Ministry of Higher Education and Scientific Research

Scientific Supervision and Scientific Evaluation Division

Directorate of Quality Assurance and Academic Accreditation

Accreditation Department

Academic Program Description

University of Al-Ameed-College of Pharmacy

2025-2026

University Name: University of Al-Ameed

Faculty/Institute: College of Pharmacy

Scientific Department:

Academic or Professional Program Name: Bachelor of Pharmacy

Final Certificate Name: Bachelor

Academic System: Semester

Description Preparation Date: September-2025

File Completion Date: October-2025

Signature:
Scientific Associate Name:
Assist. Prof. Dr. Haider Falih shamik
Date: 4/10/2025

Signature:
Head of department Name:
Prof. Dr. Uday Abdul-Ridha Al-Rikabi
Date: 14/10/2025

The file is checked by:

Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Assist. lecturer Dr. Najah Hamza kadim
Date: 14/10/2025
Signature:

14/10/2025

Approval of the Dean
Prof. Dr. Uday Abdul-Ridha Al-Rikabi

1. Program Vision

The academic program of the College of Pharmacy aims to prepares outstanding practicing pharmacists to lead the future of healthcare and compete locally and globally. This program provides comprehensive and innovative pharmaceutical care, adheres to the highest professional standards and ethics, and keeps pace with the latest scientific and technical developments in the pharmaceutical field.

2. Program Mission

The College of Pharmacy is committed to preparing scientifically and professionally qualified pharmacists capable of providing comprehensive pharmaceutical care focused on patient safety and achieving optimal therapeutic outcomes. We also strive to foster a culture of applied scientific research and innovation, contribute to the development of the pharmaceutical industry, and raise the level of healthcare services, meeting the needs of society and meeting the requirements of local and international academic accreditation.

3. Program Objectives

- Preparing competent pharmacists capable of performing efficiently in various fields of clinical and practical pharmacy.
- Empowering students to actively participate in the healthcare system and deliver exceptional pharmaceutical care, with a focus on scientific healthcare principles in the community.
- Developing students' innovative abilities in pharmacy by mastering modern techniques, advanced tools, and understanding drug interactions and side effects.
- Enhancing pharmaceutical research by involving students in pioneering research projects that advance the profession.
- Building leadership and management skills, with an emphasis on critical thinking and sound decision-making.
- Improving patient communication skills through clinical, personal, and social pharmacy training, preparing them for teamwork in the medical field.
- To prepare graduates who can address challenges and solve problems creatively while upholding the highest standards of quality in all pharmaceutical practices.

4. Program Accreditation
Not yet

5. Other external influences
Library research - extracurricular activities - volunteer activities - other

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	7	14		Basic
College Requirements	53	168		Basic
Department Requirements	-	-	-	-
Summer Training	-	-	-	Pass
Other				

* This can include notes whether the course is basic or optional.

7. Program description

Year/level	course code	Name of the course	Credit hours	
			theoretical	Practical
First year/first semester	101 ClHa	Human anatomy and Histology	3	2
	102 PcAc	Analytical Chemistry	3	2
	103 ClMp	Medical Physics	1	2
	104 PtMt	Medical Terminology	1	----

	105 ClBi	Biostatistics	2	----
	106 ClHrd	Human Rights and Democracy	2	----
First year/second semester	107 PtPh1	Physiology I	3	2
	108 PPhc	Pharmaceutical Calculations	3	2
	109 PcOc1	Organic Chemistry I	3	2
	110 ClAr	Arabic languge	2	----
	111 ClCs	Computer Sciences	1	2
Second year/first semester	212 PcOc2	Organic Chemistry II	3	2
	213 ClMm1	Medical Microbiology I	3	2
	214 PPp1	Physical Pharmacy I	3	2
	215 PtPh1	Physiology I	3	2
	216 ClCs	Computer Sciences	1	2
	217 ClBc	Baath Regime Crimes in Iraq	2	----
	218 ClAr	Arabic Language	2	----
Second year/second semester	219 PcOc3	Organic Chemistry III	2	2
	220 ClMm2	Medical Microbiology II	3	2
	221 PPp2	Physical Pharmacy II	3	2
	222 PtPh2	Physiology II	3	2
	223 PhPa1	Pharmacognosy I	3	2

	224 ClAr	Arabic Language	2	----
Third year/ first semester	325 PcIc	Inorganic Pharmaceutical Chemistry	2	2
	326 PhPa2	Pharmacognosy II	2	2
	327 PPt	Pharmaceutical Technology	3	2
	328 ClBi1	Biochemistry I	3	2
	329 ClPy	Pathophysiology	3	2
Third year/second semester	330 PcOp1	Organic Pharm. Chemistry I	3	2
	331 PtPc1	Pharmacology I	3	----
	332 PPc	Pharmaceutical and cosmetic preparations	3	2
	333 ClBi2	Biochemistry II	3	2
	334 PhPa3	Pharmacognosy III	2	2
	335 CpPe	Pharmacy Ethics	1	----
Fourth year first/ semester	436 PtPc2	Pharmacology II	3	2
	437 PcOp2	Organic Pharm. Chemistry II	3	2
	438 CpCp1	Clinical Pharmacy I	2	2
	439 PBp	Biopharmaceutics	2	2
	440 ClPu	Public Health	2	----
Fourth year/second semester	441 PtPc3	Pharmacology III	2	----
	442 PcOp3	Organic Pharm. Chemistry III	3	2

	443 CpC2	Clinical Pharmacy II	2	2
	444 PtGt	General Toxicology	2	2
	445 PIp1	Industrial Pharmacy I	3	2
	446 CpCs	Communication Skills	2	----
Fifth year/ first semester	547 PcOp4	Organic Pharm. Chemistry IV	2	----
	548 PIp2	Industrial Pharmacy II	3	2
	549 CpAt1	Applied Therapeutics- I	3	----
	550 ClCc	Clinical Chemistry	3	2
	551 ClCl	Clinical Laboratory Training	----	4
	552 PtCt	Clinical Toxicology	2	2
	553 Pr	Graduation project	1	---
Fifth year/second semester	554 CpPm	Pharmacoeconomic	2	----
	555 CpAt2	Applied Therapeutics- II	2	----
	556 CpTd	Therapeutic Drug Monitoring (TDM)	2	2
	557 PcAp	Advanced Pharmaceutical Analysis	3	2
	558 CpHt	Hospital Training	----	4
	559 PDdsd	Drug Delivery Systems Design	2	----
	560 PPb	Pharmaceutical Biotechnology	1	----

8. Expected learning outcomes for the pharmacy program
Knowledge
1. Enabling the student to obtain knowledge in the basic, subjects related to medical and pharmaceutical sciences including human biology, histology, anatomy, body functions, diseases, immunity, bacteria and viruses.
2. The student's knowledge of the structure of chemicals and methods of detection Preparing and diagnosing pharmaceutical chemical compounds and linking the chemical composition of the drug to its pharmacological effectiveness and mechanism of action.
3. Describes the various types of medicines, their therapeutic effects ، and their side effects and toxicity on the humanbody.
4. Knowledge of the physical properties of pharmaceutical compounds and their stability and its movement within the body to calculate the correct therapeutic doses.
5. Knowledge of the theoretical foundations of manufacturing and evaluating various pharmaceutical forms, Methods of optimal preparation and storage of medical preparations.
6. Identify medical terminology, prescribe the most appropriate treatment according to the diagnosis of the disease with the least side effects, and understand drug and disease interactions.
7. Identify the physical, chemical and biological properties of natural materials used for medical or health purposes.
8. Understanding mathematical operations, medical statistics and medical physics.
Skills

1. Giving the student the ability to link applied concepts and models to practical reality through applying practical experiments in college laboratories and implementing safety and security instructions during laboratory work
2. Providing the graduate with the skill to communicate effectively with medical staff, patients, and society at all levels of competence. The idea and the social and the soul and health.
3. Working efficiently in pharmacies through full knowledge of the privacy of dispensing medications, guiding the patient on how to use them, and providing advice to him.
4. Efficiency in practicing clinical work and supporting medical staff in hospitals.
5. Providing the graduate with the ability to manage pharmaceutical facilities, know the optimal methods for standardization and quality control, examine and store medicines, and practice pharmaceutical skills in developing the pharmaceutical industry.
6. Proficiency in the English language and use of electronic computers.
7. The ability to conduct pharmaceutical and clinical research.
Values
1. Enabling students to work in a team spirit and use teamwork leadership and creativity skills.

2. The ability to take responsibility to make the right decisions that serve the patient.
3. The student's commitment to the ethics of the pharmacy profession.
4. Practicing his pharmaceutical work in order to improve human health and provide health care to patients.
5. Practicing the principles and methodologies of scientific conducting and evaluating pharmaceutical research when and clinical research and the ethics of research work related to it.
6. Learn about the crimes committed by the Baath Party during the time of the previous regime.
7. Concern for human rights and citizenship.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Evaluation methods
Preparing reports, class assignments, practical laboratory tests, daily oral and written theoretical exams, semi-semester and quarterly, graduation research.

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements /Skills (If applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor		9			7	2
Assistant Professor		7			7	
Lecturer		14			10	4
Assistant lecturer		23			17	6

Professional Development

Mentoring new faculty members

- Organizing weekly workshops and presentations to enhance faculty competencies in delivering lectures, presenting scientific research, and mastering effective communication skills with students and colleagues.
- Encouraging active participation in continuing education programs, academic seminars, and specialized training programs to stay updated with the latest advancements in the pharmaceutical field.
- Providing necessary support for participation in international scientific conferences, community awareness programs, and initiatives that contribute to the development of pharmaceutical practice and community service.

Professional development of faculty members

- Professional Development Programs:
  - The college mandates active faculty participation in continuing education activities (workshops, seminars, conferences) as a key requirement for career advancement, ensuring continuous academic and professional growth.
  - Scientific and Community Initiatives:
  - Organizing and managing the college's annual international conference.
  - Collaborating with healthcare institutions to design training programs aligned with pharmaceutical practice needs.
  - Launching free awareness campaigns on critical health issues (e.g., addiction, chronic diseases, and developmental disorders).
- Strategic Partnerships:
  - Strengthening collaboration with healthcare sectors to align educational outcomes with pharmaceutical labor market demands.

12. Acceptance Criterion

Admission is centralized by the Ministry of Higher Education and Scientific Research, based on the student's grades in the sixth preparatory grade.

There are multiple admission channels, including general admission, the distinguished student's channel, the martyrs' channel, the parallel channel, foreign students, as well as direct admission channels such as the elite channel and top students in vocational institutes.

13. The most important sources of information about the program

- College of Pharmacy Guide - Al-Ameed University
- Website of the College of Pharmacy - Al-Ameed University (in Arabic and English)
- Website of Al-Ameed University
- Website of the Ministry of Higher Education and Scientific Research
- Social Media Page of the College of Pharmacy - Al-Ameed University
- Announcements posted in the college corridors

14. Program Development Plan

- Curriculum Updates: Form specialized committees to periodically update curricula in alignment with local and global labor market requirements, conducting annual reviews of course materials based on the latest developments in the pharmaceutical field.
- Stakeholder Feedback: Conduct periodic surveys involving employers in various pharmaceutical sectors, graduates, the local community, and partner health institutions to evaluate the extent to which the curricula achieve the College's goals and mission.
- Technology & Methodology: Enhance the use of modern educational technologies and electronic platforms, while implementing interactive and experiential teaching methods.
- Assessment Development: Develop assessment mechanisms designed to measure both practical and cognitive skills.
- Community Service: Organize volunteer programs and activities that serve the health sector.
- Applied Research: Direct student research projects toward applied research that contributes to solving community problems.
- Institutional Partnerships: Strengthen partnerships with health institutions to serve the community.

Curriculum map outlining how different courses within a program are built upon each other to achieve the college mission and intended outcomes																							
		Required program Learning outcomes																					
Year/ Level	Course Name	A.Knowledge								B.Skills							C.Ethics						
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
First year/ First semester	Human Anatomy and Histology	/								/							/						
	Medical Physics	/							/	/							/						
	Analytical Chemistry	/								/							/						
	medical terminology						/				/		/			/		/	/	/	/		
	Biostatistics								/														
	Human rights and Democracy																						/
First year/ Second semester	Physiology I	/								/							/						
	Pharmaceutical calculations	/				/	/		/	/		/		/		/	/	/	/	/	/		
	Computer Sciences														/		/						
	Organic Chemistry I	/	/							/							/						
	Arabic Language										/	/						/					

Curriculum map outlining how different courses within a program are built upon each other to achieve the college mission and intended outcomes																							
		Required program Learning outcomes																					
Year/ Level	Course Name	A. Knowledge								B. Skills							C. Ethics						
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
Second year/ First semester	Organic Chemistry II	/	/							/							/						
	Medical microbiology I	/								/							/						
	Physical Pharmacy I	/			/			/	/	/				/			/				/		
	Physiology I	/								/							/						
	Computer Sciences														/		/						
	Baath Regime Crimes in Iraq																					/	
	Arabic Language										/	/						/					
Second year/ Second semester	Organic Chemistry III	/	/																				
	Medical microbiology II	/								/							/						
	Physical Pharmacy II	/			/			/	/	/				/			/				/		
	Physiology II	/								/							/						
	Pharmacognosy I	/						/		/							/						
	Arabic language										/	/						/					

Curriculum map outlining how different courses within a program are built upon each other to achieve the college mission and intended outcomes																							
		Required program Learning outcomes																					
Year/ Level	Course Name	A. Knowledge								B. Skills							C. Ethics						
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
Third year/ First semester	Inorganic pharmaceutical chemistry	/	/							/	/						/	/					
	Pharmacognosy II	/						/		/							/						
	Pharmaceutical Technology	/		/	/	/				/		/		/			/	/	/	/	/		
	Biochemistry I	/								/							/						
	Pathophysiology	/								/							/						
Third year/ Second semester	Organic Pharmaceutical Chemistry I	/	/								/							/					
	Pharmacology I	/		/						/		/					/	/					
	Pharmaceutical and cosmetic preparations	/		/	/	/				/		/		/			/	/	/	/	/		
	Biochemistry II	/								/							/						
	Pharmacognosy III	/						/		/							/						
	Pharmacy Ethics						/				/		/				/		/		/		

Curriculum map outlining how different courses within a program are built upon each other to achieve the college mission and intended outcomes																							
		Required program Learning outcomes																					
Year/ Level	Course Name	A. Knowledge								B. Skills							C. Ethics						
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
Fourth year/ First semester	Pharmacology II	/		/						/		/							/				
	Organic Pharmaceutical Chemistry II	/	/							/	/								/	/			
	Clinical Pharmacy I						/				/	/	/			/	/	/	/	/	/		
	Biopharmaceutics	/	/		/	/				/		/		/			/	/	/	/	/		
	Public Health						/				/	/	/			/	/	/	/	/	/		
Fourth year/ Second semester	Pharmacology III	/		/								/								/			
	Organic Pharmaceutical Chemistry III	/	/							/	/								/	/			
	Clinical Pharmacy II						/				/	/	/			/	/	/	/	/	/		
	General Toxicology	/		/						/									/				
	Industrial Pharmacy I	/			/	/						/		/			/	/	/	/	/		
	Communication Skills						/				/	/	/			/	/	/	/	/	/		

Curriculum map outlining how different courses within a program are built upon each other to achieve the college mission and intended outcomes																							
		Required program Learning outcomes																					
Year/ Level	Course Name	A. Knowledge								B. Skills							C. Ethics						
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
Fifth year/ First semester	Organic Pharmaceutical Chemistry IV	/	/							/	/						/	/					
	Industrial Pharmacy II	/			/	/				/		/		/			/	/	/	/	/		
	Applied Therapeutics I	/					/				/	/	/			/	/	/	/	/	/		
	Clinical chemistry	/																					
	Clinical lab. training	/																					
	Clinical toxicology	/								/							/						
	Graduation Project						/				/	/	/	/		/	/	/	/	/	/		
Fifth year/ Second semester	Pharmacoeconomics						/				/	/	/			/	/	/	/	/	/		
	Applied Therapeutics II	/					/				/	/	/			/	/	/	/	/	/		
	Therapeutic Drug Monitoring						/				/	/	/			/	/	/	/	/	/		
	Advanced Pharmaceutical Analysis	/	/							/						/	/				/		
	Hospital Training						/				/	/	/			/	/	/	/	/	/		
	Drug Delivery Systems Design	/			/	/		/		/		/		/		/	/	/	/	/	/		
	Pharmaceutical Biotechnology	/								/							/						

A curriculum map outlining foundational science courses with their corresponding student learning outcomes categorized by area																							
		Program Learning outcomes																					
Area	Course Name	A. Knowledge								B.Skills							C. Ethics						
		A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	C5	C6	C7
Pharmacology and toxicology sciences	Medical Terminology						/				/		/			/		/	/	/	/		
	Physiology I	/								/							/						
	Physiology II	/								/							/						
	Pharmacology I	/		/						/		/					/	/					
	Pharmacology II	/		/						/		/							/				
	Pharmacology III	/		/								/								/			
	Toxicology	/		/						/									/				
	Clinical Toxicology	/								/							/						
Pharmacognosy and medicinal plant sciences	Pharmacognosy I	/						/		/							/						
	Pharmacognosy II	/						/		/							/						
	Pharmacognosy II	/						/		/							/						
	Human Biology	/								/							/						

Clinical laboratory sciences	Biostatistics								/														
	Computer science														/		/						
	Human Anatomy and Histology	/								/							/						
	Medical Physics	/							/	/							/						
	Human Rights and Democracy																						/
	Medical microbiology I	/								/							/						
	Medical microbiology II	/								/							/						
	Biochemistry I	/								/							/						
	Biochemistry II	/								/							/						
	Pathophysiology	/								/							/						
	Clinical biochemistry	/																					
	Clinical Laboratory Training	/																					
Pharmaceutics	Pharmaceutical Calculations	/				/	/		/	/		/		/		/	/	/	/	/	/			
	Physical pharmacy I	/			/			/	/	/				/			/				/		
	Physical pharmacy II	/			/			/	/	/				/			/				/		
	Pharmaceutical Technology	/		/	/	/				/		/		/			/	/	/	/	/		

	Pharmaceutical and cosmetic preparations	/		/	/	/				/		/		/			/	/	/	/	/		
	Industrial Pharmacy I	/			/	/						/		/			/	/	/	/	/		
	Industrial Pharmacy II	/			/	/				/		/		/			/	/	/	/	/		
	Biopharmaceutics	/	/		/	/				/		/		/			/	/	/	/	/		
	Pharmaceutical Biotechnology	/								/							/						
	Drug Delivery Systems Design	/			/	/		/		/		/		/		/	/	/	/	/	/		
Clinical Pharmacy	Clinical pharmacy I						/				/	/	/			/	/	/	/	/	/		
	Clinical pharmacy II						/				/	/	/			/	/	/	/	/	/		
	Applied Therapeutic I	/					/				/	/	/			/	/	/	/	/	/		
	Applied Therapeutic II	/					/				/	/	/			/	/	/	/	/	/		
	Pharmaceutical economic						/				/	/	/			/	/	/	/	/	/		
	Public health						/				/	/	/			/	/	/	/	/	/		
	Pharmacy practice						/				/	/	/			/	/	/	/	/	/		
	Communication skills						/				/	/	/			/	/	/	/	/	/		
	Therapeutic Drug Monitoring						/				/	/	/			/	/	/	/	/	/		

	Hospital Training						/				/	/	/			/	/	/	/	/	/		
Pharmaceutical Chemistry	Analytical Chemistry	/								/							/						
	Organic chemistry I	/	/							/							/						
	Organic chemistry II	/	/							/							/						
	Organic chemistry III	/	/																				
	Inorganic Pharmaceutical Chemistry	/	/							/	/						/	/					
	Organic Pharmaceutical Chemistry I	/	/								/							/						
	Organic Pharmaceutical Chemistry II	/	/							/	/								/	/			
	Organic Pharmaceutical Chemistry III	/	/							/	/								/	/			
	Organic Pharmaceutical Chemistry IV	/	/							/	/						/	/					
	Advanced pharmaceutical analysis	/	/							/						/	/				/		

1. Course Name
Human Anatomy & Histology
2. Course Code
101 ClHa
3. Semester/Year
1st semester/First year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total)
45 hours Theory and 30 hours Laboratory
7. Name of course coordinator(s):
Name: Ahmed ali kairalla Email: ahmed.1980582@gmail.com
8. Course objectives

1. Learning the names and functions of anatomical structures.
2. Provide comprehensive understanding of how abnormal anatomy can lead to disease.
3. To acquire a basic background in histology and to understand the properties of cells and their interactions with one another as components of tissues and organs
4. To be able to describe the normal structure and function of various cell types, tissues, and organs, and to differentiate their histological structures from each other through microscopic examination.

9- Teaching and learning strategies	
Education strategies **Learning strategies**	Graduates must be attaining the capacity to: 1. Differentiate the types of general tissue (epithelial, connective, muscular, nervous, adipose, cartilage, blood). 2. Examine a histological slide with different magnifications - Draw a labeled diagrams for types of general tissue type. 3. Graduates must have the ability to: - Conduct a scientific report. - be a part in scientific discussion 4. The student in Pharmacy will be able to understand the human body in earlier time in his/ her study in the faculty, so he/she will be able to understand the scientific contents of other courses.

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	Define anatomical terminology/cavities and demonstrate microscope proficiency.	• General anatomy: Anatomical Positions, Body regions, Body cavities. • Introduction to Histology: Definition, basic concepts of cell, tissue, organ, system. • Anatomical models & terms. • Microscopic usage & cell identification	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	3	Differentiate the four primary tissue types and identify them microscopically.	• Overview of the Four Primary tissue types- Epithelial Tissues, Connective Tissues, Muscular Tissues, Nervous Tissue.	the blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

	2		• Identification of various epithelial tissue slides. • Identification of various connective tissue slides (including cartilage and bone). • Identification of muscular tissue slides (skeletal, cardiac, smooth)	E-Learning	
3	3 2	Locate major bones on models and distinguish bone/cartilage histology.	Musculoskeletal System (-Bones & Joints) • Identification of major bones on skeletal models. • Microscopic identification of compact and spongy bone, and different types of cartilage	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	3 2	Identify heart chambers/vessels and recognize cardiovascular histology.	• Circulatory System (Cardiovascular System): Anatomy & Histology • Identification of heart chambers, major vessels on models/pro-sections • Microscopic identification of heart wall, arteries, veins, and capillaries	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	3 2	Locate lymphoid organs and identify blood cells/lymph nodes microscopically.	• Circulatory System (Lymphatic System) & Blood. • Identification of lymphoid organs on models/ prosections • Microscopic identification of blood cells (various types of	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

			WBCs), and general structure of lymph nodes		
6	3 2	Identify upper GIT anatomy and histological layers of esophagus/stomach.	• Digestive System (Part 1 - Upper GIT): Oral cavity, pharynx, esophagus, stomach • Identification of upper digestive tract parts on models/pro-sections • Microscopic identification of oral cavity, esophagus, and stomach	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
7	3 2	Identify lower GIT/accessory organs and distinguish them microscopically.	• Digestive System (Part 2 - Lower GIT & Accessory Organs): Small intestine, large intestine, rectum, anus. Salivary glands, pancreas, liver, gallbladder. • Identification of lower digestive tract and accessory organs on models/pro-sections. • Microscopic identification of small intestine, large intestine, liver, and pancreas	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
8	3 2	Locate CNS/PNS structures and recognize neurons/ganglia histology.	• Nervous System: Anatomy & Histology: Central Nervous System (brain, spinal cord) and Peripheral Nervous System (nerves, ganglia), basic organization • Identification of major brain regions and spinal cord on models.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

			• Microscopic identification of nerve tissue (neurons, nerve fibers) and ganglia		
9	3 2	Identify respiratory components and distinguish lung tissue histology.	• Respiratory System: Anatomy & Histology • Identification of respiratory system components on models/prosections • Microscopic identification of trachea, bronchus, bronchioles, and lung tissue (alveoli).	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	3 2	Identify urinary organs and recognize nephron/bladder histology.	• Urinary System: Anatomy & Histology • Identification of urinary system organs on models/pro-sections - Microscopic identification of kidney (nephron components), ureter, and bladder	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
11	3 2	Differentiate skin layers and identify accessory structures microscopically.	• Integumentary System (The Skin): - Anatomy: Layers of the skin (epidermis, dermis, hypodermis). Histology: Detailed histology of thick and thin skin, epidermal layers, , accessory structures (hair follicles, sebaceous glands, sweat glands). • Microscopic identification of thick and thin skin, and accessory structures	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

12	3 2	Locate and name major endocrine glands on anatomical models.	• Endocrine System: Anatomy pituitary, thyroid, parathyroid, adrenal, pancreas-islets of Langerhans, pineal, gonads • Identification of endocrine glands on anatomical models	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
13	3 2	Identify histological features of key endocrine glands.	• Endocrine System: Histology pituitary, thyroid, parathyroid, adrenal glands, islets of Langerhans, and pineal gland • Microscopic identification of selected endocrine glands.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
14	3 2	Identify male reproductive anatomy and testes histology.	• Male Reproductive System • Identification of male reproductive organs on models/pro-sections. • Microscopic identification of testes and accessory glands	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
15	3 2	Identify female reproductive anatomy and ovary/uterus histology.	• Female Reproductive System • Identification of female reproductive organs on models/pro-sections. • Microscopic identification of ovary (including different follicle stages) and uterus.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams, editorial, reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
Required textbooks	- Lippincott Williams &Wilinks
Main references (sources)	1. 1Atlas of Human Anatomy by Frank H. Netter 2. Basic Histology: text and Atlas, 11th ed. BY Luiz Carlos, Uchoa Junqueria 3. Wheaters functional histology: a text and colour atlas 6th ed. BY Yung , Barbara 4. Anatomy and Physiology for Healthcare by Paul Marshall; Beverly Gallacher; Jim Jolly; Shupikai Rinomhota 5. Basic Histology: text and Atlas, 11th ed. BY Luiz Carlos, Uchoa Junqueria
Recommended supporting books and references (scientific journals, reports,...)	Clinical Anatomy by Regions (Richard S. Snell 8th ed. 2010).
References, websites	

1. Course Name	
Analytical Chemistry	
2. Course Code	
102 PcAc	
3. Semester/Year	
1st Class, 1st Semester	
4. Date this description was prepared	
10/2025	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
45 hours Theory and 30 hours Laboratory	
7. Name of course coordinator(s):	
Prof. Dr. Zeyad Kadhim Oleiwi	Email: zeyadk.almajtoomi@uokufa.edu.iq
8. Course objectives	
Objectives of the study subject	By the end of this course, students will be able to: Understand the fundamentals of classical and instrumental analytical techniques. 1. By the end of this course, students will be able to: Understand the fundamentals of classical and instrumental analytical techniques. 2. Apply statistical tools in interpreting analytical data. 3. Recognize the role of pharmacopoeias in pharmaceutical quality control. 4. Perform basic titrimetric and gravimetric analyses relevant to pharmaceutical compounds 5. Correctly use and handle basic laboratory equipment while following safety protocols.

