changes	Glomerular filtration rate: measurements, factors affecting GFR	smartboard Presentation Slides /discussion	oral questions and written exams

12	3	Explain the countercurrent multiplier mechanism Describe the role of urea in urine concentration	The counter current mechanism, role of urea, water diuresis and osmotic diuresis	smartboard Presentation slides/ discussion	oral questions and written exams
13	3	Define uremia and metabolic acidosis Explain neural control of micturition	Bicarbonate excretion, regulation of Na, K and CL excretion, uremia, acidosis, micturition	smartboard Presentation Slides /discussion	oral questions and written exams
14	3	Describe the components of a normal ECG Explain electrical activity of the heart	The electrocardiogram, cardiac arrhythmias	smartboard Presentation slides/ discussion	oral questions and written exams
15	3	Define cardiac output Explain factors affecting cardiac output	Cardiac output	smartboard Presentation slides/ discussion	oral questions and written exams

11. Course Evaluation

Midterm Exam 15 marks

Quizzes and activities 5 marks

Practical 20 marks

Final Exam 60 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)

Main references (sources)	Guyton and Hall Textbook of Medical Physiology Ganong's Review of Medical Physiology
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	