	6. Prepare and standardize solutions of acids, bases, and salts with accuracy and precision. 7. Apply volumetric and gravimetric methods for quantitative chemical analysis. 8. Analyze pharmaceutical-related samples such as acetic acid, sodium carbonate–sodium hydroxide mixtures, water hardness, and ferrous iron content.
9. Teaching and learning strategies	
Education strategies **Learning strategies**	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy - Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	Define analytical chemistry roles in pharma and identify lab equipment.	• Introduction to Analytical Chemistry: Types and roles in drug development and QC • Demonstration of some laboratory equipments.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3 2	Calculate concentration units and explain volumetric analysis principles.	• Review of Basic Concepts: Concentration units, standards, • Volumetric method of analysis	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	3 2	Interpret pharmacopoeial standards and standardize HCl solution.	• Introduction to Pharmacopoeias: USP, BP, monographs, specifications • Preparation and standardization of HCl solution (known)	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct

					laboratory experiments
4	3 2	Apply ICH Q2 guidelines and determine unknown acid concentration.	• Case Study: Interpreting pharmacopoeial monographs and ICH Q2(R1) overview • Preparation and standardization of HCl solution (unknown).	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 2	Explain gravimetric precipitation theory and prepare standard NaOH.	• Gravimetric Analysis: Precipitation, Determination of the percentage of acetic acid. • Preparation and standardization of NaOH solution	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	2	Minimize weighing errors and calculate acetic acid percentage.	• Gravimetric Analysis: weighing, error sources • Determination of the percentage of acetic acid.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

7	3 2	Select indicators for acid-base titrations and analyze alkaline mixtures.	• Volumetric Analysis I: Acid-base titrations, indicators • Analysis of sodium hydroxide mixture	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 2	Perform pH calculations and determine chloride using Mohr method.	• Volumetric Analysis I: pH, calculations. • Determination of chloride by the Mohr method.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 2	Apply Volhard method principles for precipitation titrations.	• Volumetric Analysis II: Precipitation and Complexometric • titrations (Mohr, EDTA) Determination of chloride by the Volhard method.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3	Describe redox titration principles	• Redox Titrations: Principles, iodometry, permanganometry	the blackboard	Reports, assignments, oral and written theoretical

	2	and standardize KMnO4.	• Preparation and standardization of 0.1N KMnO4.	PowerPoint slides E-Learning	examinations, semi-semester and semester -Conduct laboratory experiments
11	3 2	Calculate Mean/SD and determine iron content in Mohr's salt.	• Statistical Evaluation of Data: Mean, SD • test, Grubbs test Determination of ferrous form of iron in Mohr's salt	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 2	Apply statistical confidence limits/Q-test and perform nickel gravimetry.	• Statistical Evaluation of Data: confidence limits, Q • Gravimetric determination of Nickel.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3 2	Apply Beer's Law and complete gravimetric nickel analysis.	• UV-Visible Spectrophotometry: Principles, Beer's Law, • Gravimetric	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations,

			determination of Nickel.	E-Learning	semi-semester and semester -Conduct laboratory experiments
14	3 2	Explain principles of potentiometry and conductometry.	• Electrochemical Methods: Potentiometry, Conductometry	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 2	Differentiate between TLC and paper chromatography techniques.	• Introduction to Chromatography: TLC, paper chromatography	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams Editorial, reports, etc

- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	
Main references (sources)	1. Fundamentals of Analytical Chemistry – Skoog, West, Holler & Crouch 2. Pharmaceutical Analysis – A.H. Beckett & J.B. Stenlake 3. Quantitative Chemical Analysis – Daniel C. Harris 4. Supplementary: British Pharmacopoeia (BP), United States Pharmacopeia (USP), ICH Q2(R1) 5. Handbook for Analytical Chemistry lab adopted by department
Recommended supporting books and references (scientific journals, reports)	Fundamentals of Analytical Chemistry by Stook and West Hand book for practical organic chemistry
References, websites	

1. Course Name
Medical physics
2. Course Code
110 ClMp
3. Semester/Year
1st semester/first year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total
15 hours Theory (3hrs/wk) and 30 hrs practical (2hrs/wk)
7. Name of course coordinator(s):
Lect. Dr. Muthanna Jawad Abdul Hussein Email: muthana.j@uokerbala.edu.iq
8. Course objectives
1) Gives students the ability to deal with the concepts of physics, emphasizes the knowledge and skills required to efficiently discharge the duties and responsibilities of the pharmacist. 2) students will be able to understand the physical terminology and abbreviation used to describe the lecture, and the application in medical field. 3) Gives students the ability to deal with the concepts of physics, emphasizes the knowledge and skills required to efficiently discharge the duties and responsibilities of the pharmacist. 4) students will be able to understand the physical terminology and abbreviation used to describe the lecture, and the application in medical field.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	1 2	* Define the fundamental concepts of thermodynamics and system properties. * Explain the conservation of energy principle. * Apply the formula for ground acceleration in a practical experiment.	· General concepts: Method of physics and standards; thermodynamics system and system properties; conservation of energy principle · Calculate ground acceleration	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	1 2	* Differentiate between Celsius, Fahrenheit, and Kelvin scales. * Apply the ideal gas law and equation of state to solve problems.	· Pressure; temperature and temperature scales (Celsius, Fahrenheit,Kelvin); equation of state; ideal gas and real gas; general law of gases. · Calculate the density of liquids	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

		* Experimentally determine the density of various liquid samples.			
3	1 2	* Distinguish between heat, work, energy, and power in mechanical systems. * Apply the First Law of Thermodynamics and gas laws (Boyle's and Charles's). * Demonstrate multiple methods to find the focal length of a convex lens.	· Heat and energy; work and mechanical forms of work; power; the 1st law of thermodynamics; Boyles and Charles law · Calculating the focal length of a convex lens in several ways	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	1 2	* Describe the operating principles of blood glucose monitors and parenteral devices. * Explain the physical basis of fluid administration. * Measure the viscosity of a liquid using standard laboratory equipment.	· Medical Devices for: Blood Glucose Monitoring, Parenteral · Calculate the viscosity of a liquid	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	1 2	* Understand the mechanics of infusion devices and cardiac output measurement techniques. * Analyze fluid dynamics in the cardiovascular system. * Calculate atmospheric pressure	· Infusion Devices, Cardiac Output Measurement. · Calculating atmospheric pressure	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

		using experimental data.			
6	1 2	* Explain the electrical and physical function of implantable cardiac pacemakers. * Understand the interaction between pacemakers and human physiology. * Experimentally determine the speed of sound propagation.	· Implantable Cardiac Pacemakers · Calculate the speed of sound	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
7	1 2	* Interpret the basic physics behind Electrocardiogram (ECG) signal generation. * Identify the relationship between electrical heart activity and ECG waveforms. * Compare and contrast the viscosity of different fluids experimentally.	· Electrocardiogram ECG · Comparing the viscosity of two liquids	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
8	1 2	* Describe the principles of Electroencephalography (EEG) and brain signal recording. * Differentiate between various brain wave frequencies. * Conduct comparative density measurements for different liquids.	Electroencephalography EEG · Comparing the densities of two liquids	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

9	1 2	* Apply Kirchhoff's, Planck's, Stefan-Boltzmann, and Wien's laws to radiation problems. * Differentiate between conduction, convection, and radiation heat transfer. * Continue comparative density analysis for precision.	· Radiation: Kirshoffs law; planks law; Stefan- Boltzman law; Wiens law; Black body and Albedo; Heat transfer (radiation, convection, conduction). · Comparing the densities of two liquids (cont.)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	1 2	* Explain the production and absorption mechanisms of X-rays. * Analyze X-ray spectra and their medical imaging applications. * Plot a decay curve to calculate the half-life of a radioactive source (simulated using water).	· X-Ray and X-Ray spectra; absorption of X-Ray; · Study the Decay curve and find the half-life of water	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
11	1 2	* Assess the biological effects of UV, IR, and ionizing radiation. * Identify safety protocols for radiation exposure. * Finalize the analysis of decay curves and half-life calculations.	· U.V and IR effects; medical and biological effects of radiation; · Study the Decay curve and find the half-life of water(cont.)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	1 2	* Understand the principles of radiotherapy and the	· Radiotherapy, radioactive iodine	the blackboard	Oral and written theoretical exams, semi-

		use of radioactive iodine. * Evaluate the therapeutic applications of nuclear medicine. * Measure the coefficient of surface tension for water and other liquids.	· Calculating the surface tension coefficient of water and any other liquid	PowerPoint slides E-Learning	semester and semester
13	1 2	* Explain the nuclear magnetic resonance phenomenon used in MRI. * Describe the basic components and physics of an MRI machine. * Complete surface tension calculations and error analysis.	· Magnetic Resonance Imaging MRI · Calculating the surface tension coefficient of water and any other liquid	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
14	1 2	* Describe the image reconstruction principles of Computed Tomography (CT). * Compare CT imaging physics with standard X-ray radiography. * Measure optical loss in fibers due to bending.	· Computed Tomography CT scan · Optical Fiber Loss (bend) Measurement	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
15		Explain the physical principles of diffusion and fluid rheology. * Understand the operation of a	· Diffusion and rheology · Spectrophotometer	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

		spectrophotometer for chemical analysis. * Apply spectrophotometry to measure substance concentration.			

11. Course evaluation	
Distribution of the grade outof according to the tasks assigned to the student, such as 100 daily preparation and daily, oral exams Editorial, reports, etc	
- Laboratory: 20 marks - Daily preparation and classroom activities 5 marks - The mid-term exam is 15 marks - Final exam: 60 marks	
12. Learning and teaching resources	
Reference textbook	1. Introductory Biostatistics for the Health Sciences, by Michael R. Chernick 2. Introductory Statistics Using SPSS, Second Edition, by Herschel Knapp.

1. Course Name
Medical terminology
2. Course Code
104 PtMt
3. Semester/Year
1 st Class, 1st Semester
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
15 hours Theory (1 unit/hr)
7. Name of course coordinator(s):
Prof. Dr. Uday A. Alrikabi E mail: uday_abdulreda@yahoo.com
8. Course objectives
- In this course, students will learn to pronounce, spell, and define medical and pharmaceutical terms used in health care settings. - It will use a word-building strategy that helps them discover connections and relationships among word roots, prefixes, and suffixes. - They will learn the meaning of each part of a complex medical and pharmaceutical term and be able to put the parts together and define the term.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the Unit or Topic	Learning Method	Evaluation Method
1	1	Identify basic medical word roots and their origins.	Basic word roots	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
2	1	Construct and deconstruct terms using prefixes, suffixes, and roots.	Word roots, suffixes and prefixes	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
3	1	Define anatomical planes, positions, and general disease states.	Basic anatomical terms and abnormal conditions	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
4	1	Identify terminology for organs of the reproductive and urinary systems.	The genitals and urinary tract	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
5	1	Analyze pathology and procedural terms for the genitourinary system.	The genitals and urinary tract	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
6	1	Define terms related to heart anatomy, blood vessels, and circulation.	The heart and cardiovascular system	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams

7	1	Interpret clinical abbreviations, diagnostic codes, and symptom descriptors.	Symptoms, diagnoses, treatments, qualifiers, and statistics	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
8	1	Define terms related to life stages, pediatrics, and human development.	Growth and development	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
9	1	Apply terminology specific to female reproductive health and obstetrics.	Gynecology	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
10	1	Describe terms for eye anatomy, vision physiology, and optical disorders.	The eye	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
11	1	Define terms for the central/peripheral nervous systems and mental health.	The nervous system	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
12	1	Identify terms for blood components, blood typing, and lymphatic functions.	Blood and immunity	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
13	1	Describe terminology regarding bones, joints, and musculoskeletal movement.	Bone and joint	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
14	1	Analyze terms related to hematologic disorders and immune system pathology.	Blood and immunity	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
15	1	Define terms for respiratory anatomy, breathing mechanics, and lung diseases.	The respiratory tract	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc

- The midterm exam is 30 marks - The final exam 70 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Edward CC, (Ed.); A Short course in Medical Terminology; Latest edition; Lipincott Williams and Wilkins.
Main references (sources)	Barbara A. Gylys, Regina M. Masters. Medical terminology simplified: a programmed learning approach by body systems; Latest edition.
Recommended supporting books and references (scientific journals, reports)	Vander's Human physiology: the mechanisms of body function. Eric P. Widmaier, Hershel Raff, Kevin T. Strang, last edition
References, websites	

1. Course Name
Biostatistics
2. Course Code
105 ClBi
3. Semester/Year
1st semester / First year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Name: Email:
8. Course objectives
1) Enable students to apply mathematical statistics in pharmaceutical science. 2) Use biostatistics in specific pharmaceutical courses, calculate the odds ratio and relative risk of an event 3) Estimate statistical population indicators, and develop alternative hypotheses.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the Unit or Topic	Learning Method	Evaluation Method
1-2	4	Define basic biostatistical terms and data types. Calculate measures of central tendency (mean, median) and dispersion (SD, variance).	Fundamentals of biostatistics and descriptive statistics	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams
3-4	4	Apply derivatives to find rates of change in biological contexts. Solve basic indefinite and definite integration problems.	Integration and differentiation	Blackboard PowerPoint slides E-Learning	Oral and written exams
5-6	4	Use definite integrals to calculate the area under a curve. Interpret the area under the curve in the context of probability or biological accumulation.	Applications of the area under the curve	Blackboard PowerPoint slides E-Learning	Oral and written exams

7-8	3	Explain the concept of sampling distributions and standard error. Calculate and interpret confidence intervals for population means.	Samples and confidence intervals	Blackboard PowerPoint slides E-Learning	Oral and written exams
9	3	Distinguish between dependent (outcome) and independent (predictor) variables. Identify variables in various experimental designs.	Dependent and independent variables	Blackboard PowerPoint slides E-Learning	Oral and written exams
10-11	3	Calculate and interpret correlation coefficients (e.g., Pearson's r). Construct simple linear regression models to predict outcomes.	Correlation and regression	Blackboard PowerPoint slides E-Learning	Oral and written exams
12	3	Formulate null and alternative hypotheses. Perform and interpret one-sample and two-sample t-tests (paired and unpaired).	One-sample tests and Two-sample tests	Blackboard PowerPoint slides E-Learning	Oral and written exams
13	2	Explain the logic behind Analysis of Variance (ANOVA). Apply ANOVA to compare means across three or more groups.	Analysis of variance tests	Blackboard PowerPoint slides E-Learning	Oral and written exams
14	2	Identify when data violates the assumption of normality. Select appropriate non-parametric tests (e.g.,	Choices in the domain of non-normal distribution	Blackboard PowerPoint slides	Oral and written exams

		Mann-Whitney U, Wilcoxon).		E-Learning	
15	2	Construct contingency tables for categorical data. Perform Chi-square tests to assess associations between categorical variables.	Correlation test for categorical variables	Blackboard PowerPoint slides E-Learning	Oral and written exams

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Daily exams, preparation and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks	
12. Learning and teaching resources	
Reference textbook	1) Introductory Biostatistics for the Health Sciences, by Michael R. Chernick 2) Introductory Statistics Using SPSS, Second Edition, by Herschel Knapp.
External textbook	1) Introduction Statistics – seven edition-by Prem S. Mann Calculus-11 editions by Thomas-2005 2) Biostatistics (A Foundation for Analysis in the Health sciences) Nine edition- by Wayne W. Daniel-2005

1. Course Name
Human rights and Democracy
2. Course Code
106 ClHrd
3. Semester/Year
First semester/ First year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Lecturer. Ahmed Yaqub Ibrahim Email: ahmedyaa@alameed.edu.iq
8. Course objectives
1. Introducing students to human rights, their key characteristics, sources, and the historical stages of their development. 2. Understanding how to exercise political rights. 3. Learning about the Universal Declaration of Human Rights, as well as the international charters and treaties that establish human rights.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Dialogue and discussion - Self-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required learning outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2	Define the literal and terminological meaning of democracy. Understand the core concept of "rule by the people."	Definition of Democracy	the blackboard PowerPoint	Discussion
2	2	Trace the historical origins of democracy (e.g., Ancient Greece). Distinguish between direct, representative, and liberal democratic concepts.	Origin of Democracy Different Concepts of Democracy	the blackboard PowerPoint	crime sections
3	2	Identify key features such as free elections, rule of law, and separation of powers.	Characteristics of a Democratic System	the blackboard PowerPoint	Oral and written theoretical exams, semi-

		Explain the importance of political pluralism and peaceful transfer of power.			semester and semester
4	2	Analyze the social, economic, and cultural conditions necessary for democracy to thrive. Examine the pillars of institutional integrity and an active civil society.	Conditions, Foundations, and Pillars of Democracy	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
5	2	Classify different forms of democracy (Parliamentary, Presidential, Mixed). Compare the Islamic concept of Shura (consultation) with modern democratic practices.	Types of Democracy: Democracy in Islam	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
6	2	Explain the mechanics of majority decision-making. Understand the necessity of protecting minority rights within a majority rule system	Majority Rule Systems	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
7	3	Critically evaluate the strengths (e.g., accountability) and weaknesses (e.g., inefficiency) of democracy. Summarize universal principles like equality, transparency, and freedom of expression.	Advantages and Disadvantages of Democracy Common Principles of Democracy: Democratic Systems	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester

8-9	2	Differentiate between civil rights (individual freedoms) and political rights (participation). List examples such as freedom of speech, assembly, and the right to vote	Civil and Political Rights		
10	2	Categorize rights into "generations" (Civil/Political vs. Economic/Social/Cultural). Understand the distinction between individual and collective rights.	Types of Human Rights in International Law	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
11	2	Identify key international instruments (Treaties, Conventions) that enforce these rights. Explain the role of international bodies in monitoring human rights.	Types of Human Rights in International Law	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
12	2	Summarize the historical context and significance of the 1948 Declaration. Analyze key articles outlining fundamental human freedoms	The Universal Declaration of Human Rights	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
13	2	Compare perspectives on human dignity and rights across major world religions. Identify commonalities and theological	Differences in Rights Across Religions	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester

		divergences regarding individual rights.			
14	2	Explain the specific vulnerabilities and protections required for women and children. Review key conventions like CEDAW and the Convention on the Rights of the Child.	Women's and Children's Rights	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
15	2	Analyze the compatibility and conflicts between secular laws and Islamic Sharia regarding women. Discuss issues such as inheritance, marriage, and leadership roles in both frameworks.	Women's Rights Between Sharia and Law		

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc
- Daily preparation and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks
12. Learning and teaching resources

Required textbooks (methodology, if any)	

Main references (sources)	• (الأنظمة السياسية تأليف حميد حنون, الديمقراطية من الاغريق الى عالم ما بعد الحداثة تأليف هاشم الميلاني • حقوق الانسان والطفل الديمقراطية للدكتور ماهر صالح
Recommended supporting books and references (scientific journals, reports,)	Mohamed Gharbi, Democracy and Good Governance: Challenges for Political Participation and Achieving Development, Special Issue, (Algeria, Journal of Politics and Law Notebooks, April 2011).
References, websites	

1. Course Name
Physiology I
2. Course Code
107 PtPh1
3. Semester/Year
1st Semester, 1st Class
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total
(45) hours Theory and (30) hours Laboratory
7. Name of course coordinator(s):
Name: shatha hussain kameel Email: shatha.kadhim@uokerbala.edu.iq
8. Course objectives

1. To learn the principle of human physiology and the body organized.
2. To learn the cell structure, functions, and signaling
3. To learn how the nervous system works
4. Providing students with scientific and practical theoretical background on many basic functional physiological principles related to different cells, organs, and human body systems, as well as their relationship to various diseases and essential treatments, which are necessary and fundamental to understand the effect of different medicines on the effectiveness of body systems.
5. Enable students to understand the basic principles of physiological functions of different human tissues and organs, and how to evaluate these functions and relate them to natural and abnormal conditions. It also emphasizes the role of homeostasis and hemodynamic changes in integrating the physiological state.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1-2	3	• Describe the levels of structural organization in the human body. • Define the relationship between structure (anatomy) and function (physiology).	• Introduction to physiology: How is the body organized?	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
3-4	3	• Define homeostasis and explain its significance for survival.	• Homeostasis: Framework for Human Physiology	The blackboard	Reports, assignments, oral and written

		• Compare negative and positive feedback mechanisms with clinical examples.		PowerPoint slides E-Learning	theoretical examinations
5-6	3	• Identify the functions of major cellular organelles. • Summarize the basics of protein synthesis and cellular metabolic pathways (ATP production).	• Cellular structure, protein, and metabolic pathways	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
7-8	3	• Differentiate between active and passive transport mechanisms. • Explain the principles of osmosis, diffusion, and membrane potential.	• Movement of Molecules across Cell Membranes	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
9-10	3	• Classify the types of intercellular communication (e.g., autocrine, paracrine). • Explain the role of receptors, ligands, and second messengers in signal transduction.	• Cell signaling in physiology	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
11-13	3	• Describe the generation and propagation of an action potential. • Outline the anatomical and functional divisions of the Central and Peripheral Nervous Systems.	• Neuronal signaling and the structure of the nervous system	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations

1. Course Name
Pharmaceutical Calculation
2. Course Code
108 PPhc
3. Semester/Year
Second semester/ first year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours theory and 30 hours practices
7. Name of course coordinator(s):
Ass.Prof. Dr. Abdullah Hameed Maad Email: dr.ph.abdullah.maad@gmail.com
8. Course objectives
1) Develop skills in interpreting prescriptions and medication orders accurately and safely. 2) Apply all types of measurement systems in pharmaceutical calculations, including dose determinations for different patient needs. 3) Perform calculations for adjusting formulas, including reduction and enlargement methods. 4) Calculate percentage strength, ratio strength, density, and specific gravity/volume for various pharmaceutical preparations. 5) Prepare and evaluate isotonic solutions for compatibility with physiological systems. 6) Calculate values related to electrolyte solutions, including milliequivalents, millimoles, and milliosmoles. 7) Apply principles of IV admixture preparation, and flow rate calculations for intravenous therapy.

14-15	3	• Explain the mechanism of sensory transduction (converting stimuli to nerve impulses). • Describe the pathways and receptors involved in somatic and special senses.	• Sensory physiology	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- The midterm exam is 20 marks - The practical exam (with its details) is 20 - The final exam had 60 marks	
12. Learning and teaching resources	
Required Textbooks (methodology, if any)	- Guyton and Hall: Textbook of Medical Physiology. 14^{ed}, 2022.
Main references (sources)	- Vander's Human physiology: the mechanisms of body function. Eric P. Widmaier, Hershel Raff, Kevin T. Strang, last edition
Recommended supporting (Books and Reference Scientific Journals, reports)	- Human Physiology ''An integrated Approach''. 15ed, 2014. - Essentials of Human Physiology for Pharmacy. Laurie Kelly, McCorry. 2nd, (2008). - Ganong's Review of Medical Physiology. 25ed, 2016. - 3) Ganong's Review of Medical Physiology. 26ed, 2019.
References, websites	www.physiologyplace.com

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the Unit or Topic	Learning Method	Evaluation Method
1	3 2	* Interpret common Latin abbreviations and symbols used in prescription writing. * Identify and select appropriate pharmaceutical glassware for compounding.	Interpretation of prescription or medication orders. Demonstration of different glass wares and equipment used in the field of pharmacy.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams
2	3 2	* Convert units between metric, apothecary, and avoirdupois systems. * Perform basic weighing and measuring techniques with high accuracy.	Systems of measurement. Pharmaceutical measurements	Blackboard PowerPoint slides E-Learning	Oral and written exams
3	3	* Calculate specific gravity and specific	Density, specific gravity and specific volume	Blackboard	Oral and written exams

	2	volume for liquids and solids. * Apply density concepts to convert between weight and volume.	Pharmaceutical measurements (cont)	PowerPoint slides E-Learning	
4	3 2	* Express concentrations as percent weight/weight, weight/volume, and volume/volume. * Convert between ratio strength and percentage concentration.	Percent strength, ratio strength, and other expressions of concentration Volume measurements	Blackboard PowerPoint slides E-Learning	Oral and written exams
5	3 2	* Solve complex problems involving dilution and concentration adjustments. * Accurately measure viscous liquids and small volumes.	Percent strength, ratio strength, and other expressions of concentration (cont) Volume measurements (cont)	Blackboard PowerPoint slides E-Learning	Oral and written exams
6	3 2	* Calculate doses based on patient parameters (age, weight, BSA). * Determine ingredient quantities for compounding liquid dosage forms.	Calculation of doses, calculation of doses patient parameters Calculations involving liquid pharmaceutical preparations.	Blackboard PowerPoint slides E-Learning	Oral and written exams
7	3 2	* Adjust dosage regimens for special populations (pediatrics, geriatrics). * Verify calculations for	Calculation of doses, calculation of doses patient parameters (cont) Calculations involving liquid pharmaceutical preparations (cont).	Blackboard PowerPoint slides E-Learning	Oral and written exams

		solution solubility and stability.			
8	3 2	* Scale formulation quantities up or down (reduce/enlarge) for specific batch sizes. * Define principles of isotonicity and buffer capacity.	Reducing and enlarging formulas Calculations involving buffer and isotonic liquid preparations	Blackboard PowerPoint slides E-Learning	Oral and written exams
9	3 2	* Apply the alligation method (medial and alternate) to mix products of different strengths. * Calculate dilution of stock solutions to obtain desired concentrations.	Altering product strength, use of stock solutions, and problem solving by alligation Calculations involving buffer and isotonic liquid preparations (cont.)	Blackboard PowerPoint slides E-Learning	Oral and written exams
10	3 2	* Calculate sodium chloride equivalents (E-values) to prepare isotonic solutions. * Adjust prescription quantities proportionally for dispensing.	Isotonic and buffer solutions Reducing and enlarging prescription contents.	Blackboard PowerPoint slides E-Learning	Oral and written exams
11	3 2	* Formulate pharmaceutical buffers to maintain specific pH levels. * Solve complex isotonicity problems involving multiple solutes.	Isotonic and buffer solutions (cont) Reducing and enlarging prescription contents (cont.)	Blackboard PowerPoint slides E-Learning	Oral and written exams
12	3 2	* Convert between milligrams, milliequivalents	Electrolyte solutions (milliequivalents, millimoles and milliosmoles)	Blackboard PowerPoint slides	Oral and written exams

		(mEq), and millimoles. * Calculate osmolarity for parenteral nutrition and IV fluids.	Percentages in calculating prescription contents	E-Learning	
13	3 2	* Interpret laboratory electrolyte values for clinical dose adjustments. * Validate final prescription percentages against safety limits.	Electrolyte solutions (milliequivalents, millimoles and milliosmoles) (cont.) Percentages in calculating prescription contents (cont.)	Blackboard PowerPoint slides E-Learning	Oral and written exams
14	3 2	* Calculate IV flow rates (drops/min, mL/hr) and infusion durations. * Perform serial dilutions for dispensing low-concentration drugs.	Intravenous infusions, parenteral, admixtures, rate-of-flow calculations Stock solutions and dilution technique during dispensing technique.	Blackboard PowerPoint slides E-Learning	Oral and written exams
15	3 2	* Calculate volumes required for parenteral admixtures and TPN. * Adjust infusion rates based on changing clinical orders.	Intravenous infusions, parenteral, admixtures, rate-of-flow calculations (cont) Stock solutions and dilution technique during dispensing technique (cont.)	Blackboard PowerPoint slides E-Learning	Oral and written exams

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student such as daily activities and exams, editorial, reports, etc

- Practical exam 20 - The mid-term exam 20 marks - The final exam 60

12. Learning and teaching resources	
Required textbooks (methodology, if any)	
Main references (sources)	Pharmaceutical Calculations; 15th edition (2017) by Howard C. Ansel
Recommended supporting books and references (scientific (....journals, reports	Pharmaceutical Calculations 13th Edition Howard C. Ansel, PhD
References , websites	BNF, BP and USP

1. Course Name
Computer Sceinces
2. Course Code
111 ClCs
3. Semester/Year
1st Semester/ first Year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
15 hours theory and 30 hours laboratory laboratory
7. Name of course coordinator(s):
Name: Email:
8. Course objectives
1. Provide a thorough overview of the fundamental concepts of computer applications. 2. The course covers the use of Microsoft Word, Microsoft Power point, and Google applications in detail.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the Unit or Topic	Learning Method	Evaluation Method
1	1 2	Understand basic file management, text editing, and Google Apps integration.	Introduction to Microsoft Word (File and Home Tab) Using Google applications	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams
2	1 2	Ability to integrate visuals, equations, and charts into documents.	Insert Tab Use the tape to insert mathematical equations and graphs	Blackboard, PowerPoint, E-Learning	Oral/written exams
3	1 2	Master page formatting, margins, orientation, and spacing.	Layout Tab Use tape to layout the paper	Blackboard, PowerPoint, E-Learning	Oral/written exams
4	1 2	Learn to automate citations, bibliographies, and document navigation.	References Tab The References Tab allows you to now create a table of contents, footnotes, citations, cross-references	Blackboard, PowerPoint, E-Learning	Oral/written exams

5	1 2	Ability to perform mail merges for mass communication/labels.	Mailings Tab Use the Mailing Bar to send	Blackboard, PowerPoint, E-Learning	Oral/written exams
6	1 2	Understand proofing tools, language settings, and comments.	Review Tab The use of tape in the meanings of paper and the use of tools in translation	Blackboard, PowerPoint, E-Learning	Oral/written exams
7	1 2	Learn to manipulate document views and window arrangements.	View Tab The use of tape in the meanings of paper and the use of tools in translation	Blackboard, PowerPoint, E-Learning	Oral/written exams
8	1 2	Deepen understanding of view modes and translation tools.	View Tab (Continued, The use of tape in the meanings of paper and the use of tools in translation)	Blackboard, PowerPoint, E-Learning	Oral/written exams
9	1 2	Navigate the PowerPoint interface and manage basic file operations.	Introduction to Microsoft PowerPoint Create, edit and save	Blackboard, PowerPoint, E-Learning	Oral/written exams
10	1 2	Master slide organization, formatting text, and printing handouts.	File and Home Tab Print presentations	Blackboard, PowerPoint, E-Learning	Oral/written exams
11	1 2	Ability to enhance slides with multimedia, shapes, and smart art.	Insert Tab Add graphics, create presentations with text/media	Blackboard, PowerPoint, E-Learning	Oral/written exams
12	1 2	Learn to apply professional themes and template consistency.	Design Use design layouts and templates	Blackboard, PowerPoint, E-Learning	Oral/written exams
13	1 2	Understand slide transitions to control presentation flow.	Transition Tab, Slide View Control speed, sound, and transition effects	Blackboard, PowerPoint, E-Learning	Oral/written exams

14	1 2	Master object animations to emphasize key points.	Animation Tab Entrance and exit animation effects	Blackboard, PowerPoint, E-Learning	Oral/written exams
15	1 2	Finalize presentation quality with proofing and audio integration.	Review Tab, View Tab Adding sound and reviewing effects	Blackboard, PowerPoint, E-Learning	Oral/written exams

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams Editorial, reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if (any	
Main references (sources)	- Microsoft office Professional 2019, BY Linda Foulkes, Senior Editor: Afshaan Khan. - Microsoft office Professional BY Joyce Cox, Jo a Lambert & Curtis Frge
Recommended supporting books and ,references (scientific journals (...,reports	- Windows 2011 - Microsoft office 2010
References , websites	https://www.microsoft.com/software-download/windows11

1. Course Name
Organic Chemistry I
2. Course Code
109 PcOc1
3. Semester/Year
1st Class, 2nd Semester
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and 30 hours Laboratory
7. Name of course coordinator(s):
Prof. Dr. Zeyad Kadhim Oleiwi Email: zeyadk.almajtoomi@uokufa.edu.iq
8. Course objectives
1. This course provides a foundational understanding of organic chemistry, focusing on the relationship between the structure of carbon-based molecules and their physical and chemical properties. 2. The curriculum progresses logically from fundamental principles of bonding to the chemistry of major hydrocarbon families, three-dimensional structure, and key functional groups, culminating with the unique chemistry of aromatic compounds. 3. Understand and apply thermal analysis methods by determining the melting and boiling points of known and unknown compounds. 4. Evaluate purity and identity of substances through interpretation of melting/boiling point data. 5. Perform recrystallization techniques to purify solid compounds and assess the efficiency of purification. 6. Conduct distillation methods (simple and fractional) for separation and purification of liquid mixtures. 7. Determine solubility classes of pharmaceutical compounds in different solvents, and apply solubility data in drug formulation and analysis.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours (Th/Lab)	Required Learning Outcomes (Brief)	Name of the Unit or Topic	Learning Method	Evaluation Method
1	3 / 2	• Explain atomic orbitals, hybridization (sp3, sp2, sp), and polarity. • Measure melting points to identify pure substances.	**Introduction (Structure and properties)** Lab: Determination of melting point (Known sample).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
2	4 / 2	• Describe nomenclature and physical properties of alkanes. • Assess compound	**Alkanes and methane** Lab: Determination of melting point (quiz/unknown).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments

		purity using melting point analysis.			
3	4 / 2	• Explain the structure and stability of alkenes and dienes. • Measure boiling points to characterize liquid compounds.	**Alkenes and dienes** Lab: Determination of boiling point (known sample).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
4	3 / 2	• Describe the acidity and electrophilic addition reactions of alkynes. • Identify unknown liquids via boiling point determination.	**Alkynes** Lab: Determination of boiling point (quiz/unknown).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
5	3 / 2	• Analyze conformational isomerism and stability in cycloalkanes. • Perform recrystallization to purify solid compounds.	**Cycloalkanes** Lab: Re-crystallization (known sample).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
6	4 / 2	• Define chirality, enantiomers, and assign R/S configurations. • Demonstrate proficiency in purification via recrystallization.	**Stereochemistry I** Lab: Re-crystallization (quiz/unknown).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
7	4 / 2	• Distinguish between diastereomers and meso compounds. • Perform simple distillation to	**Stereochemistry II** Lab: Distillation techniques (known samples).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments

		separate liquid mixtures.			
8	3 / 2	• Explain SN1, SN2, E1, and E2 reaction mechanisms. • Evaluate separation skills using distillation.	**Alkyl halides** Lab: Distillation techniques (quiz/unknown).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
9	3 / 2	• Describe synthesis, hydrogen bonding, and reactions of alcohols. • Classify compounds based on solubility behavior.	**Alcohols** Lab: Determination of solubility class (known sample).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
10	3 / 2	• Explain the synthesis (Williamson ether synthesis) and cleavage of ethers. • Identify functional groups using solubility tests.	**Ethers** Lab: Determination of solubility class (quiz/unknown).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
11	4 / 2	• Discuss the acidity of phenols and electrophilic substitution. • Perform liquid-liquid extraction to isolate compounds.	**Phenols** Lab: Extraction technique (quiz/unknown).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
12	4 / 2	• Apply Hückel's rule to determine aromaticity. • Practice distillation for purification of aromatic compounds.	**Aromatic Hydrocarbons** Lab: Distillation techniques (known samples).	Blackboard, Slides, E-Learning	Reports, exams, lab experiments
13	3 / 2	• Explain the mechanism of Electrophilic	**Electrophilic aromatic substitution**	Blackboard, Slides, E-Learning	Reports, exams, lab experiments

		Aromatic Substitution (EAS). • Assess mastery of distillation techniques.	Lab: Distillation techniques (quiz/unknown).		

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams, editorial, reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Handbook for Practical organic chemistry Adopted by the Department
Main references (sources)	1. Organic Chemistry: by John McMurry 10th Ed, 2023 2. Organic Chemistry: Structure and Function (8th Edition) by Vollhardt and Schore. 3. Organic Chemistry by Robert T. Morrison and Robert N. Boyd.
Recommended supporting books and references (scientific journals, reports)	
References, websites	

1. Course Name
Arabic language
2. Course Code
110 ClAr
3. Semester/Year
Second semester/ First year
4. Date this description was prepared
10/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Asst. Lect. Rami M. Jawad Abdullah Jawad Al-Asadi Email: ramialasadi4@gmail.com
8. Course objectives

At the end of the course the students:

- Enabling to learn sentence formation skills and recognize how incorrect sentences produce meaningful sentences.
- Enabling students to prepare scientific reports in Arabic.
- Enabling students to express scientific concepts accurately, avoiding common linguistic errors and using appropriate technical terminology.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Self-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2	• Define the importance of Standard Arabic. • Identify basic linguistic components.	Introduction to the Arabic Language	Lectures and discussions Power point	Oral and written tests, and preparing reports
2	2	• Construct correct verbal sentences. • Identify the verb and the doer (subject).	Verbal Sentence	Lectures and discussions Power point	Oral and written tests, and preparing reports
3	2	Construct correct nominal sentences. • Differentiate between Nominal and Verbal sentences.	Nominal Sentence	Lectures and discussions Power point	Oral and written tests, and preparing reports

4	2	• Apply rules of agreement (gender/number) between Subject and Predicate. • Identify different types of predicates.	Subject and Predicate	Lectures and discussions Power point	Oral and written tests, and preparing reports
5	2	• Explain how *Inna* changes the case endings of a sentence. • Use *Inna* and its sisters correctly in writing.	In and Its Sisters	Lectures and discussions Power point	Oral and written tests, and preparing reports
6	2	• Explain how *Kana* changes the case endings of a sentence. • Use *Kana* and its sisters correctly in writing.	Kana and Its Sisters	Lectures and discussions Power point	Oral and written tests, and preparing reports
7	3	• Identify the Subject (Fa'il) and its grammatical case. • Distinguish the Subject from the Object in complex sentences.	Rules of the Subject and the Subject	Lectures and discussions Power point	Oral and written tests, and preparing reports
8	2	• Apply rules for writing the Hamza (initial, medial, final). • Avoid common spelling errors in scientific reports.	Rules of the Hamza		
9	2	• Differentiate between the Direct Object and Absolute Object.	Object and Absolute Object	Lectures and discussions	

		• Apply correct accusative case endings.		Power point	
10	2	• Analyze the themes of pre-Islamic poetry (Mu'allaqat). • Interpret the vocabulary and imagery of Imru' al-Qais.	Imru' al-Qais: Analysis of a Poetic Text		Oral and written tests, and preparing reports
11	2	• Analyze the structure of modern Free Verse. • Discuss symbols and rain imagery in Al-Sayyab's poetry.	Badr Shakir al-Sayyab: Analysis of a Poetic Text	Lectures and discussions Power point	Oral and written tests, and preparing reports
12	2	• Analyze the neoclassical style in modern poetry. • Interpret social and political themes in Al-Jawahiri's work.	Muhammad al-Jawahiri: Analysis of a Poetic Text	Lectures and discussions Power point	Oral and written tests, and preparing reports
13	2	• Analyze Abbasid poetry and wisdom literature. • Discuss the concept of pride and philosophy in Al-Mutanabbi.	Abu al-Tayyib al-Mutanabbi: Analysis of a Poetic Text	Lectures and discussions Power point	Oral and written tests, and preparing reports
14	2	• Analyze the art of "Fakhr" (Tribal Pride) in poetry. • Interpret the heroic imagery of Amr ibn Kulthum.	Amr ibn Kulthum: Analysis of a Poetic Text	Lectures and discussions Power point	Oral and written tests, and preparing reports

15		• Analyze the transition from Jahili to Islamic poetry. • Discuss moral wisdom and reflection in Labid's verses.	Labid ibn Rabi'ah: Analysis of a Poetic Text		

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams Editorial, reports, etc	
- Daily preparation and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	• Basic grammar of the Arabic language • Al-Wajeez in Arabic for non-specialists
Main references (sources)	1. University Arabic for Non-Specialists, by Dr. Abdul Rajhi 2. Arabic Language for Non-Specialist Programs, by Dr. Mohi Hilal 3. Ibn Aqil's Commentary, Part One
Recommended supporting books and references (scientific journals, reports,)	Lexicons and dictionaries
References, websites	

1. Course Name
Organic Chemistry II
2. Course Code
212 PcOc2
3. Semester/Year
2nd Class, 1st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and 30 hours Laboratory
7. Name of course coordinator(s):
Prof. Dr. Zeyad Kadhim Oleiwi Email: zeyadk.almajtoomi@uokufa.edu.iq
8. Course objectives
Upon completion of this course, students will be able to: • Understand the fundamental chemistry of carbon. • Classify organic compounds and predict their properties and reactions. • Analyze the structure and behavior of key functional groups, including organic halides, carboxylic acids, aldehydes, ketones, and amines. • Apply the principles of stereochemistry to organic molecules.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the Unit or Topic	Learning Method	Evaluation Method
1	3 2	**Theory:** Describe the structure of benzene (resonance, orbital hybridization) and the concept of aromaticity (Hückel's Rule). **Lab:** Perform solubility tests to classify known organic compounds into their respective solubility groups (e.g., water-soluble, acid-soluble).	**Theory:** Aromatic Hydrocarbons: Benzene **Lab:** Solubility Classification (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
2	3	**Theory:** Explain the general mechanism of	**Theory:** Electrophilic	Blackboard,	Reports, assignments,

	2	Electrophilic Aromatic Substitution (EAS) and the role of the electrophile. **Lab:** Demonstrate proficiency in solubility classification principles through problem-solving exercises.	Aromatic Substitution (Introduction) **Lab:** Solubility Classification (tutorial and quiz)	PowerPoint, E-Learning	oral/written exams, Lab experiments
3	3 2	**Theory:** Predict the directing effects (ortho/para vs. meta) and activating/deactivating nature of substituents on benzene rings. **Lab:** Apply solubility testing schemes to identify the class of an unknown organic compound.	**Theory:** Electrophilic Aromatic Substitution: Arenes and their Derivatives **Lab:** Solubility Classification (unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
4	3 2	**Theory:** Discuss the structure, nomenclature, physical properties, and acidity of carboxylic acids. **Lab:** Perform specific chemical tests (e.g., Lucas test, Chromic acid test) to identify known alcohols.	**Theory:** Carboxylic Acids: Properties **Lab:** Identification of alcohols (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
5	3 2	**Theory:** Detail the synthesis of carboxylic acids and their major reactions (reduction, decarboxylation). **Lab:** Validate theoretical understanding of alcohol reactivity through tutorials and assessments.	**Theory:** Carboxylic Acids: Reactions **Lab:** Identification of alcohols (tutorial and quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
6	3	**Theory:** Compare the stability and reactivity of acid derivatives	**Theory:** Functional Derivatives of	Blackboard,	Reports, assignments, oral/written

	2	(acid chlorides, anhydrides, esters, amides). **Lab:** Analyze an unknown sample to determine if it is an alcohol and identify its specific structure.	Carboxylic Acids **Lab:** Identification of alcohols / Elemental analysis (unknown)	PowerPoint, E-Learning	exams, Lab experiments
7	3 2	**Theory:** Classify amines (1, 2, 3), and explain their nomenclature, structure, and basicity. **Lab:** Perform characteristic colorimetric tests (e.g., Ferric Chloride) to identify phenols.	**Theory:** Amines I **Lab:** Identification of Phenol (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
8	3 2	**Theory:** Describe the preparation of amines and their reactions, including diazotization and coupling. **Lab:** Demonstrate competence in the chemical identification of phenols via quizzes.	**Theory:** Amines II **Lab:** Identification of Phenol (tutorial and quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
9	3 2	**Theory:** Explain the structure of the carbonyl group in aldehydes and their specific oxidation/reduction reactions. **Lab:** Identify an unknown organic sample as a phenol using systematic testing.	**Theory:** Aldehydes **Lab:** Identification of Phenol (unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
10	3 2	**Theory:** Compare ketones with aldehydes and discuss nucleophilic addition reactions common to carbonyls.	**Theory:** Ketones **Lab:** Identification of Aldehyde	Blackboard, PowerPoint,	Reports, assignments, oral/written exams, Lab experiments

		Lab: Distinguish between aldehydes and ketones using tests like Tollen's, Fehling's, or 2,4-DNP.	and Ketone (known)	E-Learning	
11	3 2	**Theory:** Understand the mechanism of Aldol Condensation (base-catalyzed formation of beta-hydroxy aldehydes/ketones). **Lab:** Solve problems related to carbonyl identification and predict test results.	**Theory:** Aldol Condensation **Lab:** Identification of Aldehyde and Ketone (tutorial and quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
12	3 2	**Theory:** Explain the Claisen Condensation mechanism and its application in synthesizing beta-keto esters. **Lab:** Analyze an unknown carbonyl compound to determine its specific identity.	**Theory:** Claisen Condensation **Lab:** Identification of Aldehyde and Ketone (unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
13	3 2	**Theory:** Integrate knowledge of various functional groups to classify complex organic molecules. **Lab:** Apply a comprehensive systematic scheme to identify a known organic compound from any class.	**Theory:** Classification (General Review) **Lab:** Identification of Organic Compound (General, Known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
14	3 2	**Theory:** Predict the products of multi-step organic reactions and propose synthesis pathways. **Lab:** Independently identify a "General Unknown" organic compound using all	**Theory:** Reactions and Properties (General Review) **Lab:** Identification of Organic	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments

		available chemical tests.	Compound (General, Unknown)		
15	3 2	**Theory:** Discuss the enhanced acidity of phenols compared to alcohols and their electrophilic substitution reactions. **Lab:** Final assessment of practical skills in organic analysis and identification.	**Theory:** Phenols **Lab:** Identification of Organic Compound (General Quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments

11. Course evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams

Editorial, reports, etc

- Practical exam 20
- The midterm exam is 20 marks
- The final exam 60 marks

12. Learning and teaching resources

methodology, if textbooks Required any	- Organic Chemistry by Robert T. Morrison and Robert N. Boyd
Main references (sources)	- Organic Chemistry by McCurry; 5th ed. Thomason learning; CA, USA; 2000.
Recommended supporting books and references (scientific journals, reports)	
References, websites	

1. Course Name:
Medical Microbiology I
2. Course Code
213 ClMm1
3. Semester/Year:
1st semester/second year
4. Date this description was prepared:
2/9/2025
5. Available attendance forms:
Physical attendance
6. Number of academic hours (total) / number of units (total):
45 hours Theory and 30 hours Laboratory
7. Name of the course leader (if more than one name is mentioned):
Name: Email:
8. Course objectives
1. Understanding bacteria in terms of their presence in the environment and their nutritional requirements for growth and reproduction 2. Methods of transmission of bacteria and the diseases they cause 3. Treatments and resistance to antibiotics and environmental factors

9. Teaching and learning strategies:	
-Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Conceptual mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy -Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Strategy for providing examples	**Education strategies** **Education strategies**

10. Course structure:

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	Hours	Week
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	The blackboard PowerPoint slides E-Learning	• Introduction to microbiology • Bacterial classification and structure • Bacterial pathogenicity	**Cognitive outputs** The student should be able to know the causes, symptoms, and diagnosis of parasitic, viral, and immunological diseases - Determine the appropriate medication for each disease condition - Knowledge of the methods of transmission of parasitic and viral diseases - Knowledge of ways to prevent	4 2	1
Reports, assignments, oral and written theoretical examinations, semi-semester	the blackboard PowerPoint slides E-Learning	• Bacterial genetic • Bacterial growth physiology and biofilm		4 2	2

and semester			parasitic and viral diseases **Acquiring skills**		
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides	• Normal Flora • Antimicrobial resistance	- How to conduct and deliver qualitative seminars and lectures - Skill in drug education for patients - The skill of extracting the required information from approved sources **Emotional and value outcomes** -Thinking skills through translating, analysing, evaluating and extracting ideas - Instilling moral values for proper dealing with patients **transferable general and qualifying skills (other skills related to employability and personal development).**	3 2	3
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Gram positive: Staphylococcus • Gram positive: Streptococcus		4 2	4
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Gram positive: Bacillus • Gram positive: Clostridium		3 2	5
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Gram positive: Corynebacterium • Gram negative : Neisseria • Gram negative : Enteroba. E. coli		4 2	6

Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Gram negative : Salmonella and Shigella • Gram negative : Klebsiella and proteus	-Performing practical experiments - Acquiring skill in using computers - Giving the student confidence through discussing seminars - Acquire skill in writing reports - Acquiring driving skills	3	7
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Non-enteric Pseudomonas and vibrio • Brucella, Bordetella and Hemophilus		3	8
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• H. pylori and Campylobacter		2	9
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Treponema, Yersinia and Actinomycetes		3	10
Reports, assignments, oral and written	the blackboard PowerPoint slides E-Learning	• Mycobacteria		2	11

theoretical examinations, semi-semester and semester					
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Antimicrobial stewardship		2	12
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Recombinant biotechnology		2	13
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides	• Phage and toxins		1	14
Reports, assignments, oral and written theoretical examinations, semi-	the blackboard PowerPoint slides E-Learning	• Probiotics, prebiotics and postbiotics		3	15

semester and semester					

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily oral exams Editorial, reports, etc
-Practical exams: 20 marks - The mid-term exam is 20 marks - Final exam: 60 marks

12. Learning and teaching resources	
Required textbooks (methodology, if found)	
Main references (sources)	1. Lippincotts illustrated review microbiology, 2nd ed. 2. A color Atlas of microbiology by Ronald John Olds
Recommended supporting books and references (scientific journals, reports,)	3. Jawetz, Melnick, & Adelberg's. Medical Microbiology 26th ed.
Electronic references, websites	

1. Course Name
Physical Pharmacy I
2. Course Code
214 PPp1
3. Semester/Year
2nd Class, 1st Semester
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and 30hours Laboratory / 4 units
7. Name of course coordinator(s):
Name: kamil kareem atyia E mail: kamil_altameemi@alameed.edu.iq Name: Haider Mohammad jehad E mail: haider.mj80@yahoo.com
8. 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	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	**Theory:** Define intermolecular binding forces (Van der Waals, hydrogen bonds) and describe the properties of the gaseous state (Ideal Gas Law). **Lab:** Demonstrate understanding of laboratory safety protocols and the scope of physical pharmacy.	**Theory:** States of matter (Chapter 2) • Binding forces between molecules • States of matter • The gaseous state **Lab:** Introduction to physical pharmacy	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3 2	**Theory:** Differentiate between crystalline and amorphous solids, and explain the properties of the liquid and liquid-crystalline states.	**Theory:** The liquid state • Solids and crystalline state • The liquid crystalline state • The supercritical fluid state.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Lab: Perform calculations to express pharmaceutical concentrations (Molarity, Molality, Normality, % w/w).	**Lab:** Expression of concentrations in pharmaceutical preparations		-Conduct laboratory experiments
3	3 2	**Theory:** Explain the Phase Rule ($F = C - P + 2$), the supercritical fluid state, and the principles of thermal analysis (DSC/TGA). **Lab:** Practice advanced concentration calculations required for dosage form preparation.	**Theory:** • Thermal analysis • Phase equilibria and phase rule • Solid dispersions **Lab:** Expression of concentrations in pharmaceutical preparations	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 2	**Theory:** Classify solutions containing non-electrolytes and define fundamental colligative properties. **Lab:** Construct a phase diagram for a two-component liquid system (e.g., Phenol-Water).	**Theory:** Nonelectrolytes (Chapter 5) Physical properties of substances Types of solutions • Concentration expressions **Lab:** Two-component systems containing liquid phases	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 2	**Theory:** Distinguish between ideal and real solutions and calculate molecular weights using colligative properties. **Lab:** Analyze the Critical Solution Temperature (CST) of a binary system.	**Theory:** Nonelectrolytes; Ideal and real solutions Colligative properties Molecular weight determination. **Lab:** Two-component systems containing liquid phases	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3	**Theory:** Explain the Arrhenius theory of	**Theory:** Electrolyte solutions (Chapter 6);	Blackboard,	Reports, assignments, oral

	2	dissociation and the behavior of strong electrolytes in solution. **Lab:** Construct a ternary phase diagram (triangular plot) for a three-component system.	• Properties of solutions of electrolytes • Theory of dissociation • Theory of strong electrolytes **Lab:** Three-component systems	PowerPoint, E-Learning	and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	3 2	**Theory:** Define ionic strength and apply the Debye-Hückel theory to calculate activity coefficients. **Lab:** Interpret phase behavior and solubility within a three-component system.	**Theory:** Electrolyte solutions; • Ionic strength The Debye- Hückel theory Coefficients for expressing colligative properties **Lab:** Three-component systems	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 2	**Theory:** Discuss solute-solvent interactions (polar vs. non-polar) and the solubility of liquids in liquids. **Lab:** Determine tie lines in a ternary phase diagram to identify phase compositions.	**Theory:** Solubility and distribution phenomena (Chapter 9); Solvent-solute interactions; Solubility of liquids in liquids **Lab:** Tie lines for three-component systems	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 2	**Theory:** Explain factors affecting the solubility of solids in liquids and distinguish thermodynamic from kinetic solubility. **Lab:** Calculate the relative amounts of phases in a ternary system using tie line data.	**Theory:** Solubility of solids in liquids; Determining thermodynamic and kinetic solubility **Lab:** Tie lines for three-component systems	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

10	3 2	**Theory:** Identify strategies to enhance poor aqueous solubility and describe methods for accurate solubility measurement. **Lab:** Measure the partition coefficient (P) of a drug between oil and water phases.	**Theory:** Poor aqueous solubility; Measuring solubility; Partition coefficient **Lab:** Partition coefficient: Measurements and evaluation	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 2	**Theory:** Explain the Nernst Distribution Law and the distribution of solutes between immiscible solvents. **Lab:** Evaluate different experimental methods (e.g., shake-flask) for determining solubility.	**Theory:** Distribution of solutes between immiscible solvents; Solubility methods **Lab:** Solubility methods	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 2	**Theory:** Define acids and bases according to Brønsted–Lowry theory and describe ionization equilibria. **Lab:** Apply solubility measurement techniques to gather experimental data.	**Theory:** Ionic equilibria (Chapter 7); Brønsted–Lowry theory; Ionization and dissociation **Lab:** Solubility methods	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3 2	**Theory:** Classify solvents, apply Lewis electronic theory, and calculate pH for weak acids and bases. **Lab:** Prepare buffer solutions and measure	**Theory:** Classification of solvents; Lewis electronic theory; Acid-base equilibria; Calculation of pH and acidity constants; Buffer solutions **Lab:** Buffer solutions	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		their pH using a pH meter.			-Conduct laboratory experiments
14	3 2	**Theory:** Derive the Henderson-Hasselbalch equation and explain the concept of buffer capacity (beta). **Lab:** Evaluate the buffering capacity of prepared solutions against acid/base addition.	**Theory:** Buffered and isotonic solutions (Chapter 8); The buffer equation; Buffer capacity **Lab:** Buffer solutions	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 2	**Theory:** Discuss the physiological importance of buffers in biological systems (e.g., blood) and pharmaceutical formulations. **Lab:** Determine the Solubility Product Constant (K_{sp}) of a slightly soluble salt.	**Theory:** Buffers in pharmaceutical and biological systems **Lab:** Determination of solubility product constant of slightly soluble salts	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily ,preparation and daily, oraland written exams Editorial, reports, etc
- Practical exam20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
methodology, if textbooks Required any	
Main references (sources)	- Martin's Physical Pharmacy and Pharmaceutical Sciences; 7th edition; 2017. - Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022.
Recommended supporting books and references (scientific journals, reports)	- Physicochemical Principles of Pharmacy by Alexander Taylor Florence and David Attwood
References , websites	- USP, BP, and FDA

1. Course Name
Physiology I
2. Course Code
214 PPp1
3. Semester/Year
1st Semester, 2nd Class
4. Date this description was prepared
1/9/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total
25/20 (45) hours Theory and Laboratory
7. Name of course coordinator(s):
Name: shatha hussain kameel Email: shatha.kadhim@uokerbala.edu.iq
8. Course objectives

- To provide students with a comprehensive scientific and theoretical background in the physiological principles governing human cells, organs, and body systems. This foundation is essential for understanding the relationship between physiology, disease states, and pharmacotherapy.

- Furthermore, the course bridges theory and practice through hands-on medical physiology experiments, allowing students to directly observe physiological hallmarks and validate theoretical concepts with empirical results.

- To enable students to master the fundamental principles of physiological functions across various human tissues and organs. Students will learn to evaluate these functions and distinguish between normal and abnormal conditions, with a specific emphasis on the critical roles of homeostasis and hemodynamics in maintaining physiological stability.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1-2	3	• Describe the levels of structural organization in the human body. • Define the relationship between structure (anatomy) and function (physiology).	• Introduction to physiology: How is the body organized?	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
3-4	3	• Define homeostasis and explain its significance for survival.	• Homeostasis: Framework for Human Physiology	The blackboard	Reports, assignments, oral and written

		• Compare negative and positive feedback mechanisms with clinical examples.		PowerPoint slides E-Learning	theoretical examinations
5-6	3	• Identify the functions of major cellular organelles. • Summarize the basics of protein synthesis and cellular metabolic pathways (ATP production).	• Cellular structure, protein, and metabolic pathways	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
7-8	3	• Differentiate between active and passive transport mechanisms. • Explain the principles of osmosis, diffusion, and membrane potential.	• Movement of Molecules across Cell Membranes	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
9-10	3	• Classify the types of intercellular communication (e.g., autocrine, paracrine). • Explain the role of receptors, ligands, and second messengers in signal transduction.	• Cell signaling in physiology	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations
11-13	3	• Describe the generation and propagation of an action potential. • Outline the anatomical and functional divisions of the Central and Peripheral Nervous Systems.	• Neuronal signaling and the structure of the nervous system	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations

14-15	3	• Explain the mechanism of sensory transduction (converting stimuli to nerve impulses). • Describe the pathways and receptors involved in somatic and special senses.	• Sensory physiology	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- The midterm exam is 20 marks - The practical exam (with its details) is 20 - The final exam had 60 marks	
12. Learning and teaching resources	
Required Textbooks (methodology, if any)	- Guyton and Hall: Textbook of Medical Physiology. 14ed, 2022.
Main references (sources)	- Vander's Human physiology: the mechanisms of body function. Eric P. Widmaier, Hershel Raff, Kevin T. Strang, last edition
Recommended supporting (Books and Reference Scientific Journals, reports)	- Human Physiology ''An integrated Approach''. 15ed, 2014. - Essentials of Human Physiology for Pharmacy. Laurie Kelly, McCorry. 2nd, (2008). - Ganong's Review of Medical Physiology. 25ed, 2016. - 3) Ganong's Review of Medical Physiology. 26ed, 2019.
References, websites	www.physiologyplace.com

1. Course Name
Computer Sciences III
2. Course Code
216 ClCs
3. Semester/Year
First semester/ Second year
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Name: Lecturer. Ahmed D. Rathi Email: ahmosawi@alameed.edu.iq
8. Course objectives
1. Gives students the ability to deal with the Excel sheet, and assure the knowledge and skill required to efficiently discharge the duties and responsibilities of him. 2. Giving the student a scientific base on the role of artificial intelligence in their field of study due to the great orientation by scientists and researchers in the fields of medicine and pharmacy

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2	**Cognitive outputs** - The student should be able to know the use of Excel functions **Acquiring skills** - How to conduct and deliver qualitative seminars and lectures	1.Data set. 2. TODAY function. 3. IF function. 4. AND function. 5. Conditional formatting.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	2		Introduction of Artificial Intelligence	the blackboard	Oral and written theoretical

		- The skill of extracting the required information from approved sources **Emotional and value outcomes** - Thinking skills through translating, analysing, evaluating and extracting ideas - Transferable general and qualifying skills (other skills related to employability and personal development). **Transferable general and qualifying skills (other skills related to employability and personal development).** - Performing practical experiments - Acquiring skill in using computers		PowerPoint slides E-Learning	exams, semi-semester and semester
3	2		1.Data set. 2. sum function. 3. sumif function. 4. sumifs function. 5. sumproduct function.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	2		AI TECHNOLOGY	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	2		1.Data set. 2. FORECAST function. 3. Predict data in the coming months using a FORECAST function 4. TREND function.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
6	2		AI applications and AI devices	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
7	2		1.Data set. 2. Data analysis tool.	the blackboard	Oral and written theoretical exams, semi-

		- Giving the student confidence through discussing seminars		PowerPoint slides E-Learning	semester and semester
8	2	- Acquire skill in writing reports - Acquiring driving skills	AI affects the medical field. AI in Field of Pharmacy	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
9	2	- Acquiring skill in dealing	1.Data set. 2. Data analysis tool.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	2		How AI is different and Languages	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
11	2			the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	2			the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
13	2			the blackboard PowerPoint slides	Oral and written theoretical exams, semi-

				E-Learning	semester and semester
14	2			the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
15	2			the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams

Editorial, reports, etc

- Daily exams 10 marks
- Daily preparation and classroom activities 10 marks
- The midterm exam is 20 marks
- The final exam is 60 marks

12. Learning and teaching resources

Required textbooks (methodology, if any)	
Main references (sources)	- 1.Microsoft office Excel 2019 - 2.Spadafora, Anthony (21 October 2016). "Stephen Hawking believes AI could be mankind's last accomplishment". BetaNews. Archived from the original on 28 August 2017.

Recommended supporting books and references (scientific journals, reports,)	
References, websites	1.Microsoft office Excel 2019 2.Spadafora, Anthony (21 October 2016). "Stephen Hawking believes AI could be mankind's last accomplishment". BetaNews. Archived from the original on 28 August 2017.

1. Course Name
The crimes of the Ba'ath Party in Iraq
2. Course Code
217 ClBc
3. Semester/Year
First semester/ Second year
4. Date this description was prepared
9/2024
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Name: Lecturer. Ahmed Yaqub Ibrahim Email: ahmedyaa@alameed.edu.iq
8. Course objectives

- Study the concept of crimes, their types, psychological and social crimes, their effects, the most prominent violations of the Baathist regime in Iraq, the environmental crimes of the Baathist regime in Iraq, and crimes of mass graves.
- Enlighten the current generation with an intellectual perspective that unveils the crimes of this regime—crimes which, under both religious and civil law, must not remain concealed in the shadows, hidden from free Iraqis.
- Demonstrate the wealth of evidence and revelatory archives possessed by investigation and truth-seeking mechanisms regarding the crimes of the Ba'athist regime.
- Document the crimes of the Ba'ath regime in accordance with the Law of the Supreme Iraqi Criminal Tribunal of 2005.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Self-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required learning outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2	Students acquire information about the concept and types of crimes	crimes of the Baath party according to the Iraqi Supreme Criminal Court in 2005.	the blackboard PowerPoint	Discussion
2	2	Students acquire information about the crimes of the Baath party in accordance with the documentation of the Iraqi Supreme Criminal Court Law of 2005	crime sections	the blackboard PowerPoint	crime sections
3	2	Providing students with information about the types of international crimes	Types of international crimes	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester

4	2	Providing students with information about the decisions issued by the Criminal Court and the decisions issued by the Criminal Court	Psychological and social crimes and their effects	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
5	2	Students acquire information about psychological crimes, their mechanisms and effects of psychological crimes	the most prominent violations of the Ba'ath party in Iraq	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
6	2	Providing students with information about social crimes, the militarization of society, violations of Iraqi laws	violations of Iraqi laws	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
7-8	3	the position of the Baathist regime on religion, violations of Iraqi laws	violations of Iraqi laws	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
9-10	2	Providing students with information about human rights violations, crimes of the authority, and places of prisons and detention of the former regime's crimes	Crimes of authority	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
11	2	Students acquire information about the environmental crimes of the Baath regime, military and radioactive pollution, and mine explosions.	The environmental crimes of the Baath regime in Iraq	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester

12	2	Students gain information about the destruction of cities and villages, the draining of marshes, the leveling of orchards	the scorched earth policy	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
13	2	Students acquire information about mass grave crimes	Mass grave crimes	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester
14-15	2	Students acquire information about the events of the genocide graves committed by the Baathist regime in Iraq and the chronological classification of the genocide graves in Iraq	The events of the genocide graves committed by the Baathist regime in Iraq	the blackboard PowerPoint	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Daily preparation and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	Histerial Decision/Crimes of the Baath regime in Iraq

Main references (sources)	United Nations Reports Condemning the Ba'ath Regime: Human Rights Violations for the Period 1991–2003 Dr. Raed Abis and Dr. Abbas Atiyah Publisher: The Iraqi Center for Documentation of Extremism Crimes, First Edition.
Recommended supporting books and references (scientific journals, reports,)	• Archive of the Iraqi Center for Documentation of Extremism Crimes at the Al-Abbas Holy Shrine. • Archive of the Political Prisoners Foundation.
References, websites	

1. Course Name
Arabic language
2. Course Code
218 ClAr
3. Semester/Year
Second semester/ Second year
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
6. Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Asst. Lect. Rami M. Jawad Abdullah Jawad Al-Asadi Email: ramialasadi4@gmail.com
8. Course objectives
• Enable students to identify the nature of the language and the characteristics • of the Arabic language . • Enable students to understand the rules of the Arabic language and know its • impact on the formation of the semantics of the sentence and the concept of • literature and its sections throughout the ages . • Enable students to write the linguistic text in a sound language away from • linguistic errors . • Know how to put punctuation marks in the right place.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Self-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2	• Define the nature and concept of language. • Identify the unique linguistic features of Arabic.	The concept of language, its nature, and the features of the Arabic language	Lectures and discussions Power point	Oral and written tests, and preparing reports
2	2	• Differentiate between "speech," "saying," and "word." • Classify words into nouns, verbs, and letters.	Meaning of "speech, saying, word (noun, verb, letter)	Lectures and discussions Power point	Oral and written tests, and preparing reports
3	2	• Explain how adding letters to verb roots alters meaning.	Meanings of increase in verbs	Lectures and discussions	Oral and written tests, and preparing reports

		• Apply standard verb augmentation patterns.		Power point	
4	2	• Conjugate verbs correctly with various pronouns. • Apply rules for attributing verbs to subject pronouns.	Attribution of verbs to pronouns	Lectures and discussions Power point	Oral and written tests, and preparing reports
5	2	• Define the concept of literature. • Distinguish between the main divisions: poetry and prose.	The concept of literature and its divisions	Lectures and discussions Power point	Oral and written tests, and preparing reports
6	2	• Apply grammatical rules for numbers (masculine/feminine) • Match numbers correctly with counted nouns.	Numbers	Lectures and discussions Power point	Oral and written tests, and preparing reports
7-8	3	• Master the spelling rules for initial, medial, and final Hamza. • Write Hamza correctly in various contexts.	Ways of Writing hamza	Lectures and discussions Power point	Oral and written tests, and preparing reports
9-10	2	• Analyze the characteristics of pre-Islamic literature. • Identify the poets and themes of the Mu'allaqāt.	Pre-Islamic literature Mu'allaqāt	Lectures and discussions Power point	Oral and written tests, and preparing reports

11	2	• Discuss the evolution of literature in the Islamic era. • Analyze the art of poetic contradictions (Naqa'id).	Islamic literature / Contradictions	Lectures and discussions Power point	Oral and written tests, and preparing reports
12	2	• Use prepositions correctly in sentences. • Interpret the semantic significance of different prepositions.	Prepositions and their significance	Lectures and discussions Power point	Oral and written tests, and preparing reports
13	2	• Apply standard punctuation marks in writing. • Enhance text clarity through proper punctuation.	Punctuations	Lectures and discussions Power point	Oral and written tests, and preparing reports
14	2	• Identify common linguistic and grammatical errors. • Apply corrections to improve language accuracy.	Language Corrections	Lectures and discussions Power point	Oral and written tests, and preparing reports
15		• Analyze verbal declension (I'rab) rules. • Distinguish between apparent and estimated declension.	Verbal Declension and Estimated Declension		

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams

Editorial, reports, etc	
- Daily preparation and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	• Basic grammar of the Arabic language • Al-Wajeez in Arabic for non-specialists • Arabic lessons collector . • History of Arabic Literature
Main references (sources)	Explanation of Ibn Aqeel
Recommended supporting books and references (scientific journals, reports,)	Lexicons and dictionaries
References, websites	

1. Course Name	
Organic Chemistry III	
2. Course Code	
219 PcOc3	
3. Semester/Year	
2nd Class, 2nd Semester	
4. Date this description was prepared	
2/9/2025	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
45 hours Theory and Laboratory	
7. Name of course coordinator(s):	
Prof. Dr. Zeyad Kadhim Oleiwi	Email: zeyadk.almajtoomi@uokufa.edu.iq
8. Course objectives	
Objectives of the study subject	- To teach students the principles of heterocyclic chemistry including the fundamental principles and the features, classes and reactions of heterocyclic compounds; - it enables students to apply these principles in complicated reactions that involve heteroatoms.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the Unit or Topic**	**Learning Method**	**Evaluation Method**
1	3 2	**Theory:** Describe the structure of benzene (resonance, hybridization) and define aromaticity using Hückel's Rule. **Lab:** Perform solubility tests to classify organic compounds into main solubility groups (H2O, Ether, 5% HCl, etc.).	**Theory:** Aromatic Hydrocarbons: Benzene **Lab:** Solubility Classification (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
2		**Theory:** Explain the general mechanism of	**Theory:** Electrophilic	Blackboard,	Reports, assignments,

	3 2	Electrophilic Aromatic Substitution (EAS) (e.g., halogenation, nitration). **Lab:** Demonstrate understanding of solubility principles through problem-solving and quizzes.	Aromatic Substitution (Introduction) **Lab:** Solubility Classification (tutorial and quiz)	PowerPoint, E-Learning	oral/written exams, Lab experiments
3	3 2	**Theory:** Predict the effect of substituents on the reactivity and orientation (ortho, meta, para) of aromatic rings. **Lab:** Apply solubility schemes to identify the class of an unknown organic compound.	**Theory:** Electrophilic Aromatic Substitution: Arenes and their derivatives **Lab:** Solubility Classification (unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
4	3 2	**Theory:** Discuss the nomenclature, physical properties (boiling point, solubility), and acidity of carboxylic acids. **Lab:** Perform chemical tests (Lucas, Oxidation) to identify alcohols and distinguish primary, secondary, and tertiary structures.	**Theory:** Carboxylic acids: properties **Lab:** Identification of alcohols (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
5	3 2	**Theory:** Detail the synthesis of carboxylic acids and their reactions (salt formation, reduction). **Lab:** Validate theoretical knowledge	**Theory:** Carboxylic acids: reaction **Lab:** Identification of	Blackboard, PowerPoint,	Reports, assignments, oral/written exams, Lab experiments

		of alcohol reactivity through tutorials and assessments.	alcohols (tutorial and quiz)	E-Learning	
6	3 2	**Theory:** Compare the reactivity of carboxylic acid derivatives (acid chlorides, anhydrides, esters, amides). **Lab:** Analyze an unknown liquid sample to confirm if it is an alcohol and identify it.	**Theory:** Functional derivatives of carboxylic acids **Lab:** Identification of alcohols / Elemental analysis (unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
7	3 2	**Theory:** Classify amines and explain their structure, nomenclature, and basicity compared to ammonia. **Lab:** Perform characteristic colorimetric tests (e.g., Ferric Chloride) to identify phenols.	**Theory:** Amines I **Lab:** Identification of phenol (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
8	3 2	**Theory:** Describe the preparation of amines and reactions such as alkylation and acylation. **Lab:** Distinguish phenols from other acidic organic compounds via quizzes.	**Theory:** Amines II **Lab:** Identification of phenol (tutorial and quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
9	3	**Theory:** Explain the carbonyl group structure in aldehydes and methods of preparation (oxidation of alcohols).	**Theory:** Aldehydes	Blackboard, PowerPoint,	Reports, assignments, oral/written exams, Lab experiments

	2	**Lab:** Identify an unknown sample as a phenol using systematic chemical testing.	**Lab:** Identification of phenol (unknown)	E-Learning	
10	3 2	**Theory:** Compare ketones with aldehydes and discuss nucleophilic addition reactions. **Lab:** Differentiate between aldehydes and ketones using specific tests (Tollen's, Fehling's, 2,4-DNP).	**Theory:** Ketones **Lab:** Identification of aldehyde and ketone (known)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
11	3 2	**Theory:** Understand the mechanism of Aldol Condensation and the formation of β-hydroxy carbonyls. **Lab:** Solve theoretical and practical problems regarding carbonyl identification.	**Theory:** Aldol condensation **Lab:** Identification of aldehyde and ketone (tutorial and quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
12	3 2	**Theory:** Explain the Claisen Condensation mechanism involving esters and enolates. **Lab:** Analyze an unknown carbonyl compound to determine its specific identity.	**Theory:** Claisen condensation **Lab:** Identification of aldehyde and ketone (unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
13	3 2	**Theory:** Review and integrate properties of various functional groups for classification purposes.	**Theory:** Classification **Lab:** Identification of	Blackboard, PowerPoint,	Reports, assignments, oral/written exams, Lab experiments

		Lab: Apply a comprehensive systematic scheme to identify a known organic compound from any class.	organic compound (general, known)	E-Learning	
14	3 2	**Theory:** Predict products of organic reactions and propose synthesis pathways based on properties. **Lab:** Independently identify a "General Unknown" organic compound using all available chemical tests.	**Theory:** Reactions and properties **Lab:** Identification of organic compound (general, unknown)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments
15	3 2	**Theory:** Discuss the acidity of phenols, resonance stabilization of the phenoxide ion, and electrophilic substitution. **Lab:** Final assessment of practical skills in organic analysis and identification.	**Theory:** Phenols **Lab:** Identification of organic compound (general quiz)	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral/written exams, Lab experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
methodology, if textbooks Required any	- Organic Chemistry by Robert T. Morrison and Robert N. Boyd . - Organic Chemistry by McCurry; 5th ed. Thomason learning; CA, USA; 2000.
Main references (sources)	- Organic Chemistry by Robert T. Morrison and Robert N. Boyd . - Organic Chemistry by McCurry; 5th ed.
Recommended supporting books and references (scientific journals, reports)	Thomason learning; CA, USA; 2000
References, websites	

1. Course Name:
Medical Microbiology II
2. Course Code
220 ClMm2
3. Semester/Year:
Second semester/second year
4. Date this description was prepared:
2/9/2025
5. Available attendance forms:
Physical attendance
6. Number of academic hours (total) / number of units (total):
60 hours Theory and Laboratory
7. Name of the course leader (if more than one name is mentioned):
Name: Email:
8. Course objectives
1. Providing students with information about parasitic and viral diseases affecting human health, their most important causes and vectors, and methods detecting, treating and controlling them. 2. Providing students with information about fungi causing systemic diseases and methods of detecting treating and controlling them.

9. Teaching and learning strategies:	
-Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Conceptual mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy -Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Strategy for providing examples	**Education strategies** **Education strategies**

10. Course structure:

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	Hours	Week
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	The blackboard PowerPoint slides E-Learning	• Introduction to human parasite & taxonomy • Protozoa/Sarcodina : intestinal (Entamoeba histolytica)	**Cognitive outputs** The student should be able to know the causes, symptoms, and diagnosis of parasitic, viral, and immunological diseases - Determine the appropriate medication for each disease condition - Knowledge of the methods of transmission of parasitic and viral diseases - Knowledge of ways to prevent parasitic and viral diseases	2	1
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Commensally intestinal amoeba: (Entamoeba coli) • Protozoa/Mastigophora : Intestinal flagellates: (Giardia lamblia)		2	2

			Acquiring skills - How to conduct and deliver qualitative seminars and lectures - Skill in drug education for patients - The skill of extracting the required information from approved sources **Emotional and value outcomes** -Thinking skills through translating, analysing, evaluating and extracting ideas - Instilling moral values for proper dealing with patients **transferable general and qualifying skills (other skills related to employability and personal development).** -Performing practical experiments - Acquiring skill in using computers - Giving the student confidence through discussing seminars - Acquire skill in writing reports - Acquiring driving skills		
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides	• Genital flagellates: (Trichomonas vaginalis) • Blood and tissue flagellates: (Leishmania spp. & Trypanosoma spp.)		2	3
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Protozoa/ Sporozoa (Apicomplexa): Blood Sporozoa: (Plasmodium Spp.) • Tissue Sporozoa: (Toxoplasma gondii)		2	4
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Protozoa/ Ciliophora: (Balantidium coli) • Metazoa: Platyhelminthes (flatworms): Cestoda (tapeworms) : (Taenia spp.)		2	5
Reports, assignments, oral and written theoretical examinations, semi-semester	the blackboard PowerPoint slides E-Learning	• Hymenolepis spp • Echinococcus spp		2	6

and semester					
Reports, assignments , oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Trematoda (flukes): Blood flukes (Schistosoma spp.) • Hepatic flukes: (Fasciola hepatica)		3	7
Reports, assignments , oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Metazoa: Nemathelminthes (roundworms): • Nematoda: Ascaris lumbricoides, Trichuris trichuria • Enterobius vermicularis		3	8
Reports, assignments , oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Ancylostoma duodenale(• Introduction to Virology & General characterstics of virus		2	9
Reports, assignments , oral and written theoretical examinations, semi-semester	the blackboard PowerPoint slides E-Learning	• Viral replication • Propagation f viruses & one step growth curve		2	10

and semester					
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Antiviral drugs • Genetic interaction & Classifications of viruses		2	11
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• DNA viruses • RNA viruses		2	12
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Classify fungi causing human infections. Opportunistic Mycosis – Candidiasis, Aspergillosis		2	13
Reports, assignments, oral and written theoretical examinations, semi-semester	the blackboard PowerPoint slides	• Infections of keratinized tissues e.g. Skin, hair & nails.– Pityriasis Vesicolor, white piedra, black piedra, tinea nigra,		2	14

and semester		Malassezia species, dermatophytes			
Reports, assignments, oral and written theoretical examinations, semi-semester and semester	the blackboard PowerPoint slides E-Learning	• Fungi causing systemic diseases. - Histoplasmosis, Blastomycosis, Coccidioidomycosis		2	15

11. Course evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams
Editorial, reports, etc

-Practical exams: 20 marks
- The mid-term exam is 20 marks
- Final exam: 60 marks

12. Learning and teaching resources

Required textbooks (methodology, if found)	Lab manual for practical virology and parasitology, - Atlas of Helminthes and Protozoa
Main references (sources)	1. Medical Microbiology 24th ed. 2007 by E Jawetz 2. Medical parasitology, 5th ed. By Dr. D.R. Arora & Dr. Brij Bala Arora. 2018
Recommended supporting books and references (scientific journals, reports,...)	
Electronic references, websites	

1. Course Name
Physical Pharmacy (II)
2. Course Code
221 PPp2
3. Semester/Year
2nd Class, 2nd Semester
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and 30 hours Laboratory / 4 units
7. Name of course coordinator(s):
Name: kamil kareem atyia E mail: kamil_altameemi@alameed.edu.iq Name: Haider Mohammad jehad E mail: haider.mj80@yahoo.com
8. Course objectives
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	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	3 2	**Theory:** Define the concept of complexation and classify complexes into metal, organic, and inclusion types. Explain the methods used to analyze complexation. **Lab:** Apply physicochemical principles to select and implement appropriate solubilization techniques that enhance the bioavailability and stability of pharmaceutical preparations	**Theory:** Complexation (Chapter 10): Classification; Metal complexes; Organic molecular complexes; Inclusion compounds; Methods of analysis **Lab:** Solubilization of components of pharmaceutical preparations	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3 2	**Theory:** Explain the principles of mass transfer and diffusion. Differentiate between steady-state and non-steady-state diffusion using Fick's First and Second Laws.	**Theory:** Diffusion (Chapter 11): Introduction; Steady state diffusion; Fick's first law; Fick's second law **Lab:** Solubilization	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Lab: Demonstrate the technique of solubilization to enhance the solubility of poorly soluble drugs.	of components of pharmaceutical preparations		-Conduct laboratory experiments
3	3 2	**Theory:** Describe the mechanism of drug diffusion through biological and synthetic membranes. Calculate permeability coefficients and lag time. **Lab:** Investigate the specific solubilization behavior of Aspirin using various solvents or surfactants.	**Theory:** Diffusion through membranes; Permeability; Diffusion driving forces; Lag time; Apparatus and methods for assessing drug diffusion **Lab:** Solubilization of Aspirin	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 2	**Theory:** Define chemical kinetics and determine the order of reaction (zero, first, second). Explain the influence of temperature on reaction rates (Arrhenius equation). **Lab:** Analyze data derived from Aspirin solubilization experiments to determine solubility limits.	**Theory:** Chemical kinetics and stability (Chapter 14): Introduction; Rates, orders and molecularity; Temperature effects **Lab:** Solubilization of Aspirin	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 2	**Theory:** Identify factors affecting drug stability (pH, solvent, light) and design accelerated stability testing protocols to predict shelf-life. **Lab:** Apply kinetic principles to determine the reaction rate constant and order for a degrading pharmaceutical.	**Theory:** Other factors effects; Stability of pharmaceuticals; Accelerated stability and stress testing **Lab:** Interfacial phenomena (Chapter 15) / Rate kinetics	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3	**Theory:** Define interfacial tension and surface free energy. Calculate the Hydrophile-Lipophile	**Theory:** Systems of Hydrophile–Lipophile Classification;	Blackboard, PowerPoint,	Reports, assignments, oral and written theoretical

	2	Balance (HLB) and explain the mechanism of wetting and adsorption. **Lab:** Evaluate the stability of a pharmaceutical formulation using rate kinetics data.	Adsorption at solid/gas/liquid interfaces; Wetting agents; Applications of surfactants; Foams; Electric properties **Lab:** Rate kinetics: Application in stability of pharmaceutical stability	E-Learning	examinations, semi-semester and semester -Conduct laboratory experiments
7	3 2	**Theory:** Review key concepts from Chapters 10-15 and demonstrate competency in solving problems related to diffusion, kinetics, and interfacial phenomena. **Lab:** Finalize stability reports and interpret kinetic data for shelf-life estimation.	**Theory:** Mid-Semester Review / Assessment (Covering Complexation to Interfacial Phenomena) **Lab:** Rate kinetics: Application in stability of pharmaceutical stability	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 2	**Theory:** Define rheology and differentiate between Newtonian and Non-Newtonian flow behaviors (plastic, pseudoplastic, dilatant) and thixotropy. **Lab:** Determine the Critical Micelle Concentration (CMC) of a surfactant using surface tension measurements.	**Theory:** Rheology (Chapter 16): Newtonian systems; Non-Newtonian systems; Thixotropy **Lab:** Determination of critical micelles concentration	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9		**Theory:** Describe methods to measure viscosity (capillary, rotational viscometers) and explain the significance of viscoelasticity in	**Theory:** Determination of rheological properties; Viscoelasticity; Pharmaceutical areas in which	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		pharmaceutical formulations. **Lab:** Analyze the effect of surfactant concentration on physical properties to verify CMC values.	rheology is significant **Lab:** Determination of critical micelles concentration		-Conduct laboratory experiments
10	3 2	**Theory:** Classify dispersed systems and describe the specific properties of colloidal dispersions (Tyndall effect, Brownian motion). **Lab:** Measure the viscosity of different liquid systems using an Ostwald viscometer or rotational viscometer.	**Theory:** Colloidal dispersions (Chapter 17): Introduction; Types of colloidal systems; Optical properties of colloids **Lab:** Viscosity: Measurements and calculations	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 2	**Theory:** Explain the electrical properties of colloids (Zeta potential) and their role in physical stability. Discuss solubilization by micelles. **Lab:** Calculate viscosity coefficients and interpret the flow behavior of the tested samples.	**Theory:** Kinetic properties of colloids; Electrical properties; Solubilization using colloids; Pharmaceutical applications **Lab:** Viscosity: Measurements and calculations	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 2	**Theory:** Define micrometrics and describe statistical methods for determining particle size and size distribution (e.g., normal distribution). **Lab:** Continue viscosity assessments or introduction to particle sizing equipment.	**Theory:** Micrometrics (Chapter 19): Particle size and size distribution; Methods of determining particle size; Particle shape and surface area **Lab:** Viscosity: Measurements and calculations	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3	**Theory:** Explain methods for determining surface	**Theory:** Methods for determining	Blackboard,	Reports, assignments,

	2	area and derived powder properties (porosity, bulk density) and their impact on flowability. **Lab:** Determine particle size distribution using optical microscopy and sedimentation techniques.	surface area; Derived properties of powders (porosity, packing, density, flow) **Lab:** Determination of particle size by optical microscopy and Sedimentation	PowerPoint, E-Learning	oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	3 2	**Theory:** Discuss the general concepts of polymer science, including synthesis methods and the properties of copolymers and polymer blends. **Lab:** Analyze particle size data to generate size distribution curves and calculate average diameters.	**Theory:** Pharmaceutical polymers (Chapter 21): Introduction (history, concepts, synthesis); Copolymers and polymer blends **Lab:** Determination of particle size by optical microscopy and Sedimentation	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 2	**Theory:** Differentiate between thermoplastic/thermoset polymers and evaluate polymer applications in controlled drug delivery systems. **Lab:** Final practical assessment on micrometrics and particle characterization.	**Theory:** Thermoplastic and thermoset polymers; Polymer properties (Tg, molecular weight); Applications in drug delivery **Lab:** Determination of particle size by optical microscopy and Sedimentation	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams Editorial, reports, etc

- Practical exam20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
methodology, if textbooks Required any	
Main references (sources)	1. Martin's Physical Pharmacy and Pharmaceutical Sciences; 7th edition; 2017. 2. Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022.
Recommended supporting books and references (scientific journals, reports)	Physicochemical Principles of Pharmacy by Alexander Taylor Florence and David Attwood
References , websites	USP, BP, and FDA

1. Course Name
Physiology II
2. Course Code
222 PtPh2
3. Semester/Year
2nd Class, 2st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
6.Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Name : shatha hussain kadhim Email: shatha.kadhim@uokerbala.edu.iq
8. Course objectives
- To enable students understanding the basic principles of physiological functions of different tissues and organs of the human being, and how to evaluate these functions and correlate them with the normal and abnormal conditions. - It also emphasizes on the role of homeostatic and hemodynamic changes in the integration of physiological status.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2 2	Define the principles of chemical signaling and hormone classification. Describe the composition and general functions of blood plasma components.	• Introduction to endocrinology • Hematology; Blood & plasma	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

2	2 2	Explain the role of the hypothalamus in controlling the pituitary gland. Demonstrate the ability to perform a manual Red Blood Cell (RBC) count.	• Hypothalamus • Estimation no.of RBCs	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	2 2	Differentiate between anterior and posterior pituitary hormones and their target organs. Interpret RBC count results clinically (e.g., erythrocytosis vs. anemia).	• Pituitary gland • Estimation no.of RBCs	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	2 2	Describe the synthesis and metabolic functions of T3 and T4 hormones. Perform a manual Total White Blood Cell (WBC) count calculation.	• Thyroid gland • Estimation no.of WBCs	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

5	2 2	Contrast the functions of glucocorticoids, mineralocorticoids, and catecholamines. Identify and distinguish between neutrophils, lymphocytes, monocytes, eosinophils, and basophils under a microscope.	• Adrenal cortex & medulla • differential of WBCs	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	2 2	Outline the hormonal regulation of the ovarian and menstrual cycles. Measure Packed Cell Volume (PCV) accurately using a centrifuge.	• Female reproductive system. • Hematocrit	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	2 2	Explain the physiological changes during pregnancy and lactation. Determine hemoglobin concentration and assess for anemia.	• Female reproductive system. • Hemoglobin estimation	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	2	Describe spermatogenesis and the function of testosterone.	• Male reproductive system • Blood Types	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

	2	Determine ABO and Rh blood groups using agglutination tests.			-Conduct laboratory experiments
9	2 2	Explain the roles of PTH, Calcitonin, and Vitamin D in bone remodeling. Classify different types of anemia based on red cell indices and etiology.	• hormonal control of calcium metabolism and the physiology of the bone • Anemia; Types of anemia	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	2 2	Analyze the regulation of blood glucose by Insulin and Glucagon. Differentiate between primary (vera) and secondary polycythemia.	• endocrine functions of the pancreas • Polycythemia Types of polycythemia	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	2 2	Trace the digestion and absorption pathways of carbs, lipids, and proteins. Explain the physiological mechanisms of iron absorption, transport, and storage.	• Gastrointestinal function: Digestion and absorption of carbohydrates; proteins; lipids; absorption of water and electrolytes; vitamins and minerals. • Iron metabolism	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	2	Identify key GI hormones (Gastrin, CCK, Secretin) and	Regulation of Gastrointestinal function. Introduction;	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical

		their effects on motility and secretion. Explain the enteric nervous system's role in gut regulation.	gastrointestinal hormones;	E-Learning	examinations, semi-semester and semester -Conduct laboratory experiments
13	2	Describe the metabolic functions of the liver and the role of bile in lipid digestion. Discuss bilirubin metabolism and excretion.	• liver and biliary system.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	2	Synthesize knowledge of hemostasis, coagulation cascades, and fibrinolysis. Review physiological responses to blood loss.	• Blood Physiology	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	2	Apply blood physiology concepts to clinical case scenarios. Comprehensive review of hematological parameters.	• Blood Physiology	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Practical exam 20 marks. - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Review of Medical Physiology; Ganong W.F (Ed.) latest edition.
Main references (sources)	. Textbook of Medical Physiology by Guyton AC; latest edition.
Recommended supporting books and references (scientific journals, reports)	
References, websites	

1. Course Name
Pharmacognosy I
2. Course Code
223 PhPa1
3. Semester/Year
2nd Semester/ 2nd Year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 Theoretical hours and 30 laboratory hours
7. Name of course coordinator(s):
Name: Mazin Saleem Shaker Email: mazinsaleem97@gmail.com
8. Course objectives

- This course aims to study the principles of pharmacognosy and medicinal plants, their nomenclature, classification, and chemistry of the active substances they contain,

- in addition to learning methods for extracting the active substances in several ways, purifying them, and diagnosing them using several types of chromatography and their applications.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	• Define Pharmacognosy and explain its historical development. • Outline the scope of Pharmacognosy in modern pharmacy. • Describe the basic principles of studying natural drugs.	**General Introduction:** The Scope of Pharmacognosy, definitions and basic principles	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	3 2	• Classify natural products based on morphology, taxonomy, and chemistry.	**Drugs from natural sources**, crud drugs, official and non-official drugs. Classification of natural products	The blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

		• Differentiate between official (pharmacopeial) and non-official drugs. • Identify various natural sources of drugs (plant, animal, marine, mineral).		E-Learning	
3	3 2	• Apply the rules of binomial nomenclature to name medicinal plants. • Explain the principles of plant taxonomy. • Outline the initial steps in the production of crude drugs.	**Plant nomenclature and taxonomy.** Production of crude drugs:	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	3 2	• Compare wild vs. cultivated sources of medicinal plants. • Describe optimal methods for collection, harvesting, and drying to preserve active constituents. • Explain proper storage conditions to prevent degradation.	**Production of crude drugs:** Cultivation, collection, drying and storage.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	3 2	• Identify the primary factors (biotic and abiotic) causing drug deterioration. • Recognize signs of spoilage (mold, insect attack, oxidation). • Discuss methods to prevent deterioration during storage.	**Deterioration of crude natural products.**	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
6	3 2	• Correlate specific natural products with their therapeutic effects. • Describe the mechanism of action for	**Pharmacological activities of natural products.**	The blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

		major classes of natural drugs. • Discuss the toxicity and safety profiles of natural compounds.		E-Learning	
7	3 2	• Categorize the chemical nature of secondary metabolites (alkaloids, glycosides, tannins, etc.). • Explain the biosynthetic pathways of major drug classes. • Relate chemical structure to biological activity.	**Chemistry of natural drug products.**	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
8	3 2	• Demonstrate methods for macroscopic (organoleptic) examination of drugs. • Define specific physical constants (solubility, melting point, specific gravity) used in quality control. • Detect adulteration using physical evaluation methods.	**Quality control:** Evaluation of natural products; macroscopical evaluation; physical evaluation.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
9	3 2	• Perform chemical assays to identify active constituents. • Explain the principles of biological assays (bioassays) for potency. • Interpret spectroscopic data (UV, IR) for standardization.	**Quality control:** Evaluation of natural products; chemical evaluation; biological evaluation; spectroscopical evaluation.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	3 2	• Select appropriate extraction methods (maceration, percolation, soxhlet) for specific plant materials.	**Phytochemical investigation of herbal products:** Extraction of the plant material; Separation and isolation	The blackboard	Oral and written theoretical exams, semi-semester and semester

		• Outline procedures for the isolation and purification of phytoconstituents. • Describe methods to characterize isolated compounds.	of constituents; characterization of the isolated compounds.	PowerPoint slides E-Learning	
11	3 2	• Define the fundamental principles of separation techniques. • Classify separation methods based on physical and chemical mechanisms (adsorption, partition, ion exchange). • Explain the theoretical plates and resolution concepts.	**Separation technique:** Introduction; Mechanisms of separation and classification based on the type of technique;	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	3 2	• Differentiate between the operational principles of TLC, HPLC, GC, and Electrophoresis. • Select the correct chromatographic method for analyzing specific compound mixtures. • Analyze chromatograms to identify and quantify components.	**paper chromatography;** Thin layer chromatography; Ion-exchange chromatography; Gel filtration chromatography; Column chromatography; Gas chromatography; HPLC; Electrophoresis; Affinity chromatography.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
13	3 2	• Discuss the role of ethnopharmacology in modern drug discovery. • Analyze case studies of drugs derived from traditional medicine (e.g., Morphine, Artemisinin). • Explain the validation process of traditional remedies.	**Traditional plant medicines as a source of new drugs.**	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

14	3 2	• Define plant tissue culture and its historical significance. • Demonstrate aseptic techniques required for establishing tissue cultures. • Identify the equipment and nutrient media components used in the laboratory.	**Tissue culture of medicinal plant:** Introduction and history; laboratory of the plant tissue culture; aseptic techniques	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
15	3 2	• Explain the role of plant growth regulators (auxins, cytokinins) in development. • Apply tissue culture techniques for the production of secondary metabolites. • Discuss environmental control and biotransformation in tissue culture.	**Application of the plant tissue culture;** environmental and biological control; plant growth regulators.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc
- Daily exams, preparation and classroom activities 5 marks - The midterm exam is 15 marks - Practical exam 20 marks. - The final exam 60 marks

12. Learning and teaching resources	
Required textbooks (methodology, if any)	Trease and Evans Pharmacognosy; 15th ed., 2000.
Main references (sources)	Textbook Of Pharmacognosy and Phytochemistry Biren N. Shah and A.K. Seth
Recommended supporting books and references (scientific journals, reports,)	Robbers JE, Speedie MK, Tyler VE (Eds.); Pharmacognosy and Pharmacobiotechnology; the latest edition. Michael Heinrich, Joanne Barnes; Fundamentals of Pharmacognosy & Phytotherapy.
References, websites	American Society of Pharmacognosy (ASP)

1. Course Name
Inorganic pharmaceutical chemistry
2. Course Code
325 PcIc
3. Semester/Year
3rd Class, 1st Semester
4. Date this description was prepared
10/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
60 hours Theory and Laboratory
7. Name of course coordinator(s):
Abbas Abdulridha Mehihi Email: abbas-mehihi@alameed.edu.iq
8. Course objectives

1. This course examines the clinical application of inorganic compounds, focusing on the relationship between chemical structure and therapeutic or diagnostic function.
2. Students will study the roles of key metals in medicine, including platinum anticancer agents and chelation therapy.
3. A significant component is dedicated to radiopharmacy, covering the principles, safe handling, and application of radiopharmaceuticals in advanced medical imaging and treatment.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2 2	• Define the electron configurations and general chemical properties of Alkali Metals. • Explain the biological role of Sodium and Potassium ions and the mechanism of active transport. • Evaluate the advantages, disadvantages, and toxicity of Lithium-based drugs.	**Alkali Metals:** Lithium, Sodium, Potassium: Electron configuration, chemial properties of metals, Advantages and disadvantages using lithium-based drugs, Sodium as an essential ion in the human body, Active transport of sodium ions, Drugs, diet and toxicity of sodium ions, Potassium and its clinical application.	the blackboard Power-Point slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

			• **To prepare and submit calcium carbonate (CaCO3).**		
2	2 2	• Describe the electron configuration and chemical properties of Alkaline Earth Metals. • Analyze the biological importance of Magnesium and Calcium in human physiology. • Discuss clinical applications and preparations of Magnesium-based drugs.	**Alkaline Earth Metals:** Magnesium, Calcium: Electron configuration of metals, Major uses and Chemical properties, 2 Magnesium Biological importance and clinical applications and preparations. Calcium: the key to many human functions. • **To prepare and submit magnesium carbonate (MgCO3)**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	2 2	• Explain the general chemistry of Group 13 elements (Al, B, Ga). • Discuss the pharmaceutical applications of boric acid and Bortezomib. • Evaluate the biological importance of Aluminum and the role of adjuvants in vaccines.	**Group 13:** Aluminium, Boron and Gallium: General chemistry of group 13 elements, pharmaceutical applications of boric acid, Bortezomib, Biological importance of Aluminium and its adjuvants, • **To prepare and submit Zinc sulphate (ZnSO4).**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	2 2	• Classify different types of antacids and Aluminum-based therapeutics. • Explain the mechanism of phosphate binders and antiperspirants.	**Antacids,** Aluminium-based therapeutics, Phosphate binders, Antiperspirant. Gallium Introduction, Chemistry, Pharmacology of gallium-based drugs and their uses	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		• Discuss the chemistry and pharmacology of Gallium-based drugs.	• **To prepare and submit Potash alum (K2SO4. Al2(SO4)3.24 H2O)**	E-Learning	-Conduct laboratory experiments
5	2 2	• Compare and contrast Silicon-based drugs with their Carbon-based analogues. • Explain the concept of bioisosterism regarding Silicon isosters. • Discuss the clinical applications of organosilicon drugs.	**The Carbon Group:** General chemistry of group 14 elements, Silicon-based drugs versus carbon-based analogues, Introduction of silicon groups, Silicon isosters, Organosilicon drugs. • **To prepare and submit Potash alum (K2SO4. Al2(SO4)3.24 H2O)**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	2 2	• Describe the electronic configurations of Transition Metals (d-Block). • Analyze the mechanism of action of Platinum anticancer agents. • Explain the biological roles of Iron and Copper and the potential of Silver as an antimicrobial.	**Transition Metals and d-Block Metal Chemistry:** Electronic configurations, platinum anticancer agents, Iron and its role in biological systems, clinical applications. Copper-containing drugs, Silver: the future of antimicrobial agents? • **To prepare and submit aluminum hydroxide.**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	2 2	• Evaluate the use of gold compounds in the treatment of rheumatoid arthritis. • Discuss the biological role, clinical applications, and toxicity of Zinc.	**Gold:** the fight against rheumatoid arthritis and zinc and its role in biological systems, clinical applications and toxicity.	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-

			• **To perform limit test for iron in given sample.**	E-Learning	semester and semester -Conduct laboratory experiments
8	2 2	• Define heavy-metal poisoning and the principles of chelation therapy. • Compare the mechanisms of various chelating agents (EDTA, BAL, DMSA, DMPS, ALA). • Identify appropriate antidotes for specific metal toxicities.	**Chelation Therapy:** What is heavy-metal poisoning? What is chelation? Chelation therapy, Calcium disodium edetate, Dimercaprol (BAL), Dimercaptosuccinic acid (DMSA), 2,3 Dimercapto-1-propanesulfonic acid (DMPS), and Lipoic acid (ALA). • **To perform limit test for chloride in given sample.**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	2 2	• Explain the mechanism of action of protective adsorbents in gastrointestinal disorders. • Identify common inorganic compounds used as protective adsorbents.	• **Protective adsorbents** • **To perform limit test for sulphate in given sample.**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	2 2	• Classify inorganic topical agents based on their therapeutic use (astringents, protectives, antimicrobials). • Discuss the formulation and	• **Topical agents** • **To perform identification test for boric acid.**	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-

		application of inorganic topical preparations.		E-Learning	semester and semester -Conduct laboratory experiments
11	2 2	• Describe the chemistry and function of dental agents, including fluorides, abrasives, and desensitizers. • Explain the role of inorganic compounds in caries prevention.	• **Dental agents** • **To perform the identification test of ammonium chloride.**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	2 2	• Define organometallic chemistry and the structure of metallocenes. • Analyze the potential of Ferrocene derivatives as antimalarial and anticancer agents. • Discuss the therapeutic potential of Titanocenes and Vanadocenes.	**Organometallic Chemistry:** What is organometallic chemistry and metallocenes? Ferrocene derivatives as potential antimalarial agent and antibreast cancer, Titanocenes in titanium-based anticancer agents and Vanadocene dichloride as anticancer agents, Further vanadium-based drugs: insulin mimetics. • **Acid neutralising capacity of aluminium hydroxide gel.**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	2 2	• Explain the fundamental principles of radioactivity and radioactive decay. • Discuss the clinical applications of radioactive compounds in medicine.	**Radioactive Compounds and Their Clinical Application,** • **(unknown sample).**	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-

				E-Learning	semester and semester -Conduct laboratory experiments
14	2	• Outline the protocols for the safe dispensing and handling of radiopharmaceuticals. • Discuss radiation protection measures for patients and healthcare workers. • Evaluate the therapeutic uses of specific radiopharmaceuticals.	• **Radiopharmacy:** dispensing and protection, Therapeutic use of radiopharmaceuticals. • **(unknown sample).**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	2	• Differentiate between diagnostic and therapeutic radiopharmaceuticals. • Explain the mechanisms of radiopharmaceuticals used for diagnostic imaging.	• **Radiopharmaceuticals for imaging.** • **(unknown sample).**	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and oral, and written exams in addition to editorial, reports, etc
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
methodology, if textbooks Required any	Handbook for Analytical Chemistry lab adopted by department
Main references (sources)	1. Essentials of Inorganic Chemistry for Students of Pharmacy, Pharmaceutical Sciences and Medicinal Chemistry by KATJA A. STROHFELDT, School of Pharmacy, University of Reading, UK 2. Inorganic Medicinal and Pharmaceutical Chemistry by Block, Roche Soine and Wilson, latest edition.
Recommended supporting books and references (scientific journals, reports)	Organic Chemistry by McCurry; 5th ed.
References, websites	

1. Course Name
Pharmacognosy II
2. Course Code
326 PhPa2
3. Semester/Year
3rd Class, 1st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours hours of theory and 30 hours Laboratory
7. Name of course coordinator(s):
Name : mazin saleem shaker E-mail: mazinsaleem97@gmail.com
8. Course objectives

- This course explores the classification, physicochemical properties, and extraction methods of glycosides and volatile oils, providing a deep understanding of their structural diversity and stability.

- Students will examine the biosynthetic pathways and chemical reactions of these secondary metabolites to master their isolation, purification, and identification techniques.

- Additionally, the curriculum investigates the pharmacological activities and therapeutic applications of these bioactive compounds to ensure their effective use in pharmaceutical formulations.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy
Learning strategies	- Self-learning strategy - E-learning strategy - Study strategy - Spaced practice strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2 2	Understand basic metabolic pathways and gastric acid detection techniques.	Introduction: General biosynthesis pathways. Lab: Gastric juice analysis (HCl).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	2 2	Classify carbohydrates and perform quantitative analysis of gastric acidity.	Carbohydrates. Lab: Gastric juice analysis (Free & Total acid).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments.
3	2 2	Define glycoside properties and identify cardio-active varieties.	Glycosides: Biosynthesis & Properties. Lab: Cardio-active glycosides (P1).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

4	2 2	Differentiate between cardiac, saponin, and anthraquinone glycosides.	Cardiac, Saponin, Anthraquinone glycosides. Lab: Cardio-active glycosides (P2).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	2 2	Analyze the chemistry of flavonoid and cyanophore glycosides.	Flavonoid, Cyanophore, Isothiocyanate glycosides. Lab: Anthraquinone (P1).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	2 2	Understand the structures of aldehyde, alcohol, and phenolic glycosides.	Aldehyde, Alcohol, Phenolic glycosides. Lab: Anthraquinone (P2).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	2 2	Identify lactone glycosides, coumarins, and their chemical signatures.	Lactone glycosides; Coumarins and Chromones. Lab: Saponin glycosides (P1).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	2 2	Classify resins and tannins and understand their therapeutic roles.	Resins and Tannins. Lab: Saponin glycosides (P2).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	2 2	Explain the chemical composition and extraction of fixed oils and waxes.	Lipids: Fixed oils and waxes. Lab: Saponin glycosides (P3).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	2 2	Understand the volatile oil	Volatile oils: Introduction and Biosynthesis.	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical

		biosynthetic pathways and chemistry.	Lab: Tannins (P1).		examinations, semi-semester and semester -Conduct laboratory experiments
11	2 2	Differentiate volatile oils based on hydrocarbon and alcohol content.	Volatile oils: Hydrocarbons, Alcohols, Aldehydes. Lab: Tannins (P2).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	2 2	Analyze the properties of ketone, phenol, oxide, and ester volatile oils.	Ketones, Phenols, Oxides, Esters as volatile oils. Lab: Volatile oils (P1).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	2 2	Understand the clinical relevance of phenolic ether volatile oils.	Phenolic ethers as volatile oils. Lab: Volatile oils (P2).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	2 2	Identify toxic plants and the chemistry of flavonoid glycosides.	Non-medicinal toxic plants. Lab: Flavonoid glycoside (P1).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	2 2	Explain the biosynthesis and roles of vitamins and amino acids.	Vitamins and Amino acids. Lab: Flavonoid glycoside (P2).	Blackboard, PPT, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and written exams editorial, reports, etc	
- Practical exam 20 marks - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
Reference textbook	Robbers JE, Speedie MK, Tyler VE (Eds.); Pharmacognosy and Pharmacobiotechnology; the latest edition.
External textbook	Trease & Evans Pharmacognosy (16Th Edition)

1. Course Name
Pharmaceutical Technology
2. Course Code
327 PPt
3. Semester/Year
First semester/ third year
4. Date this description was prepared
10/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours theory and 30 hours practices
7. Name of course coordinator(s):
Ass. Prof. Hassan Dhulfiqar Abdulameer Email: dr.hassanalbassam80@gmail.com
8. Course objectives
1. Understand the fundamentals of pharmaceutical preformulation, including solubility, partitioning, powder, and compaction properties. 2. Learn the formulation, preparation, and administration of various solution dosage forms, both oral and topical. 3. Explore the principles and techniques involved in developing suspensions, including stability, rheology, and compounding methods. 4. Study the formulation and delivery mechanisms of aerosols and foams, with focus on metered-dose inhalers and topical/vaginal applications. 5. Gain knowledge of parenteral dosage forms, including types of injections, sterilization methods, and production standards. 6. Develop an understanding of storage, packaging, and labeling practices across all listed dosage forms to ensure quality and patient safety.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	Understand GLP/safety protocols and how solubility and molecular dissociation impact drug behavior.	• The concept of preformulation - Solubility - Molecular dissociation - Partitioning • Introduction: Laboratory Safety and Good Laboratory Practice (GLP)	the blackboard PowerPoint slides E-Learning	,Reports ,assignments oral and written theoretical ,examinations semi-semester and semester
2	3 2	Determine dissolution rates and analyze how hygroscopicity and physical	• Dissolution rate • Hygroscopicity • Physical form	the blackboard PowerPoint slides	Oral and written theoretical exams, semi-

		polymorphism influence drug stability.	• Calibration curve and saturated solubility determination (UV and HPLC)	E-Learning	semester and semester
3	3 2	Characterize powder flow and compaction properties essential for solid dosage form development and processing.	• Powder properties • Compaction properties • Calibration curve and saturated solubility determination (UV and HPLC)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	3 2	Explain the principles of solubility enhancement and the formulation of syrups and elixirs for oral delivery.	• Some Solvents for Liquid Preparations • Preparation of solutions • Mixing oral liquids • Oral solutions and preparations for oral solution • Syrups • Elixirs • Oral solutions: preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	3 2	Identify the formulation requirements and administration	• Tinctures	the blackboard	Oral and written theoretical exams, semi-

		techniques for tinctures and specialized topical or cavity solutions.	• Proper administration and use of liquid peroral dosage forms • Topical Solutions and Tinctures • Vaginal and rectal solutions • Topical tinctures • Syrups: materials, preparation methods and quality evaluation	PowerPoint slides E-Learning	semester and semester
6	3 2	Master extraction techniques and the use of nonaqueous solvents for preparing specialized and dental solutions.	• Topical oral (dental) solutions • Miscellaneous solutions • Nonaqueous solutions • Extraction methods for preparing solutions • Syrups: materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
7	3 2	Apply Stokes' Law to understand sedimentation rates and the physical stability of pharmaceutical suspensions.	• Reasons for suspension • Features of desired in a pharmaceutical suspension	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

			• Sedimentation rate of the particles of a suspension • Physical features of the dispersed phase • Dispersion medium • Elixirs: materials, preparation methods and quality evaluation		
8	3 2	Evaluate rheological properties and compounding techniques for preparing stable and sustained-release suspensions.	• Rheology of suspensions • Preparation of suspensions • Sustained-release suspensions • Extemporaneous compounding of suspensions • Elixirs: materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
9	3 2	Demonstrate proficiency in mixing solids into liquids and selecting appropriate packaging to maintain suspension integrity.	• Mixing solids in liquids • Packaging and storage of suspensions • Tinctures: materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

10	3 2	Formulate dry powders for reconstitution and prepare aromatic waters using standardized quality evaluation methods.	• Examples of pharmaceutical suspensions • Dry powders for oral suspension • Aromatic waters: materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
11	3 2	Understand the mechanics of aerosol systems, including valve assembly and the operation of metered-dose inhalers.	• Types of aerosols • Advantages of the aerosol dosage form • The aerosol principle • Aerosol systems • Aerosol container and valve assembly • Metered-dose inhalers • Filling operations • Suspensions: materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	3 2	Compare different aerosol types (foams, topical, vaginal) and ensure proper patient administration and storage.	• Packaging, labeling, and storage • Proper Administration and Use of • Proper administration and use of	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

			pharmaceutical aerosols • Examples of aerosols • Topical aerosols • Vaginal and rectal aerosols • Foams: Their types and preparation • Suspensions: materials, preparation methods and quality evaluation		
13	3 2	Identify parenteral routes and select appropriate solvents and vehicles for safe and effective injections.	• Injections • Parenteral routes of administration • Official types of injections • Solvents and vehicles for injections • Suspensions: materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
14	3 2	Calculate colligative properties for isotonicity and validate sterilization methods for	• Colligative properties for injections • Methods of sterilization	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

		industrial parenteral production.	• Validation/verification of sterility • The industrial preparation of parenteral products • Packaging, labeling, and storage of injections • Available injections (examples) • Quality evaluation of parenteral preparations		
15	3 2	Differentiate between Small and Large Volume Parenterals and manage the requirements for irrigation and dialysis solutions.	• Small volume parenterals • Large volume parenterals • Special considerations associated with parenteral therapy • Irrigation and dialysis solutions • Quality evaluation of parenteral preparations	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily exams and editorial, reports, etc	
- Practical exam 20 - The mid-term exam 20 marks - The final exam 60	
12. Learning and teaching resources	
Required textbooks (methodology, if (any	Handbook of Extemporaneous Preparation by Mark Jackson and Andrew Lowey; 1st edition; 2010.
Main references (sources)	1. Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022. 2. Pharmaceutical Dosage Forms and Drug Delivery Systems by Howard A. Ansel; 11th edition, 2017.
Recommended supporting books and ,references (scientific journals (...,reports	
References , websites	• British Pharmacopeia (BP); 2025 edition. • United States Pharmacopeia- National Formulary (USP-NF); 2025 edition.

1. Course Name
Biochemistry I
2. Course Code
328 ClBi1
3. Semester/Year
3rd Class, 1st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and 30 hours Laboratory
7. Name of course coordinator(s):
Name: rudhab ibrahim mohammed Email: risamaw@alameed.edu.iq
8. Course objectives
1. The primary goal of biochemistry is to provide basic information and general principles to primary studies students that will familiarize the recipient with the special structure of small, large biological molecules. 2. Introducing third-stage students to carbohydrates, proteins, and fats, in addition to nucleic acids, enzymes, and vitamins. 3. Identify the types of enzymes and their inhibitors (enzyme kinetics).

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required learning outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Define** the four major classes of macromolecules (carbohydrates, proteins, lipids, nucleic acids).	Introduction to the macromolecule's biochemistry: Definitions and terms; Carbohydrate, proteins, enzymes, DNA, Clinical value. General urine examination: Physical properties.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Draw** the general structure of amino acids and classify them by side-chain properties (polar, non-polar, acidic, basic).	Amino acids: Structures of A.A (table of standard A.A abbreviation and side chain); classification, properties, isomerism.	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

			general urine examination: Chemical properties; Protein in urine; Sugar in urine.	E-Learning	-Conduct laboratory experiments
3	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Calculate** isoelectric points (pI) and interpret titration curves for amino acids. **Explain** the concept of the Zwitterion and its role in buffering systems.	Amino acids: Chemical reactions, Zwitter ions, titration curve calculating isoelectric point values. Examples and questions. Non-standards A.A: Structures, existence and clinical value. General urine examination: Ketone bodies in urine (Rothera test); Bile salts in urine (Hays test); Bilirubin in urine.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Describe** the resonance stabilization and planar nature of the peptide bond. **Discuss** the physiological roles of essential peptides like glutathione and insulin.	Peptides: Peptide bond, resonance forms, isomers, physical properties and chemical reactions. Essential poly peptides in human body, structures, roles and clinical values. General urine examination: Evaluation of unknown urine sample.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

5	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Compare** primary, secondary (alpha-helix, beta-sheet), tertiary, and quaternary protein structures. **Explain** the forces stabilizing these structures (H-bonds, hydrophobic interactions).	Proteins: Structure and conformations of proteins, Primary structure, Secondary structure (α-helix, β-sheet), tertiary structure, quaternary structure. Classification, synthesis, cellular functions (Enzymes, cell signaling, and ligand transport, structural proteins), protein in nutrition. Cerebrospinal fluid analysis: Measurement of glucose in CSF.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Explain** the principles of protein denaturation and sequencing (Edman degradation). **Discuss** the applications of proteomics and bioinformatics in modern medicine.	Denaturation of proteins and protein sequencing: Determining A.A composition, N-terminal A.A analysis, C- terminal A.A analysis, Edman degradation, prediction protein sequence from DNA/ RNA sequences. Methods of protein study: Protein purification, cellular localization, proteomics and bioinformatics, structure predication and simulation.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

			Cerebrospinal fluid analysis: Measurement of chloride in CSF.		
7	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Classify** carbohydrates into monosaccharides, disaccharides, and polysaccharides. **Explain** stereoisomerism, anomers, and epimers in sugars.	Carbohydrates: Chemistry and classification, biomedical importance, classification of CHO, Stereochemistry of monosaccharides, metabolism of CHO; Physiologically important monosaccharides, glycosides, disaccharides, polysaccharides. Cerebrospinal fluid analysis: Measurement of proteins in CSF.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Define** lipids and classify them (fatty acids, triacylglycerols, phospholipids). **Differentiate** saturated vs. unsaturated fatty acids and their health implications.	Lipids: Introduction, classification of lipids, fatty acids, nomenclature of F.A, saturated F.A, unsaturated F.A, physical and physiological properties of F.A, metabolism of lipids. Phospholipids, lipid peroxidation and antioxidants, separation and identification of	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

			lipids, amphipathic lipids. Serum calcium measurement.		
9	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Explain** the mechanism of enzyme catalysis and transition state stabilization. **Compare** "Lock and Key" vs. "Induced Fit" models.	Enzymes: Structures and mechanism, nomenclature, classification, mechanisms of catalysis, thermodynamics, specificity, lock and key model, induced fit model, transition state stabilization, dynamics and function, allosteric modulation. Biological function, cofactors, coenzymes, involvement in disease. Blood phosphorus measurement (inorganic phosphate).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Differentiate** competitive, non-competitive, and irreversible enzyme inhibition. **Solve** problems involving inhibition kinetics and Ki.	Enzyme inhibition: Reversible inhibitors, competitive and noncompetitive inhibition, mixed-type inhibition, Irreversible inhibition. Inhibition kinetics and binding affinities (ki), questions and solutions.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

			Serum total proteins (quantitative analysis).		
11	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Analyze** Michaelis-Menten kinetics and Lineweaver-Burk plots. **Explain** factors affecting enzyme activity (pH, Temp).	Kinetics: General principles, factors effecting enzyme rates (substrate conc., pH, temperature, etc), single-substrate reaction (Michaelis-Menten kinetics), kinetic constants. Examples of kinetic questions and solutions. Control of activity and uses of in activators; multi-substrate reactions, ternary-complex mechanisms, ping-pong mechanisms, non-Michaelis- Menten kinetics, pre-steady-state kinetics, chemical mechanisms. Estimation of urea level in the blood.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Describe** the components of nucleotides and the structure of DNA double helix. **Explain** base pairing rules (Chargaff's rules) and DNA supercoiling.	Nucleic Acid: Chemical structure, nucleic acid components, nucleic acid bases, nucleotides and deoxynucleotides (Properties, base pairing, sense and antisense, super-coiling, alternative	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

			structures, quadruple structures. Measurement of serum uric acid level.		
13	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Explain** the "Central Dogma": Replication, Transcription, and Translation. **Describe** how genetic information is stored and transmitted.	Biological functions of DNA: Genes and genomes, transcription and translation, replication. Measurement of serum ascorbic acid level.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Outline** the digestion and absorption pathways for carbs, lipids, and proteins. **Discuss** the biochemistry of hemostasis (blood clotting cascade).	Special topics: Nutrition, digestion, and absorption. Biomedical importance, digestion and absorption of carbohydrates, lipids, proteins, vitamins and minerals; energy balance. Biochemistry of hemostasis and clot formation. Gastric juice analysis: Detection of free hydrochloric acid concentration	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Describe** the Fluid Mosaic Model and the	Biochemistry of extracellular and intracellular communication: Plasma membrane structure and function; Biomedical	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations,

		role of membrane proteins. **Explain** membrane asymmetry and transport mechanisms.	importance, membrane proteins associated with lipid bilayer, membranes protein composition, dynamic structures of membranes, a symmetric structure of membranes. Gastric juice analysis: detection of free acid, total acid content.	E-Learning	semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of100 according to the tasks assigned to the student, such as da preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Practical exam 20 - The midterm exams 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	- Lehninger PRINCIPLES OF BIOCHEMISTRY Fourth Edition 2004
Main references (sources)	- Harper's Illustrated biochemistry 30th Edition 2015 - Lippincotts Illustrated Reviews Biochemistry - 3rd edition 2004
Recommended supporting books and references (scientific journals, reports)	

References , websites	

1. Course Name
Pathophysiology
2. Course Code
329 ClPy
3. Semester/Year
3rd Class, 1st Semester
4. Date this description was prepared
2/9/2024
5. Available attendance forms
Theory and practical
Number of academic hours (total) / number of units (total)
45 hours Theory (3hrs/wk) and 30 hrs practical (2hrs/wk)
7. Name of course coordinator(s):
Name: E.mail
8. Course objectives
• Describe the basic concepts of pathophysiology at the cellular level related to injury, the self-defense mechanism, mutation, and cellular proliferation. Outline basic pathological factors that influence the disease process. • Describe the impact and abnormal functions upon the organ (s) associated with the disease process of targeted body systems. Describe clinical manifestations associated with the diseased organ(s).

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required learning outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Define** the core concepts of pathophysiology: etiology, pathogenesis, clinical manifestations, and sequelae. **Explain** the relationship between normal physiology, pathology, and disease progression. **Discuss** the general principles of cellular responses to stress and noxious stimuli.	Introduction. General introduction and slide preparation.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Differentiate** between reversible and irreversible cell injury mechanisms (hypoxia, free radicals). **Compare** necrosis and apoptosis regarding	Cell injury and tissue response; Degeneration; Necrosis; Atrophy; Hypertrophy; Metaplasia and Calcification;	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-

		morphology and inflammation. **Describe** cellular adaptations: atrophy, hypertrophy, hyperplasia, and metaplasia. **Explain** the vascular and cellular stages of acute inflammation and the process of wound healing/repair.	Inflammation and Repair. Cell injury and degenerations.	E-Learning	semester and semester -Conduct laboratory experiments
3	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Analyze** the causes and clinical signs of sodium (hyponatremia/hypernatremia) and potassium (hypokalemia/hyperkalemia) imbalances. **Explain** the pathophysiology of fluid volume disorders: SIADH (water retention) vs. Diabetes Insipidus (water loss).	Disorders of electrolytes and water and acid–base balances: Hyper And Hyponatremia; Hyper and Hypokalemia; Syndrome of inappropriate secretion of ADH; Diabetes insipidus; Metabolic acidosis and alkalosis; Respiratory acidosis and alkalosis. Growth disturbances.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Explain** Virchow's Triad and the formation of thrombi and emboli. **Differentiate** between types of shock (hypovolemic, cardiogenic, septic) and their stages. **Compare** the pathophysiology of left vs. right heart failure. **Discuss** the mechanisms of essential hypertension and the	Disorders of cardiovascular system: Hyperemia; Congestion and edema; Thrombosis; embolism and infarction; Shock; Coronary heart disease and MI; Rheumatic heart disease; Heart failure; Acute pulmonary edema; Essential	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

		consequences of Myocardial Infarction (MI).	hypertension; Secondary hypertension; Malignant hypertension; Hypotension; Aneurysm versus varicose veins; Inflammation.		
5	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Distinguish** between Obstructive (Asthma, Emphysema) and Restrictive lung diseases. **Explain** the pathogenesis of Tuberculosis and the inflammatory response in Pneumonia. **Describe** the genetic defect in Cystic Fibrosis and its respiratory consequences. **Discuss** the hemodynamic causes of Pulmonary Embolism and Pulmonary Hypertension.	Disorders of respiratory system: Pneumonias; Tuberculosis; Respiratory distress syndrome; Bronchial asthma; Emphysema and bronchiectasis; Cystic fibrosis; Pulmonary embolism; Pulmonary hypertension. Thrombosis.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Differentiate** Nephrotic Syndrome (proteinuria) from Nephritic Syndrome (hematuria). **Explain** the pathophysiology of Acute Kidney Injury (Prerenal, Intrarenal, Postrenal). **Describe** the progression of Chronic Renal Failure and its systemic effects.	Disorders of the renal system: Nephrotic syndrome; Glomerulonephritis; Diabetic glomerulosclerosis; Hypertensive glomerular disease; Pyelonephritis; Drug related nephropathies; Acute renal failure;	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

			Chronic renal failure. Neoplasia.		
7	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Explain** the imbalance between protective and aggressive factors in Peptic Ulcer Disease. **Compare** the pathology of Crohn's Disease versus Ulcerative Colitis. **Describe** the stages of Viral Hepatitis and the development of Liver Cirrhosis. **Discuss** the formation of gallstones (Cholelithiasis) and associated complications.	Disorders of GI and hepatobiliary systems: Peptic ulcer and Zollinger –Ellison syndrome; Irritable bowel syndrome; Crohn's disease; Diarrhea; Celiac disease; Viral hepatitis; Primary biliary cirrhosis; Liver failure; Cholelithiasis Disorders of respiratory system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Compare** the clinical presentation and lab findings of Hypothyroidism vs. Hyperthyroidism. **Explain** the autoimmune pathophysiology of Graves' Disease.	Disorders of thyroid function: Hypothyroidism. Hyperthyroidism. Graves's disease. Thyrotoxicosis. Disorders of the cardiovascular system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Differentiate** between Cushing Syndrome (cortisol excess) and Addison's Disease (adrenal insufficiency).	Disorders of adrenal function: Cushing syndrome. Adrenal cortical Insufficiency (primary and secondary).	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-

		Explain the pathophysiology of Congenital Adrenal Hyperplasia (CAH).	Congenital adrenal hyperplasia. Pheochromocytoma. Disorders of renal system.	E-Learning	semester and semester -Conduct laboratory experiments
10	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Contrast** the etiology of Type 1 (autoimmune) vs. Type 2 (insulin resistance) Diabetes Mellitus. **Identify** the criteria for Metabolic Syndrome and its cardiovascular risks. **Explain** the pathophysiology of diabetic complications (neuropathy, retinopathy, nephropathy).	Diabetes mellitus and metabolic syndrome. Liver disorders.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Classify** primary and secondary Dyslipoproteinemias. **Explain** the role of LDL oxidation and macrophage foam cells in atherosclerosis. **Analyze** lipid profiles to assess cardiovascular risk.	Dyslipoproteinemia. Disorders of the gastrointestinal tract.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Differentiate** between benign and malignant tumors (differentiation, invasion, metastasis). **Explain** the role of oncogenes and tumor suppressor genes in carcinogenesis.	Neoplasia. Disorders of the central nervous system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Describe the systems used for Staging (TNM) and Grading of tumors.			-Conduct laboratory experiments
13	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Compare** the pathophysiology of Osteoporosis (bone mass loss) vs. Osteomalacia (mineralization defect). **Differentiate** Osteoarthritis (wear-and-tear) from Rheumatoid Arthritis (autoimmune). **Explain** the mechanism of uric acid crystal deposition in Gout. **Discuss** the systemic autoimmune nature of Systemic Lupus Erythematosus (SLE).	Metabolic &rheumatic disorders of skeletal system: - Osteoporosis, osteomalacia & rickets, rheumatoidarthritis, systemic lupus erythromatosus, ankylosing spondylitis, gout, osteoarthritis syndrome. Disorders of the reproductive system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Classify** Hypersensitivity reactions (Type I: IgE, Type II: Cytotoxic, Type III: Immune Complex, Type IV: Delayed). **Explain** the mechanism of anaphylactic shock. **Discuss** the failure of self-tolerance in autoimmune diseases.	Alterations in the immune response (pathophysiology of immunopathology): - Hypersensitivity disorders. Disorders of skeletomuscular system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 (Theory) 2 (Lab)	By the end of this week, students should be able to: **Explain** the mechanisms of Transplant Rejection (Hyperacute, Acute, Chronic). **Describe** the pathophysiology of Graft-versus-Host Disease (GVHD). **Differentiate** between Primary (genetic) and	Transpalantation immunopathology. - Immunodeficiency disorders. Disorders of endocrine system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Secondary (e.g., HIV/AIDS) Immunodeficiencies.			-Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such asdaily activities such as oral and written exams and editorial, reports, etc	
- Practical exam20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	- an introduction to clinical medicine 7ed.Cary D. Hammer, editor Stephen J. Mc Phee editor
Main references (sources)	- Essentials in Pathophysiology by: Carol Mattson Porth 2nd Ed.and pathophysiologly of disease.
Recommended supporting books and references scientific journals, reports))	https://www.us.elsevierhealth.com/nursing/pathophysiology
References , websites	https://bookauthority.org/books/best-pathophysiology-books

1. Course Name
Organic Pharmaceutical Chemistry I
2. Course Code
330 PcOp1
3. Semester/Year
3rd Class, 2nd Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours theory and 30 hours practices
7. Name of course coordinator(s):
Name: Abbas abdulridha mehihi Email: abbas-mehihi@alameed.edu.iq
8. Course objectives

- This course provides a comprehensive overview of the core principles governing how drugs interact with the human body, from metabolism and distribution to receptor binding and therapeutic action.

- The curriculum is structured to first explain what the body does to a drug (pharmacokinetics), then detail the principles of rational drug design (pharmacodynamics).

- By integrating pharmacokinetic and pharmacodynamic knowledge, students will learn the logic behind designing safer and more effective therapeutic agents. This includes understanding structure-activity relationships (SAR) and optimizing molecular properties to achieve desired therapeutic outcomes while minimizing adverse effects.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 (Theory) 2 (Lab)	**Explain** the physicochemical properties (solubility, partition coefficient) that influence drug distribution in the body. **Prepare** a standard solution of Potassium Permanganate (KMnO4). **Perform** a redox titration to standardize KMnO4 against a primary standard (e.g., Sodium Oxalate).	• Drug distribution • Preparation and standardization of 0.1N KMnO4 (known sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

2	3 (Theory) 2 (Lab)	**Calculate** the percentage of drug ionization using the Henderson-Hasselbalch equation. **Predict** drug absorption based on pKa and pH of the environment. **Demonstrate** accuracy and precision in identifying the concentration of an unknown sample using permanganometry.	• Acid- base properties • Preparation and standardization of 0.1N KMnO4 (quiz and unknown).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	3 (Theory) 2 (Lab)	**Apply** statistical methods to correlate chemical structure with biological activity. **Explain** the importance of regression analysis in drug discovery. **Perform** a quantitative assay of Hydrogen Peroxide (H2O2) using a standard Permanganate solution.	• Statistical prediction of pharmacological activity • Assay of hydrogen peroxide solution (known sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 (Theory) 2 (Lab)	**Describe** the components of Quantitative Structure-Activity Relationship (QSAR) models. **Interpret** Hansch analysis and the role of lipophilic, electronic, and steric parameters. **Analyze** an unknown peroxide sample to determine its purity/concentration.	• QSAR models • Assay of hydrogen peroxide solution (quiz and unknown sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 (Theory) 2 (Lab)	**Differentiate** between the types of bonds involved in drug-receptor complexes (covalent, ionic, hydrogen, van der Waals). **Explain** how bond strength correlates with	• Drug receptor interaction: forces involved	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations,

		the reversibility of drug action. **Perform** a redox titration to assay Ferrous Sulfate ($FeSO_4$).	• Assay of ferrous sulfate (known sample).	E-Learning	semi-semester and semester -Conduct laboratory experiments
6	3 (Theory) 2 (Lab)	**Explain** the impact of chirality and optical isomerism on drug potency and toxicity (Eutomer vs. Distomer). **Discuss** the concept of Bioisosterism in drug modification. **Determine** the concentration of Ferrous Sulfate in an unknown sample.	• Steric features of drugs Isosterism, Optical isomerism and biological activity. • Assay of ferrous sulfate (unknown sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	3 (Theory) 2 (Lab)	**Define** prodrugs and classify them (Carrier-linked vs. Bioprecursors). **Explain** the rationale for prodrug design (improving solubility, stability, or taste). **Standardize** a Sodium Dithionite/Thiosulfate ($Na_2S_2O_4$) solution for use in redox titrations.	• Prodrug • Preparation and standardization of 0.1$Na_2S_2O_4$ solution (known sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 (Theory) 2 (Lab)	**Design** a theoretical prodrug strategy to overcome a specific pharmacokinetic barrier. **Compare** ester and amide prodrugs regarding their hydrolysis rates. **Assess** the concentration of an unknown $Na_2S_2O_4$ solution via titration.	• Prodrug • reparation and standardization of 0.1$Na_2S_2O_4$ solution (quiz and unknown sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 (Theory)	**Analyze** mechanisms of site-specific drug delivery using prodrugs.	• Prodrug	The blackboard	Reports, assignments, oral and written

	2 (Lab)	**Discuss** the role of enzymes in prodrug activation. **Perform** an iodometric assay to determine the purity of Copper Sulfate (CuSO4).	• Assay of copper sulfate (known sample).	PowerPoint slides E-Learning	theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3 (Theory) 2 (Lab)	**Outline** the two major phases of drug metabolism (Phase I and Phase II). **Explain** the First-Pass Effect and its impact on drug bioavailability. **Quantify** Copper Sulfate content in an unknown sample accurately.	• General pathways of drug metabolism. • Assay of copper sulfate (unknown sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 (Theory) 2 (Lab)	**Identify** the major sites of biotransformation (Liver, Kidney, Intestine). **Describe** the catalytic cycle of Cytochrome P450 monooxygenases. **Perform** an assay of Chlorinated Lime (Bleaching powder) to determine available chlorine.	• Sites of drug biotransformation; Role of cytochrome P450 mono oxygenases in oxidative biotransformation. • Assay of Chlorinated Lime (known sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 (Theory) 2 (Lab)	**Predict** the products of oxidative metabolic reactions (N-dealkylation, O-dealkylation, Hydroxylation). **Draw** chemical structures of metabolites for given drug examples. **Analyze** an unknown sample of Chlorinated Lime for quality control.	• Oxidative reactions. • Assay of Chlorinated Lime (quiz and unknown).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

13	3 (Theory) 2 (Lab)	**Explain** reductive metabolic pathways (Azo and Nitro reduction) and hydrolytic reactions (Esters, Amides). **Identify** drugs that undergo hydrolysis in plasma. **Prepare** and assay Lugol's Solution (Iodine/Potassium Iodide) using iodimetry.	• Reductive reactions; Hydrolytic reactions. • Preparation and assay of Lugol's Solution (known sample).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	3 (Theory) 2 (Lab)	**Describe** Phase II conjugation reactions (Glucuronidation, Sulfation, Acetylation).	• Phase II reactions. • Preparation and assay of Lugol's Solution (quiz and unknown).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 (Theory) 2 (Lab)	Analyze physiological factors (age, gender, pregnancy) and pathological states (liver/kidney disease) that alter drug metabolism. Explain the mechanism and clinical consequences of enzyme induction and enzyme inhibition. Discuss the impact of genetic polymorphisms (Pharmacogenomics) on inter-individual variability in drug response.	• Factors affecting drug metabolism	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and written exams Editorial, reports, etc	
- Practical exam 20 - The mid-term exam 20 marks - The final exam 60	
12. Learning and teaching resources	
methodology, if textbooks Required any	
Main references (sources)	• Wilson and Gisvolds textbook of organic medicinal and pharmaceutical chemistry, John M. B.; John H.B. (Twelfth edition). • An Introduction to Medicinal Chemistry 5th Edition by Graham L. Patrick, University of the West of Scotland, UK
Recommended supporting books and references (scientific journals, reports)	• Organic Chemistry by McCurry; 5th ed.
References, websites	

1. Course Name
Pharmacology I
2. Course Code
331 PtPc1
3. Semester/Year
Second semester/third year
4. Date this description was prepared
2/9 /2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours therory
7. Name of course coordinator(s):
Ass. Prof. haider faleh shamik Email: hasaedi@alameed.edu.iq
8. Course objectives
1) Understand the principles of pharmacokinetics, pharmacodynamics, and drug–receptor interactions as a foundation for pharmacology. 2) Apply knowledge of antimicrobial pharmacology to explain mechanisms of action, resistance, therapeutic uses, and adverse effects of major drug classes. 3) Integrate pharmacological concepts to evaluate rational drug selection and optimize therapy for infectious diseases.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning Method**	**Evaluation Method**
1	3	By the end of this week, students should be able to: 1. Define Pharmacology and distinguish between pharmacokinetics and pharmacodynamics. 2. Explain the mechanisms of drug absorption and the factors affecting bioavailability. 3. Describe the different routes of drug administration.	General introduction to Pharmacology and Pharmacokinetics.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

2	3	By the end of this week, students should be able to: 1. Analyze the processes of drug distribution, metabolism (Phase I and II reactions), and excretion. 2. Calculate key pharmacokinetic parameters: Half-life ($t_{1/2}$), Clearance (Cl), and Volume of Distribution (V_d).	Continue Pharmacokinetics	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
3	3	By the end of this week, students should be able to: 1. Define drug receptors and explain the concepts of affinity, efficacy, and potency. 2. Differentiate between full agonists, partial agonists, inverse agonists, and antagonists.	Drug Receptor interaction and Pharmacodynamics.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	3	By the end of this week, students should be able to: 1. Interpret dose-response curves and calculate the Therapeutic Index. 2. Outline the anatomical division of the Autonomic Nervous System (ANS) and identifying major neurotransmitters.	Continue Pharmacodynamics. The autonomic nervous system.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	3	By the end of this week, students should be able to: 1. Describe the synthesis, storage, and release of Acetylcholine. 2. Classify cholinergic receptors (Muscarinic and Nicotinic) and describe the effects of Cholinomimetic drugs.	Cholinergic system.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
6	3	By the end of this week, students should be able to: 1. Compare the mechanisms and uses of reversible vs.	Continue Cholinergic system.	The blackboard	Oral and written theoretical exams, semi-

		irreversible anticholinesterases. 2. Evaluate the clinical applications of antimuscarinic drugs (e.g., Atropine) and neuromuscular blockers.		PowerPoint slides E-Learning	semester and semester
7	3	By the end of this week, students should be able to: 1. Describe the biosynthetic pathway of Catecholamines (Dopamine, Norepinephrine, Epinephrine). 2. Differentiate between Alpha (alpha) and Beta (beta) adrenergic receptors and their physiological roles.	Adrenergic system.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
8	3	By the end of this week, students should be able to: 1. Discuss the clinical uses of sympathomimetics in conditions like asthma and shock. 2. Analyze the therapeutic effects of Adrenergic antagonists (Beta-blockers and Alpha-blockers).	Continue Adrenergic system.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
9	3	By the end of this week, students should be able to: 1. Explain the principles of antimicrobial therapy, including selective toxicity and resistance mechanisms. 2. Describe the mechanism of action, spectrum, and adverse effects of Penicillins.	Principal of antimicrobial therapy. β- lactam and other cell wall synthesis inhibitor antibiotics.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	3	By the end of this week, students should be able to: 1. Classify Cephalosporins by generation and describe their spectrum of activity. 2. Explain the indications for Carbapenems,	Continue β- lactam and other cell wall synthesis inhibitor antibiotics.	The blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

		Monobactams, and Glycopeptides (Vancomycin).		E-Learning	
11	3	By the end of this week, students should be able to: 1. Explain how Fluoroquinolones inhibit DNA replication (DNA gyrase/Topoisomerase IV). 2. Describe the sequential blockade of folate synthesis by Sulfonamides and Trimethoprim.	Quinolones, Folate antagonists, and urinary tract antiseptics.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	3	By the end of this week, students should be able to: 1. Identify antibiotics that inhibit the 30S ribosomal subunit (Tetracyclines, Aminoglycosides). 2. Discuss the specific toxicities of Aminoglycosides (nephrotoxicity/ototoxicity).	Protein synthesis inhibitors.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
13	3	By the end of this week, students should be able to: 1. Identify antibiotics that inhibit the 50S ribosomal subunit (Macrolides, Chloramphenicol, Clindamycin). 2. Outline the first-line anti-tuberculosis regimen (RIPE: Rifampin, Isoniazid, Pyrazinamide, Ethambutol).	Continue Protein synthesis inhibitors. Antimycobacterial Drugs.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
14	3	By the end of this week, students should be able to: 1. Differentiate the mechanisms of Polyenes (Amphotericin B) and Azoles in treating fungal infections. 2. Summarize the treatment strategies for Malaria and Amoebiasis.	Antifungal drugs. Antiprotozoal drugs.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

15	3	By the end of this week, students should be able to: 1. Classify Anthelmintics based on target organism (Nematodes vs. Platyhelminths). 2. Explain the mechanism of action of key antivirals (e.g., Acyclovir for Herpes, HAART for HIV).	Anthelmintic drugs. Antiviral drugs.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily quizzes and oral, and editorial, reports, etc.	
- Daily quizzes and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	Lippincott Illustrated Reviews Pharmacology 7th Edition, 2019.
Main references (sources)	- Goodman & Gilman's The Pharmacological Basis of Therapeutics 13th edition 2018. - Basic & Clinical Pharmacology 14th Edition 2018 - Rang & Dale's Pharmacology 9th Edition 2020.
Recommended supporting books and references (scientific journals, reports,...)	British National Formulary
References, websites	FDA

1. Course Name
Pharmaceutical and Cosmetic Preparations
2. Course Code
332 PPc
3. Semester/Year
second semester/ third year
4. Date this description was prepared
10/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours theory and 30 hours practices
7. Name of course coordinator(s):
Ass. Prof. hassan Dhulfiqar Abdulameer Email: dr.hassanalbassam80@gmail.com
8. Course objectives
1) Understand the principles, preparation, and stability of pharmaceutical emulsions, including surfactant systems and microemulsions. 2) Study the formulation, compounding, and use of semisolid dosage forms such as ointments, creams, gels, and dermatologic preparations. 3) Explore the design and clinical applications of suppositories, vaginal inserts, and medication sticks, including manufacturing and quality control. 4) Learn the physicochemical and therapeutic considerations for selecting appropriate bases and packaging for topical and rectal formulations. 5) Examine the formulation strategies and clinical uses of cosmetic products, including sunscreens, exfoliants, and anti-aging preparations. 6) Apply knowledge of formulation science to ensure safety, effectiveness, and patient acceptability of pharmaceutical and cosmetic products.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 (Theory) 2 (Lab)	• Define emulsions and explain their pharmaceutical purpose. • Explain the theories of emulsification. • Analyze the role of Gibbs free energy in emulsion stability. • Describe general methods for the preparation of emulsions.	**Emulsions:** materials, preparation methods and quality evaluation. **Emulsions:** materials, preparation methods and quality evaluation	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	3 (Theory) 2 (Lab)	• Classify different types of emulsifying agents. • Apply the HLB system to select surfactants.	**Ointments:** materials, preparation methods and quality evaluation.	The blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

		• Calculate proportions for the blending of surfactants. • Explain the significance of globule surface area. • Demonstrate specific methods of emulsion preparation.	**Emulsions:** materials, preparation methods and quality evaluation (cont.)	E-Learning	
3	3 (Theory) 2 (Lab)	• Describe the process of mixing immiscible liquids. • Differentiate between microemulsions and coarse emulsions. • Evaluate factors affecting the stability of emulsions (creaming, coalescence). • Identify examples of oral and topical commercial emulsions.	**Ophthalmic ointments:** materials, preparation methods and quality evaluation **Ointments:** materials, preparation methods and quality evaluation.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	3 (Theory) 2 (Lab)	• Define ointments and their applications. • Classify and select appropriate ointment bases. • List compendial requirements for ointments. • Describe methods for the preparation of ointments (fusion, incorporation).	**Creams:** materials, preparation methods and quality evaluation **Ointments:** materials, preparation methods and quality evaluation (cont.)	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	3 (Theory)	• Describe the composition and preparation of creams.	**Gels:** materials, preparation methods and quality evaluation.	The blackboard	Oral and written theoretical

	2 (Lab)	• Explain the preparation, packaging, and storage of gels. • Differentiate between pastes, plasters, and glycerogelatins. • Select appropriate packaging for semisolid preparations. • Identify examples of ointments, creams, and gels.	**Ophthalmic ointments:** materials, preparation methods and quality evaluation.	PowerPoint slides E-Learning	exams, semi-semester and semester
6	3 (Theory) 2 (Lab)	• Compare features and uses of dermatological preparations. • Discuss features of ophthalmic, nasal, rectal, and vaginal preparations. • Explain the mechanisms of drug release from semisolid dosage forms.	**Suppositories:** materials, preparation methods and quality evaluation. **Creams:** materials, preparation methods and quality evaluation	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
7	3 (Theory) 2 (Lab)	• Define suppositories and their therapeutic uses. • Analyze factors affecting drug absorption from rectal suppositories. • Classify suppository bases and formulation variables. • Perform calculations for dose replacement and displacement values.	**Hair care formulations:** materials, preparation methods and quality evaluation. **Gels:** materials, preparation methods and quality evaluation	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

		• Describe the manufacturing process of suppositories.			
8	3 (Theory) 2 (Lab)	• Apply quality control tests to suppositories. • Determine appropriate packaging and storage conditions. • Assess stability issues in suppositories. • Differentiate between rectal and urethral suppositories with examples.	**Skin care formulations:** materials, preparation methods and quality evaluation. **Suppositories:** materials, preparation methods and quality evaluation.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
9	3 (Theory) 2 (Lab)	• Describe vaginal inserts (tablets) and medication sticks. • Identify special types of suppositories. • Discuss clinical considerations for suppository administration.	**Detection and characterization of pharmaceutical incompatibilities** (chemical and physical incompatibilities). **Suppositories:** materials, preparation methods and quality evaluation (cont.)	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	2 (Theory)	• Identify physical and chemical pharmaceutical incompatibilities. • Apply methods to correct or prevent incompatibilities in dosage forms.	**Cosmetic Formulations:** Introduction **Hair care formulations:** materials, preparation methods and quality evaluation.	The blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
11	3 (Theory)	• Define the scope and classification of cosmetic formulations. • Analyze the basic components and	**Cosmetic Formulations:** Cosmetic formulation of skin care products (Chapter 1)		

		structure of skin care products (Chapter 1). • Describe the function, preparation, and quality control of toners and astringents (Chapter 5).	• Toners and astringents (Chapter 5) **Hair care formulations:** materials, preparation methods and quality evaluation (cont.)		
12	3 (Theory) 2 (Lab)	• Define antiperspirants and differentiate them from deodorants. • Explain the mechanism of action of antiperspirants. • Identify common active ingredients used in antiperspirants (e.g., Aluminum salts). • Discuss the formulation challenges and safety considerations for antiperspirant products (Chapter 8).	**Antiperspirants** (Chapter 8) **Skin care formulations:** materials, preparation methods and quality evaluation	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
13	3 (Theory) 2 (Lab)	• Define UV radiation and describe its physiological effects on the skin. • Explain the mechanism of action of sunscreens (physical blockers vs. chemical absorbers). • Interpret the Sun Protection Factor (SPF) and other efficacy metrics.	**Sunscreens** (Chapter 9) **Skin care formulations:** materials, preparation methods and quality evaluation (cont.)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

		• Design and evaluate sunscreen formulations for stability and efficacy (Chapter 9).			
14	3 (Theory) 2 (Lab)	• Describe the intrinsic and extrinsic factors contributing to skin aging. • Identify key active ingredients in anti-aging products (e.g., retinoids, peptides, antioxidants). • Explain the delivery systems used to enhance the penetration of anti-aging actives. • Formulate anti-aging skin care products suited for different skin types (Chapter 11).	**Anti-aging skin care formulations** (Chapter 11). **Detection and characterization of pharmaceutical incompatibilities** (chemical and physical incompatibilities)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
15	3 (Theory) 2 (Lab)	• Define skin exfoliation and its clinical benefits for skin health.	**Topical exfoliation** clinical effects and formulating considerations. **Detection and characterization of pharmaceutical incompatibilities** (chemical and physical incompatibilities) cont.		

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily oral exams and editorial, reports, etc

- Practical exam 20 - The mid-term exam 20 marks - The final exam 60	
12. Learning and teaching resources	
Required textbooks (methodology, if (any	
Main references (sources)	• Pharmaceutical Dosage Forms and Drug Delivery Systems by Howard A. Ansel; 11th edition, 2017. • Cosmetic Formulation of Skin Care Products; by Zoe Diana Draelos and Lauren A. Thaman; Taylor and Francis Group; 2006
Recommended supporting books and references (scientific journals reports)	• Pharmaceutical Dosage forms and Drug Delivery Systems By Haward A. Ansel; latest edition • Handbook of Extemporaneous Preparation by Mark Jackson and Andrew Lowey; 1st edition; 2010. • British Pharmacopeia (BP); 2025 edition. • United States Pharmacopeia- National Formulary (USP-NF); 2025 edition. • FDA Cosmetic Regulations
References , websites	BNF, BP and USP

Course Description

1. Course Name
Biochemistry II
2. Course Code
333 ClBi2
3. Semester/Year
3rd Class, 2nd Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and 30 hours Laboratory
7. Name of course coordinator(s):
Name: rudhab ibrahim mohammed Email: risamaw@alameed.edu.iq
8. Course objectives

1- Foundational Principles: To provide introductory students with the core concepts and chemical frameworks necessary to understand the metabolic pathways of both macro and micro-biological molecules.

2- Advanced Metabolic Study: To provide third-stage students with an in-depth analysis of the metabolic processes governing carbohydrates, lipids, proteins, and nucleic acids, as well as the physiological roles of enzymes and vitamins.

3- Regulatory Dynamics: To master the principles of metabolic regulation and homeostatic control, specifically focusing on the catalytic and inhibitory functions of enzymes.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	3 2	**Theory:** Define metabolism, distinguish between catabolism and anabolism, and identify major metabolic fuels. **Lab:** Perform a physical examination of urine (volume, color, odor, pH, and specific gravity) and interpret normal vs. abnormal findings.	**Theory:** Overview of Metabolism **Lab:** General urine examination: Physical properties.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3 2	**Theory:** Explain the glycolysis pathway, its regulation, and the oxidation of pyruvate under aerobic and anaerobic conditions. **Lab:** Perform chemical tests to detect pathological amounts of protein (proteinuria) and glucose (glycosuria) in urine.	**Theory:** Glycolysis **Lab:** General urine examination: Chemical properties; Protein in urine; Sugar in urine.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	3 2	**Theory:** Describe the Citric Acid (Krebs) Cycle as the central metabolic pathway for	**Theory:** The Citric Acid Cycle	Blackboard, PowerPoint,	Reports, assignments, oral and written theoretical examinations,

		carbohydrates, lipids, and amino acids. **Lab:** Conduct qualitative tests for ketone bodies (Rothera's), bile salts (Hay's), and bilirubin to aid in diagnosing metabolic or hepatic disorders.	**Lab:** General urine examination: Ketone bodies in urine (Rothera test); Bile salts in urine (Hays test); Bilirubin in urine.	E-Learning	semi-semester and semester -Conduct laboratory experiments
4	3 2	**Theory:** Explain the components of the Respiratory Chain and the mechanism of Oxidative Phosphorylation for ATP production. **Lab:** Apply cumulative urinalysis skills to analyze and identify abnormalities in an unknown urine sample.	**Theory:** The Respiratory Chain and Oxidative Phosphorylation. **Lab:** General urine examination: Evaluation of unknown urine sample.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 2	**Theory:** Define bioenergetics and explain the role of ATP as the high-energy currency of the cell. **Lab:** Measure glucose levels in Cerebrospinal Fluid (CSF) and understand its diagnostic value for meningitis.	**Theory:** Bioenergetics **Lab:** Cerebrospinal fluid analysis: Measurement of glucose in CSF.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3 2	**Theory:** Describe the metabolism of glycogen (glycogenesis and glycogenolysis) and its regulation by hormones. **Lab:** Quantitatively measure chloride levels in CSF.	**Theory:** Metabolism of Glycogen **Lab:** Cerebrospinal fluid analysis: Measurement of chloride in CSF.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	3 2	**Theory:** Explain the pathway of gluconeogenesis and how the body regulates blood	**Theory:** Gluconeogenesis	Blackboard, PowerPoint,	Reports, assignments, oral and written theoretical examinations,

		glucose levels during fasting. **Lab:** Determine protein concentration in CSF to assess central nervous system integrity.	**Lab:** Cerebrospinal fluid analysis: Measurement of proteins in CSF.	E-Learning	semi-semester and semester -Conduct laboratory experiments
8	3 2	**Theory:** Describe the Pentose Phosphate Pathway (HMP Shunt) and its significance in producing NADPH and ribose. **Lab:** Perform quantitative measurement of serum calcium levels.	**Theory:** The Pentose Phosphate Pathway and Other Pathways of Hexose Metabolism **Lab:** Serum calcium measurement.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 2	**Theory:** Outline the biosynthesis of fatty acids and the formation of eicosanoids. **Lab:** Measure inorganic phosphate (phosphorus) levels in the blood.	**Theory:** Biosynthesis of Fatty Acids **Lab:** Blood phosphorus measurement (inorganic phosphate).	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3 2	**Theory:** Explain Beta-oxidation of fatty acids and the process of Ketogenesis. **Lab:** Quantify serum total proteins and discuss the clinical significance of hypoproteinemia/hyperproteinemia.	**Theory:** Oxidation of Fatty Acids **Lab:** Serum total proteins (quantitative analysis).	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 2	**Theory:** Discuss the metabolism of acylglycerols and sphingolipids. **Lab:** Estimate blood urea levels to assess renal function and nitrogen balance.	**Theory:** Metabolism of Acylglycerols and Sphingolipids **Lab:** Estimation of urea level in the blood.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

					-Conduct laboratory experiments
12	3 2	**Theory:** Explain lipid transport via lipoproteins (VLDL, LDL, HDL) and lipid storage mechanisms. **Lab:** Measure serum uric acid levels and relate findings to conditions like gout.	**Theory:** Lipid Transport and Storage **Lab:** Measurement of serum uric acid level.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3 2	**Theory:** Describe the biosynthesis, transport, and excretion of cholesterol. **Lab:** Measure serum Ascorbic Acid (Vitamin C) levels.	**Theory:** Cholesterol Synthesis, Transport, and Excretion. **Lab:** Measurement of serum ascorbic acid level.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	3 2	**Theory:** Distinguish between essential and non-essential amino acids and describe the biosynthesis of non-essential ones. **Lab:** Analyze gastric juice to detect the concentration of free hydrochloric acid (HCl).	**Theory:** Biosynthesis of the Nutritionally Nonessential Amino Acids **Lab:** Gastric juice analysis: Detection of free hydrochloric acid concentration.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 2	**Theory:** Explain the catabolism of proteins, removal of amino acid nitrogen, and the Urea Cycle. **Lab:** Perform titration to determine total acid content in gastric juice.	**Theory:** Catabolism of Proteins and of Amino Acid Nitrogen. **Lab:** Gastric juice analysis: detection of free acid, total acid content.	Blackboard, PowerPoint, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of100 according to the tasks assigned to the student, such as daily preparation and daily, oral exams ,editorial and reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	- Harper's Illustrated biochemistry 30th Edition 2015
Main references (sources)	- Lehninger PRINCIPLES OF BIOCHEMISTRY Fourth Edition 2004 - Lippincotts Illustrated Reviews Biochemistry - 3rd edition 2004
Recommended supporting books ,and references (scientific journals reports)	
References , websites	

1. Course Name
Pharmacognosy III
2. Course Code
334 PhPa3
3. Semester/Year
3rd Class, 2nd Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours of theory and 30 hours of Laboratory
7. Name of course coordinator(s):
Name: mazin saleem shaker E-mail: mazinsaleem97@gmail.com
8. Course objectives

- Demonstrate knowledge of the taxonomy, morphology, plant collection of medicinal plants.
- Roles of medicinal plants and their active constituents.
- Explain the biosynthesis, chemistry, and pharmacological activities of major classes of phytochemicals.
- Explain the extraction, separation, isolation, and identification of bioactive natural products.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion Strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning Method	Evaluation Method
1	2 (Th) 2 (Pr)	Define alkaloids and describe their physical and chemical properties; perform extraction techniques to isolate piperine.	Alkaloids: Introduction Alkaloids piperine	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters. Conduct laboratory experiments.
2	2 (Th) 2 (Pr)	identify the structural characteristics of pyridine, piperidine, and pyrrolidine alkaloids and master the isolation of piperine from natural sources.	Pyridine, piperidine, pyrrolidine alkaloids. Alkaloids piperine	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters. Conduct laboratory experiments.
3	2 (Th) 2 (Pr)	Explain the pharmacological activity and structural features of Tropane alkaloids and conduct	Tropane alkaloids Black pepper.	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters.

		laboratory extractions from black pepper.		E-Learning	Conduct laboratory experiments.
4	2 (Th) 2 (Pr)	Categorize Quinoline and Iso-quinoline alkaloids, discuss their therapeutic uses, and perform identification tests on black pepper extracts.	Quinoline tropan alkaloids; iso-quinoline alkaloids; Black pepper.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters. Conduct laboratory experiments.
5	2 (Th) 2 (Pr)	Describe the chemistry of Imidazole and Indole alkaloids while mastering the laboratory preparation of Tropane alkaloid derivatives.	Imidazole alkaloids; indole alkaloids. Tropaine alkaloids.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters. Conduct laboratory experiments.
6	2 (Th) 2 (Pr)	Classify Steroidal, Lupinane, and Amino alkaloids (Protoalkaloids) and evaluate their specific chemical reactions in the lab.	Alkaloids: Steroidal alkaloids; lupinane alkaloids; Tropaine alkaloids	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters. Conduct laboratory experiments.
7	2 (Th) 2 (Pr)	Discuss the complex structures and pharmacology of alkaloidal amines and purine alkaloids, focusing on Indole alkaloid isolation.	alkaloidal amines; purine alkaloids. Indole alkaloids.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semesters, and semesters.
8	2 (Th) 2 (Pr)	Identify natural sources of antibiotics and relate them to the extraction and purification processes of Indole alkaloids.	Antibiotics: Natural sources; Indole alkaloids.	The blackboard PowerPoint slides	Conduct laboratory experiments.

				E-Learning	
9	2 (Th) 2 (Pr)	Explain the biosynthetic pathways of antibiotics and perform the laboratory identification of Harmala alkaloids.	Antibiotics: biosynthetic pathways, Identification of Harmala alkaloids.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	2 (Th) 2 (Pr)	Describe antibiotic isolation and purification methods while analyzing the properties of purine bases.	Antibiotics: isolation and purification. Purine bases.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments.
11	2 (Th) 2 (Pr)	Identify Purine alkaloids (Xanthines) like Caffeine and Theophylline and understand the core principles of phytotherapy.	Phytotherapy: Introduction, principles. Purine bases.		Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	2 (Th) 2 (Pr)	Explain medicinal plant roles in healthcare systems and demonstrate the isolation and purification of citric acid from lemon juice.	Phytotherapy: medicinal plants in selected health care systems. Isoquinoline alkaloids	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	2 (Th) 2 (Pr)	Classify antibiotics by mode of action and perform extraction methods for Isoquinoline alkaloids, lignans, and isoflavones.	Phytotherapy: Important natural products Isoquinoline alkaloids	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

14	2 (Th) 2 (Pr)	Identify phytomedicines used in modern pharmacy and analyze the purity of isolated organic acids and lignans using TLC.	Phytotherapy: Phytomecines used in pharmacy & medicine Citric acid	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	2 (Th) 2 (Pr)	Discuss clinical applications and safety profiles of key phytomedicines and master the extraction techniques for Peganum harmala alkaloids.	Phytotherapy: Phytomecines used in pharmacy & medicine Citric acid	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation , daily, oral exams and reports, etc.	
- Practical exam 20 marks - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
Reference textbook	• Robbers JE, Speedie MK, Tyler VE (Eds.); Pharmacognosy and Pharmacobiotechnology; the latest edition.
External textbook	• Trease and Evans Pharmacognosy; 16th ed., 2009 • Textbook of Pharmacognosy and Phytochemistry by Biren Shah ,2010 • Chromatographic Analysis of Pharmaceuticals by John A. Adamovics: Second Edition,2021

1. Course Name	
Pharmaceutical ethics	
2. Course Code	
335 CpPe	
3. Semester/Year	
third Class, second Semester	
4. Date this description was prepared	
2/9/2025	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
15 hours Theory and Laboratory	
7. Name of course coordinator(s):	
Name: Rudhab ibrahim mohammed	Email: risamawi@alameed.edu.iq
8. Course objectives	
Objectives of the study subject	- To provide the students information about the principles of pharmaceutical ethics which provide guidance for the pharmacists in his \her relationship with the patients, other health care providers

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the Unit or Topic**	**Learning Method**	**Evaluation Method**
1	1	**Define** the fundamental concepts of pharmacy ethics and **explain** the distinction between theoretical and practical ethics.	Introduction to Pharmacy Ethics (Theoretical considerations).	Blackboard, PPT, E-Learning	Reports, assignments, exams
2	1	**Differentiate** between legal requirements (Law) and moral obligations (Ethics) in professional practice.	Law and Ethics	Blackboard, PPT, E-Learning	Reports, assignments, exams
3	1	**Interpret** the specific provisions of the Code of Ethics for Pharmacists and **apply** them to professional conduct.	Code of Ethics for Pharmacists.	Blackboard, PPT, E-Learning	Reports, assignments, exams
4	1	**Demonstrate** an understanding of Beneficence and Non-maleficence and how to prioritize patient welfare.	Common Ethical Considerations in Pharmaceutical Care Practice (Beneficence).	Blackboard, PPT, E-Learning	Reports, assignments, exams

5	1	**Evaluate** the conflict between paternalism and patient Autonomy, and **discuss** the obligation of Honesty (Veracity).	Common Ethical Considerations in Pharmaceutical Care Practice (Autonomy, Honesty).	Blackboard, PPT, E-Learning	Reports, assignments, exams
6	1	**Apply** protocols for obtaining Informed Consent and maintaining patient Confidentiality and Fidelity (trust).	Common Ethical Considerations in Pharmaceutical Care Practice (Informed Consent, Confidentiality, Fidelity).	Blackboard, PPT, E-Learning	Reports, assignments, exams
7	1	**Analyze** ethical dynamics between pharmacists, physicians, and nurses to foster collaborative professional relationships.	Interprofessional Relations.	Blackboard, PPT, E-Learning	Reports, assignments, exams
8	1	**Utilize** a structured ethical decision-making framework to resolve complex moral dilemmas systematically.	Making ethical decisions.	Blackboard, PPT, E-Learning	Reports, assignments, exams
9	1	**Critique** the ethical standards governing human subject research, including the role of IRBs and clinical trial safety.	Ethical issues related to clinical pharmacy research.	Blackboard, PPT, E-Learning	Reports, assignments, exams
10	1	**Identify** common ethical barriers in day-to-day clinical practice and **propose** solutions to overcome them.	Ethical problems in the pharmacist's clinical practice.	Blackboard, PPT, E-Learning	Reports, assignments, exams
11	1	**Develop** strategies to ethically manage and prevent drug diversion, abuse, and misuse in community settings.	Preventing misuse of medicines.	Blackboard, PPT, E-Learning	Reports, assignments, exams
12	1	**Synthesize** ethical principles (autonomy, beneficence, justice) to	Case studies in pharmacy ethics.	Blackboard, PPT, E-Learning	Reports, assignments, exams

		analyze and argue specific case studies.			
13	1	**Discuss** the diverse ethical, religious, and legal perspectives surrounding abortion and the pharmacist's right to conscience.	Special problem areas like abortion.	Blackboard, PPT, E-Learning	Reports, assignments, exams
14	1	**Examine** ethical obligations regarding access to reproductive health and the dispensing of contraceptives.	Ethical issues related to contraception.	Blackboard, PPT, E-Learning	Reports, assignments, exams
15	1	**Assess** the ethical implications of permanent sterilization and the rights of vulnerable populations.	Ethical issues related to sterilization.	Blackboard, PPT, E-Learning	Reports, assignments, exams

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily exams and editorial reports, etc	
- Mid-term exam 30 marks - Final exam 70 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	- Ruth Rodgers, (ed.); fast track: Law and Ethics in Pharmacy Practice. Pharmaceutical Press 2010.
Main references (sources)	- Robert J. Cipolle, Linda M. Strand, Peter C. Morley. Pharmaceutical Care Practice: The - Clinician's Guide, 2nd Edition. - Robert m. Veatch and Amy Haddad. Case Studies in Pharmacy Ethics. second edition. Copyright © 2008 by Oxford University Press, Inc.

Recommended supporting books ,and references (scientific journals reports)	- Joy Wingfield and David Badcott . Pharmacy Ethics and Decision Making. - Pharmaceutical Press2007
References, websites	

1. Course Name	
Pharmacology II	
2. Course Code	
436 PtPc2	
3. Semester/Year	
4th year, 1st Semester	
4. Date this description was prepared	
2/9/2024	
5. Available attendance forms	
Physical attendance	
(units (total academic hours (total) / number of Number of	
45 hours Theory and 30 hours of Laboratory work	
7. Name of course coordinator(s):	
Asst. Prof. Haider falih shamik	E. mail: hasaedi@alameed.edu.iq
8. Course objectives	
Objectives of the study subject	1. To introduce the pharmacy students to the general pharmacology of the central nervous system and to the various drug groups used in the treatment of CNS diseases or drugs altering its function. 2. The student will be introduced to the various drugs used in the management of cardiovascular diseases. 3. Moreover the course will cover the drugs affecting the gastrointestinal and respiratory systems.
9. Teaching and learning strategies	

iesEducation strateg **Learning strategies**	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - learning strategy-Self - learning strategy-E - Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 Theory 2 Lab	Define the scope of CNS pharmacology and neurotransmission. Classify CNS stimulants (psychomotor stimulants vs. hallucinogens). Explain the mechanism of action, clinical uses, and adverse effects of amphetamines, methylphenidate, and xanthines. • Understand laboratory safety guidelines. • Introduction to experimental pharmacology and animal handling.	Introduction to CNS pharmacology. CNS stimulants. Introduction of pharmacology	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

2	3 Theory 2 Lab	• Distinguish between anxiolytic and hypnotic effects. • Compare Benzodiazepines and Barbiturates regarding mechanism of action (GABA receptor), pharmacokinetics, and safety profile. • Discuss the treatment of insomnia and anxiety disorders. • Identify common pharmacology lab equipment (e.g., organ baths, kymographs, levers) and their uses.	· Anxiolytic and Hypnotic drugs. · Demonstration of some laboratory equipments.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	3 Theory 2 Lab	• Define General Anesthesia and the concept of MAC (Minimum Alveolar Concentration). • Classify inhalation and intravenous anesthetics. • Explain the mechanism of action of Local Anesthetics (esters vs. amides) and their clinical applications. • Demonstrate and practice different routes of drug administration (oral, IP, IM, SC, IV) in laboratory animals.	· General and Local Anesthetics. · Routes of administration	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 Theory 2 Lab	• Explain the dopamine hypothesis of schizophrenia. • Differentiate between Typical (1st gen) and Atypical (2nd gen) antipsychotics. • Identify extrapyramidal side effects (EPS) and metabolic risks associated with neuroleptics.	· Antipsychotic (neuroleptic) drugs. · Onset Of Action And Duration Of Drug	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		• Observe and calculate the onset of action and duration of effect for selected drugs in animal models.			-Conduct laboratory experiments
5	3 Theory 2 Lab	• Classify opioid receptors (mu, kappa, delta) and their physiological effects. • Discuss morphine pharmacodynamics, therapeutic uses, and the management of opioid overdose (antagonists). • Explain the phenomenon of opioid tolerance and dependence. • Analyze the depressant effects of barbiturates on the CNS by measuring sleeping time and onset.	· Opioid analgesics and antagonists. · Onset Of Action And Duration Of Barbiturates	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3 Theory 2 Lab	• Pathophysiology of Parkinson's and Alzheimer's diseases. • Explain the mechanism of Levodopa/Carbidopa, dopamine agonists, and MAO-B inhibitors. • Discuss drugs used to improve cholinergic transmission in Alzheimer's. • (Lab content integrated/continued from previous weeks or review).	· Treatment of neurodegenerative diseases.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	3 Theory 2 Lab	• Classify seizures and appropriate drug choices for each type. • Explain mechanisms of antiepileptics (Na+ channel blockers, GABA enhancers, Ca++ channel blockers). • Discuss pharmacokinetics and	· Antiepileptic Drugs.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		teratogenicity of major antiepileptics (e.g., Phenytoin, Valproate).			-Conduct laboratory experiments
8	3 Theory 2 Lab	• Review physiological control of blood pressure. • Classify antihypertensives: ACE inhibitors, ARBs, Beta-blockers, Calcium channel blockers, and Vasodilators. • Discuss "stepped care" management of hypertension. • Observe the effects of parasympathomimetic drugs (e.g., pilocarpine) on glandular secretions (salivation).	· Antihypertensive drugs. · Effect of Parasympathomimetic on glandular secretions	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 Theory 2 Lab	• Classify diuretics (Loop, Thiazide, K-sparing) and explain their site of action in the nephron. • Discuss the management of Heart Failure (HF) using inotropes (Digoxin) and unloading agents. • Evaluate the analgesic and anti-inflammatory properties of NSAIDs using standard screening models.	· Diuretics. · The treatment of heart failure (HF). · Evaluation of the Non- Steroidal Anti-Inflammatory Drugs (NSAIDs)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3 Theory 2 Lab	• Explain the cardiac action potential and mechanisms of arrhythmia. • Classify antiarrhythmic drugs according to the Vaughan Williams classification (Classes I-IV). • Discuss indications and toxicity (pro-arrhythmic effects) of these drugs.	· Antiarrhythmic drugs.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

					-Conduct laboratory experiments
11	3 Theory 2 Lab	• Differentiate between Stable, Unstable, and Variant (Prinzmetal) angina. • Explain the mechanism of organic nitrates, beta-blockers, and CCBs in reducing myocardial oxygen demand. • Discuss drug combinations for angina pectoris.	· Antianginal Drugs.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 Theory 2 Lab	• Discuss agents used in anemia (Iron, B12, Folic acid). • Classify anticoagulants (Heparin vs. Warfarin), antiplatelets (Aspirin, Clopidogrel), and thrombolytics. • Explain monitoring parameters (INR, aPTT). • Evaluate the analgesic efficacy of opioids using methods like the Hot Plate or Tail Flick test.	· Drugs affecting the blood. · Evaluation of Opioid analgesics	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3 Theory 2 Lab	• Explain lipid metabolism and lipoprotein types (LDL, HDL, VLDL). • Discuss the mechanism and side effects of Statins, Fibrates, Resins, and Ezetimibe. • Identify therapeutic goals for hyperlipidemia. • Observe the effects of miotics and mydriatics on pupil size and light reflex.	· Antihyperlipidemic drugs. · Effect of Drugs on Human Eyes	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct

					laboratory experiments
14	3 Theory 2 Lab	• Discuss drugs for Peptic Ulcer Disease (PPIs, H2 blockers, Antacids) and H. pylori treatment. • Classify antiemetics based on receptor activity (5-HT3, D2, NK1). • Review laxatives and antidiarrheal agents.	· Gastrointestinal and antiemetic drugs.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3 Theory 2 Lab	• Pathophysiology of Asthma and COPD. • Classify Bronchodilators (Beta-2 agonists, Antimuscarinics, Methylxanthines). • Explain the role of anti-inflammatory agents (Corticosteroids, Leukotriene modifiers) in respiratory disease.	· Drugs acting on the respiratory system.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as oral, and monthly exams ،daily preparation and daily Editorial, reports, etc
- Practical exam20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
Required textbooks (methodology, if (any	Lipincott Illustrated Reviews Pharmacology 7rd Edition 2019.
(Main references (sources	- Goodman & Gilman's The Pharmacological Basis of Therapeutics 13th edition 2018. - Katzung & Trevor's Pharmacology Examination and Board Review 12th Edition 2019 - Rang & Dale's Pharmacology 9th Edition 2020
Recommended supporting books and references (scientific journals, (...،reports	British National Formulary
references , websites	FDA

1. Course Name
Organic Pharmaceutical Chemistry II
2. Course Code
437 PcOp2
3. Semester/Year
4th Class, 1st Semester
4. Date this description was prepared
1/10/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and Laboratory
7. Name of course coordinator(s):
Abbas Abdulridha Mehihi Email: abbas-mehihi@alameed.edu.iq
8. Course objectives
- This course offers an in-depth exploration of the pharmaceutical chemistry and pharmacology of major drug classes that target key physiological systems. - The curriculum focuses on the relationship between chemical structure and biological activity (SAR), the mechanism of action at specific receptors, and the therapeutic applications of these agents in treating various diseases.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	Hours	Required learning outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	Define the physiological role of the cholinergic system synthesize salicylic acid from precursor materials.	Cholinergic agents, cholinergic receptors and their subtypes. Preparation of salicylic acid.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3	Explain the Structure-Activity Relationships (SAR) and stereochemistry of cholinergic agonists and	Cholinergic agonists; stereochemistry and SAR; products; cholinesterase inhibitors	the blackboard	Reports, assignments, oral and written theoretical

	2	perform recrystallization techniques to purify salicylic acid.	Re-crystallization of salicylic acid.	PowerPoint slides E-Learning	examinations, semi-semester and semester -Conduct laboratory experiments
3	3 2	Describe the SAR of solanaceous alkaloids and cholinergic antagonists, and synthesize aspirin via acetylation.	Cholinergic blocking agents; SAR; solanaceous alkaloid and analogues; Synthesis of aspirin.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 2	Classify synthetic neuromuscular and ganglionic blocking agents based on structure, and demonstrate proficiency in purifying aspirin.	synthetic cholinergic blocking agents and products; ganglionic blocking agents (neuromuscular blocking agents' products; cholinesterase inhibitors. Re-crystallization of aspirin.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 2	Discuss the biosynthesis, storage, and release of adrenergic neurotransmitters and perform a quantitative assay of a known aspirin sample.	Adrenergic agents (adrenergic neurotransmitters), Assay of aspirin (known sample).	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	3	Differentiate between direct and indirect-acting sympathomimetics and	drugs affecting adrenergic neurotransmission;	the blackboard	Reports, assignments, oral and written theoretical

	2	determine the purity of an unknown aspirin sample.	sympathomimetic agents Assay of aspirin (unknown sample).	PowerPoint slides E-Learning	examinations, semi-semester and semester -Conduct laboratory experiments
7	3 2	Analyze the structural requirements for adrenergic receptor antagonism and perform a redox titration to assay ferrous sulfate.	adrenergic receptor antagonists Assay of ferrous sulfate (unknown sample).	the blackboard PowerPoint slides E-Learning	Reports, assignments, ora and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 2	Compare the SAR and mechanisms of benzodiazepines versus barbiturates and synthesize nitrobenzene via electrophilic aromatic substitution.	CNS depressant; benzodiazepines and related compounds; barbiturate Preparation of nitrobenzene.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	3 2	Categorize antipsychotics and anticonvulsants by chemical class and synthesize aniline through the reduction of nitrobenzene.	CNS depressant with skeletal muscle relaxant properties; antipsychotics; anticonvulsants Preparation of aniline.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3	Explain the therapeutic uses and chemistry of	CNS stimulants	the blackboard	Reports, assignments, ora

	2	CNS stimulants and synthesize acetanilide via amine protection.	Preparation of acetanilide.	PowerPoint slides E-Learning	and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 2	Evaluate drugs affecting the Renin-Angiotensin system (ACEIs/ARBs) and apply recrystallization methods to purify acetanilide.	Drugs affecting the Renin Angiotensin pathway and Re-crystallization of acetanilide.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	3 2	Classify calcium channel blockers and vasodilators and perform chlorosulfonation as a key step in sulfa drug synthesis.	calcium blockers, vasodilators. Chlorosulfonation of acetanilide.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3 2	Contrast first and second-generation H1-antihistamines based on SAR and side effects, and perform amination on a sulfonyl chloride intermediate.	Structure–activity relationships at H1-receptors; first-generation antihistamine classes; second generation antihistamines; Amination of p-chlorobenzene sulfonyl chloride.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

14	3 2	Examine the development of H2-antagonists and dual-acting antihistamines, and hydrolyze intermediates to produce sulfanilamide.	Recent antihistamine developments: the "dual-acting" antihistamines; histamine H2-antagonists: structural derivation of the "H2-antagonists" Hydrolysis of p-chlorobenzene sulfonyl chloride to sulfanilamide.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	3	Discuss the mechanism and SAR of Cyclooxygenase (COX) inhibitors and conduct a quantitative assay of sulfa drugs.	Cyclooxygenases; Therapeutic Classifications; SAR. Assay of sulfa drugs (known sample).	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as activities and daily preparation oral and written exams in addition to editorial, reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	- Foye's Principles of Medicinal Chemistry Roche PhD (Author), S. William PhD Zito 7 th Edition PhD by Victoria PhD F. , College of Pharmacy, Houston Uni, Texas, USA.

Main references (sources)	- Wilson and Gisvolds textbook of organic medicinal and pharmaceutical chemistry, John M. B.; John H.B. (Twelfth edition). - An Introduction to Medicinal Chemistry 7th Edition by Graham L. Patrick, University of the West of Scotland, UK
Recommended supporting books and references (scientific journals, reports)	- Organic Chemistry by McCurry; 5th ed.
References, websites	

1. Course Name
Clinical Pharmacy I
2. Course Code
438 CpCp1
3. Semester/Year
4 st Class, 1st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours Theory and 30 hours Laboratory, (45 unit)
7. Name of course coordinator(s):
Name: Ali hamid abd-alhusaain Email: alihamid8282@gmail.com
8. Course objectives
Introduce students to the philosophy of "pharmaceutical care" and the skills and attitudes necessary to develop a pharmaceutical care practice. The weekly practices emphasize active and collaborative learning activities to provide students with problem-solving skills, communication skills; ethical standards of conduct; and responsible attitudes toward patient care as well as a sound scientific knowledge base.
9. Teaching and learning strategies

Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2	1. Demonstrate effective communication techniques (active listening, empathy) in patient interactions. 2. Apply structured questioning protocols (e.g., WWHAM, ASMETHOD) to gather patient history. 3. Explain the importance of patient privacy and confidentiality in the pharmacy setting.	Introduction to community pharmacy. Respiratory problems: Cough, Common cold. Communication with patients.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	2	1. Differentiate between dry (non-productive) and productive (chesty) coughs. 2. Identify "red flag" symptoms (e.g., hemoptysis, chest pain) requiring immediate	Respiratory problems: allergic rhinitis, Otitis media, Laryngitis & Pharyngitis.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		referral. 3. Recommend appropriate OTC treatments (antitussives vs. expectorants) based on cough etiology.	Respiratory system in practice (part I) : Cough.	role of a pharmacist in the pharmacy.	
3	2	1. Distinguish between the symptoms of the common cold and influenza. 2. Recommend pharmacological (decongestants, analgesics) and non-pharmacological relief. 3. Counsel patients on the safe use of sympathomimetics in hypertensive or diabetic patients.	Respiratory system in practice (part II) : Common cold.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
4	2	1. Assess the causes of constipation (lifestyle, drug-induced, or pathological). 2. Compare the onset of action and mechanisms of bulk, osmotic, and stimulant laxatives. 3. Provide lifestyle advice regarding fiber intake and hydration to prevent recurrence.	G.I.T system in practice (part I): Constipation.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
5	2	1. Evaluate the severity of diarrhea and assess the risk of dehydration, especially in vulnerable groups. 2. Explain the appropriate use of Oral Rehydration Salts (ORS) and antimotility agents (e.g., loperamide). 3. Recognize the Rome IV criteria symptoms for	G.I.T system in practice (part II): Diarrhea and IBS.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Irritable Bowel Syndrome (IBS) management.			
6	2	1. Identify symptoms of Gastroesophageal Reflux Disease (GERD) and dyspepsia. 2. Compare the efficacy and duration of action of antacids, H2-receptor antagonists, and PPIs. 3. Recognize "alarm symptoms" (e.g., dysphagia, weight loss) that necessitate medical referral.	GIT system in practice (part III): GERD	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
7	2	1. Differentiate between types of hair loss (androgenetic alopecia vs. alopecia areata) and treatments (e.g., Minoxidil). 2. Advise on the management of cold sores (HSV-1) using topical antivirals. 3. Identify Tinea pedis (Athlete's foot) and recommend appropriate antifungal therapy and hygiene measures.	Skin conditions in practice (part I): Hair loss; cold sore and athlete's foot.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
8	2	1. Distinguish between seborrheic dermatitis (dandruff) and other scalp conditions like psoriasis. 2. Recommend appropriate medicated shampoos (e.g., ketoconazole, selenium sulfide). 3. Outline a stepwise approach to managing eczema using emollients and topical corticosteroids.	Skin conditions in practice (part II): Dandruff and Eczema	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

9	2	1. Explain treatment options for viral warts (salicylic acid, cryotherapy) and their application. 2. Recognize the clinical presentation of scabies (intense itching, burrows). 3. Counsel patients on the correct application of permethrin and environmental decontamination.	Skin conditions in practice (part III): warts and scabies.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
10	2	1. Integrate knowledge from respiratory, GIT, and skin modules to solve complex patient cases. 2. Demonstrate competency in rapid decision-making during simulated patient interactions. 3. Perform effective medication reconciliation and identify potential drug-drug interactions.	Collective Practice number 1.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
11	2	1. Identify common pediatric ailments: Oral thrush, colic, pinworm, and diaper rash. 2. Calculate appropriate pediatric doses for OTC medications based on age and weight. 3. Provide reassurance and non-pharmacological advice to parents regarding infant colic and rash hygiene.	Pediatrics in practice: Oral thrush; colic; pinworm and napkin rash.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
12	2	1. Differentiate between allergic, bacterial, and viral conjunctivitis	Minor eye disorders in		

		based on symptoms (discharge, itch). 2. Recommend appropriate eye drops (antibiotic, antihistamine, lubricant) for minor eye disorders. 3. Demonstrate the proper technique for administering eye drops and eye ointments.	practice.		
13	2	1. Manage primary dysmenorrhea using appropriate analgesics (e.g., NSAIDs) and non-pharmacological heat therapy. 2. Recognize the symptoms of cystitis (UTI) and recommend alkalinizing agents or medical referral. 3. Differentiate between vaginal candidiasis (thrush) and bacterial vaginosis to determine appropriate OTC treatment.	Women health in practice.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
14	2	1. Assess factors contributing to insomnia and recommend sleep hygiene principles (e.g., caffeine reduction). 2. Select appropriate sedating antihistamines (e.g., diphenhydramine) for short-term management of temporary insomnia.	Insomnia and motion sickness in practice.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		3. Propose prophylactic treatments for motion sickness (e.g., hyoscine, cinnarizine) based on the patient's age and travel duration.			
15	2	1. Synthesize knowledge across all therapeutic areas (Respiratory, GIT, Skin, etc.) to manage complex, multi-symptom patient cases. 2. Demonstrate proficiency in triage: distinguishing self-limiting conditions from those requiring immediate medical intervention. 3. Apply ethical and legal principles to pharmacy practice scenarios involving OTC sales and patient counseling.	Collective practice number.	The blackboard, PowerPoint slides, E-Learning, Conducting scenarios that simulate the role of a pharmacist in the pharmacy.	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks
12. Learning and teaching resources

methodology, if textbooks Required any	ALISON BLENKINSOPP, PAUL PAXTON(eds), Symptoms in the Pharmacy. A Guide to the Management of Common Illness, 8th edition
Main references (sources)	- Lor waterfield, Community Pharmacy Hand Book, 5th edition
Recommended supporting books and references (scientific journals, reports)	• Paul Rutter. Community Pharmacy. Symptoms, Diagnosis and Treatment. 5th edition. 2021
References, websites	https://www.medscape.com/

1. Course Name
Biopharmaceutics
2. Course Code
439 PBp
3. Semester/Year
4th Class, 1st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
60 hours Theory and Laboratory
7. Name of course coordinator(s):
Name: Kamil K. Atiyah Altameemi Email : kamil_altameemi@alameed.edu.iq
8. Course objectives
- The course deals with the physical and chemical properties of drug substance, dosage form and the biological effectiveness of the drug or drug product upon administration, including drug availability in the human from a given dosage form. - The pharmacokinetic part of the drug in the biological system, and quantification of drug concentration pattern in normal subjects and in certain disease states.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2 (Theory) 2 (Lab)	**1.** Define the scope and importance of biopharmaceutics in drug development. **2.** Demonstrate competency in using spectrophotometry to construct a standard calibration curve. **3.** Calculate unknown concentrations using the calibration equation.	1- Introduction to biopharmaceutics. 2- Preparation of calibration curve of salicylic acid.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	2 (Theory) 2 (Lab)	**1.** Describe the anatomical and physiological barriers to drug absorption. **2.** Differentiate between passive diffusion, active	1- Biopharmaceutic aspects of products; drug absorption; mechanisms of absorption.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		transport, and facilitated diffusion. **3.** Perform swelling index tests to evaluate bulk laxatives.	2- In vitro evaluation of bulk laxative.		-Conduct laboratory experiments
3	2 (Theory) 2 (Lab)	**1.** Explain how pKa, solubility, and partition coefficient influence drug absorption. **2.** Apply the Noyes-Whitney equation to dissolution rates. **3.** Determine the acid-neutralizing capacity of antacid formulations.	1- Physicochemical factors that effect on absorption; dissolution rate. 2- In vitro evaluation of antacids.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	2 (Theory) 2 (Lab)	**1.** Classify dosage forms and explain the function of diluents, binders, and disintegrants. **2.** Analyze how excipients influence bioavailability. **3.** Conduct dissolution testing of tablets in simulated gastric fluid (SGF).	1- Type of dosage forms and effects of excipients on dosage form. 2- Dissolution of tablets in acidic media.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	2 (Theory) 2 (Lab)	**1.** Describe the kinetics of the One Compartment Open Model (IV Bolus). **2.** Calculate Vd, k, and t1/2 for a one-compartment drug. **3.** Conduct dissolution testing of tablets in simulated intestinal fluid (SIF).	1- One compartment open model. 2- Dissolution of tablets in basic media.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

6	2 (Theory) 2 (Lab)	**1.** Distinguish between one-compartment and multi-compartment kinetics. **2.** Identify distribution ($alpha$) and elimination ($beta$) phases on a semi-log plot. **3.** Solve tutorial problems related to compartmental modeling.	1- Multicompartment models. 2- Review and tutorial.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	2 (Theory) 2 (Lab)	**1.** Describe the pharmacokinetics of first-order absorption (k). **2.** Calculate the absorption rate constant (k) using the method of residuals (feathering).	1- Pharmacokinetics of drug absorption. 2- Determination of pharmacokinetic parameters from CP-time by residual method.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	2 (Theory) 2 (Lab)	**1.** Define absolute bioavailability (F) and relative bioavailability. **2.** Explain the regulatory standards for bioequivalence studies. **3.** Review calculation methods for AUC and bioavailability.	1- Bioavailability and bioequivalence. 2- Review and tutorial.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
9	2 (Theory) 2 (Lab)	**1.** Define total body clearance and its relationship to Vd and k.	1- Clearance of drugs from the biological systems.	The whiteboard	Reports, assignments, oral and written theoretical examinations,

		2. Calculate the Area Under the Curve (AUC) using the Trapezoidal Rule. **3.** Interpret plasma concentration-time data to determine clearance.	2- Determination of pharmacokinetic parameters from CP-time by trapezoidal method.	PowerPoint slides E-Learning	semi-semester and semester -Conduct laboratory experiments
10	2 (Theory) 2 (Lab)	**1.** Explain the hepatic extraction ratio and the "first-pass effect." **2.** Classify drugs based on high vs. low extraction ratios. **3.** Solve problems related to hepatic clearance mechanisms.	1- Hepatic elimination of drugs. 2- Review and tutorial.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	2 (Theory) 2 (Lab)	**1.** Explain the clinical significance of plasma protein binding on drug distribution. **2.** Calculate PK parameters (k, k) using urinary excretion data (Rate and Sigma-Minus methods).	1- Protein binding of drugs. 2- Determination of pharmacokinetic parameters from urine excretion samples.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	2 (Theory) 2 (Lab)	**1.** Describe the kinetics of constant rate IV infusion. **2.** Calculate steady-state concentration (Css) and loading doses. **3.** Analyze the effect of infusion rate changes on plasma levels.	1- Intravenous infusion. 2- Review and tutorial.	The whiteboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	2 (Theory)	**1.** Explain the principle of superposition in multiple dosing.	1- Multiple dosage regimens.	The whiteboard	Reports, assignments, oral and written

	2 (Lab)	**2.** Calculate accumulation factors and fluctuation at steady state. **3.** Determine the reaction order and rate constant for aspirin hydrolysis.	2- Hydrolysis of aspirin.	PowerPoint slides E-Learning	theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	2 (Theory) 2 (Lab)	**1.** Differentiate between linear and non-linear (Michaelis-Menten) pharmacokinetics. **2.** Identify signs of saturation kinetics (dose-dependent elimination). **3.** Evaluate the stability and effectiveness of enteric coatings at pH 6.8.	1- Non-linear pharmacokinetics. 2- Hydrolysis of aspirin in buffer pH 6.8.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
15	2 (Theory) 2 (Lab)	**1.** Explain the impact of renal disease on drug half-life and clearance. **2.** Perform dosage adjustments based on creatinine clearance (Clcr). **3.** Review comprehensive course concepts for final assessment.	1- Dosage adjustment in renal diseases. 2- Review and tutorial.	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as activities and daily preparation oral and written exams in addition to editorial, reports, etc	
- Practical exam20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	
Main references (sources)	Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics; Latest edition
Recommended supporting books and references (scientific journals reports)	Aulton's Pharmaceutics: The Design and Manufacture of Medicines, 6th Edition, Michael E. Aulton (Author) Churchill, Livingstone-Elsevier
References , websites	

1. CourseName	
Public Health	
2. CourseCode	
440 ClPu	
3. Semester/Year	
4th Class, 1st Semester	
4. Date this description was prepared	
2/9/2024	
5. Available Attendance Forms	
Physical attendance	
Number of units (total) / Number of academic hours (total)	
Two hours per week and two units	
7. Name of course coordinator(s):	
Name: Ass. Prof. Ghufran lutfi ismail	E. mail:
8. Course Objectives	
This course enables the students to understand the principles of public health and the art of preventing disease, promoting health and prolonging life, through organized effort of society.	
9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept Mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy

Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Example-presentation strategy

10. Course structure					
Week	Hours	**Required learning outcomes**	**Name of the topic or unit**	**Learning method**	**Evaluation method**
1	2	Define the scope of public health and its distinction from clinical practice. Describe the structure and levels of the Health Care System in Iraq. Explain methods for measuring population health, including morbidity and mortality indicators.	Introduction: The scope and concerns of public health, health care system in Iraq Measuring, Monitoring, and Evaluating the Health of a Population	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
2	2	Explain the criteria and principles of population screening programs. Identify major Non-Communicable Diseases (NCDs) affecting the population (e.g., Diabetes, Hypertension). Discuss risk factors and prevention strategies for chronic diseases.	Population screening and public health Prevention and control of non-communicable diseases	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
3	2	Outline the chain of infection and general control measures.	Principles of infectious disease control	Black board	Reports, assignment, oral and

		Analyze the National Immunization Plan of Iraq, including schedule and target diseases. Explain the concept of herd immunity and vaccine coverage.	National immunization plan of Iraq.	PowerPoint slides E-learning	written exams, midterm and final term exams
4	2	Classify communicable diseases by mode of transmission (GI, Respiratory, Contact). Discuss the public health impact of Tobacco and Alcohol use. Analyze strategies for the prevention of illicit drug use and harm reduction.	Communicable diseases (infections through the gastro-intestinal tract, Infections through skin and mucous membranes, Infections through the respiratory tract) Prevention and control of public health hazards (Tobacco, alcohol, Public health aspects of illicit psychoactive drug use)	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
5	2	Evaluate the burden of lifestyle diseases including Obesity and physical inactivity. Discuss the epidemiology and prevention of STIs, Hepatitis, and TB. Identify key issues in public mental health and suicide prevention strategies.	Major health problems (Obesity, Physical activity and health, Public mental health and suicide, Dental public health, sexually transmitted infections, Chronic hepatitis and other liver disease, Tuberculosis)	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
6	2	Classify major nutritional disorders (macronutrient vs.	Nutritional disorders	Black board	Reports, assignment, oral and written exams,

		micronutrient deficiencies). Define the concept of Family Health and its components. Discuss the role of nutrition in maintaining family health across the lifespan.	Family health	PowerPoint slides E-learning	midterm and final term exams
7	2	Identify physical, chemical, and biological hazards in the environment. Discuss the relationship between workplace conditions and health (Occupational Health). Explain strategies for preventing occupational injuries and diseases.	Environmental health Occupational health	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
8	2	Advise on health risks associated with international travel (vaccinations, prophylaxis). Trace the historical evolution of pharmacy practice from ancient times to modern day. Discuss the changing role of the pharmacist in society.	Travel health Introduction: a historic background of pharmacy practice.	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
9	2	Define the scope of modern Pharmacy Practice.	Pharmacy Practice and the health care system	Black board	Reports, assignment, oral and

		Explain the pharmacist's role within the multidisciplinary healthcare team. Discuss the integration of pharmacy services into the broader healthcare system.		PowerPoint slides E-learning	written exams, midterm and final term exams
10	2	Apply Health Promotion models in a community pharmacy setting. Define Pharmaceutical Care and distinguish it from traditional dispensing. Explain the philosophy of patient-centered care.	Health promotion in community pharmacy Introduction to Pharmaceutical care	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
11	2	Develop a Pharmaceutical Care Plan (Assessment, Care Plan, Evaluation). Identify and categorize Drug Therapy Problems (DTPs). Set therapeutic goals and monitoring parameters for patients.	Pharmaceutical care planning	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
12	2	Discuss the principles of Community	Community pharmacy management	Black board	Reports, assignment, oral and

		Pharmacy Management (financial, inventory, personnel). Describe the organization and functions of Hospital Pharmacy Services. Compare the clinical roles of pharmacists in community vs. hospital settings.	Hospital pharmacy service.	PowerPoint slides E-learning	written exams, midterm and final term exams
13	2	Identify biological hazards in the pharmacy setting. Implement standard precautions and proper waste disposal. Discuss safety protocols for handling hazardous drugs (e.g., chemotherapy).	Biosafety in pharmacy practice	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
14	2	Explain the purpose and development of a Drug Formulary. Discuss Regulatory Affairs regarding drug registration and licensing. Analyze the impact of regulations on drug quality and availability.	Formulary management and Regulatory affairs	Black board PowerPoint slides E-learning	Reports, assignment, oral and written exams, midterm and final term exams
15	2	Define the concept of Rational Use of Drugs (WHO definition).	Rational Use of Drugs	Black board	Reports, assignment, oral and written exams, midterm and

		Identify the consequences of irrational drug use (Antimicrobial resistance, costs, adverse events). Discuss strategies to promote rational prescribing and dispensing practices.		PowerPoint slides E-learning	final term exams

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the students such as daily preparation and daily and monthly exams, reports, editorials, etc..	
Midterm exam 30 marks Final exam 70 marks	
12. Learning and teaching resources	
Textbooks (if any required)	Lucas AO, Gilles HM, (Eds), Short Textbook of Public Health Medicine for the Tropic, (4th Ed), 2003.
Main references (sources)	Maxcy-Rosenau-Last Public Health and Preventive Medicine Public Health and Preventive Medicine [15 ed.], 2008 by Robert Wallace
Recommended supporting books and references (reports, scientific journals)	WHO journal (Eastern Mediterranean Health Journal)
Websites, references	WHO website, UpToDate database, MedScape database

1. Course Name	
Pharmacology III	
2. Course Code	
441 PtPc3	
3. Semester/Year	
Second semester/fourth year	
4. Date this description was prepared	
2/9/2025	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
30 hours	
7. Name of course coordinator(s):	
Asst. Prof. Haider falih shamik	E. mail: hasaedi@alameed.edu.iq
8. Course objectives	
Objectives of the study subject	1. The primary goal of pharmacology is to provideTo introduce the pharmacy students to various drug groups affecting endocrine systems and their use in correcting abnormalities in the endocrine functions. 2. Moreover, the course will cover the drugs used in the management of neoplastic diseases, bone disorders, obesity and erectile dysfunction. Inflammatory agents and the anti-inflammatory drugs will also be covered during this course. 3. Study the groups of anti-inflammatory drugs and those used in the treatment of rheumatism and gout, and find out the indications for use and side effects

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required learning outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2	Identify the physiological roles of pituitary and thyroid hormones and explain the pharmacological management of hyper/hypothyroidism.	Hormones of the pituitary and thyroid glands.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	2	Understand the mechanism of action of insulin and differentiate between the various classes of oral hypoglycemic agents for Type 2 Diabetes.	Insulin and oral hypoglycemic drugs.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
3	2	Analyze the pharmacokinetics of long-acting vs. rapid-acting insulins and manage the clinical complications of hypoglycemic therapy.	Insulin and oral hypoglycemic drugs(cont.)	the blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

				E-Learning	
4	2	Explain the classification, anti-inflammatory mechanisms, and metabolic effects of glucocorticoids and mineralocorticoids.	Adreno-corticosteroids	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	2	Describe the clinical uses of corticosteroids. Identify the physiological functions and therapeutic applications of estrogen, progesterone, and testosterone.	Adreno-corticosteroids(cont.) The gonadal hormones.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
6	2		The gonadal hormones inhibitors. Autacoids	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
7	2	Evaluate the use of gonadal hormone inhibitors in clinical practice. Define the role of autacoids (histamine, serotonin) in local cell signaling.	Autacoid antagonists Non-steroidal anti-inflammatory drugs (NSAIDs)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
8	2	Master the pharmacology of antihistamines and serotonin antagonists, and explain the mechanism of action of NSAIDs in pain and inflammation.	Other anti-inflammatory agents.	the blackboard PowerPoint slides	Oral and written theoretical exams, semi-semester and semester

				E-Learning	
9	2	Understand the pathophysiology of erectile dysfunction and the pharmacology of phosphodiesterase-5 (PDE5) inhibitors and alternative therapies.	Drugs used in erectile dysfunction.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	2	Identify the mechanisms of bone resorption and explain the pharmacology of bisphosphonates, SERMs, and calcium regulators used in osteoporosis.	Drugs used in osteoporosis.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
11	2	Analyze the pharmacological strategies for weight management, including appetite suppressants and lipase inhibitors, and their safety profiles.	Drugs used in the management of obesity.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	5	Categorize cytotoxic agents and immunosuppressants, explaining their mechanisms of action, resistance patterns, and systemic toxicities.	Cancer Chemotherapy: Anticancer drugs and immunosuppressants.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as activities and daily exams and editorial, reports, etc	
- Daily exam and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	Lipincott Illustrated Reviews Pharmacology 7rd Edition 2019,
Main references (sources)	- Goodman & Gilman's The Pharmacological Basis of Therapeutics 13th edition 2018. - Katzung & Trevor's Pharmacology Examination and Board Review 12th Edition 2019 - Rang & Dale's Pharmacology 9th Edition 2020
Recommended supporting books and references (scientific (...,journals, reports	British National Formulary
References , websites	FDA

1. Course Name
Organic Pharmaceutical Chemistry III
2. Course Code
442 PcOp3
3. Semester/Year
4th Class, 2nd Semester
4. Date this description was prepared
1/10/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory and Laboratory
7. Name of course coordinator(s):
Abbas Abdulridha Mehihi Email: abbas-mehihi@alameed.edu.iq
8. Course objectives
- This course covers the medicinal chemistry and pharmacology of chemotherapeutic drugs. - It details the mechanisms of anticancer agents, from traditional antineoplastics to modern biotherapeutics. - The curriculum also provides an in-depth of major antibacterial classes (including β-lactams and sulfonamides) and concludes with an overview of antiviral and antifungal agents.
9. Teaching and learning strategies

Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 2	Theory: Define cancer chemotherapy; Classify alkylating agents; Explain the mechanism of action (MOA) and chemical instability of nitrogen mustards. Lab: Understand the mechanism of Ceftriaxone degradation in aqueous solution and identify chemical tests to detect the opening of the beta-lactam ring.	Anticancer agents: Antineoplastic agents: alkylating agents; antimetabolites Hydrolytic Degradation of Ceftriaxone and Detection of β-Lactam Ring Cleavage part (1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
2	3	Theory: Discuss the Structure-Activity Relationship (SAR) of antimetabolites (folate	Antineoplastic: antimetabolites	The blackboard	Reports, assignments, oral and

	2	antagonists, pyrimidine/purine analogues); Explain their role in inhibiting DNA synthesis. Lab: Understand the mechanism of Ceftriaxone degradation in aqueous solution and identify chemical tests to detect the opening of the beta-lactam ring.	Hydrolytic Degradation of Ceftriaxone and Detection of β-Lactam Ring Cleavage part (2)	PowerPoint slides E-Learning	written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	3 2	Theory: Classify antitumor antibiotics (e.g., anthracyclines); Discuss their intercalation mechanism and specific toxicities (e.g., cardiotoxicity). Lab: Evaluate how acidic pH levels cause the degradation of Penicillin G and explain why it cannot be administered orally.	Antineoplastic: antibiotics Demonstration of Acidic Instability of Benzylpenicillin (Penicillin G)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
4	3 2	Theory: Identify plant-derived antineoplastics (vinca alkaloids, taxanes, camptothecins); Explain the mechanism of microtubule inhibition/stabilization. Lab: Contrast the structural differences that make Azithromycin more acid-stable than Erythromycin, allowing for improved pharmacokinetics.	Antineoplastic: plants products Comparative Stability Study of Azithromycin and Erythromycin	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	3 2	Theory: Discuss miscellaneous agents (cisplatin, enzymes) and biological response modifiers; Summarize	Antineoplastic: products; miscellaneous compounds	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations,

		combination chemotherapy principles. Lab: Demonstrate through laboratory observation the rapid degradation of Erythromycin in gastric-like pH compared to Azithromycin.	Comparing the acid stability of Azithromycin and Erythromycin	E-Learning	semi-semester and semester -Conduct laboratory experiments
6	3 2	Theory: Explain the chemistry of hormonal therapy (Tamoxifen, aromatase inhibitors) and kinase inhibitors; Discuss drug resistance mechanisms. Lab: Analyze the factors (lipophilicity and ionization) affecting the absorption of various tetracyclines and predict their bioavailability.	Hormones and related compounds; Future antineoplastic agents Comparative In Vitro Evaluation of Oral Absorption Potential of Tetracycline Class Antibiotics part (1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
7	3 2	Theory: Describe the technology behind monoclonal antibodies (mAbs) and their specific antigens; Discuss the principles of gene therapy vectors. Lab: Analyze the factors (lipophilicity and ionization) affecting the absorption of various tetracyclines and predict their bioavailability.	Monoclonal antibodies; Gene therapy of cancer. Comparative In Vitro Evaluation of Oral Absorption Potential of Tetracycline Class Antibiotics part (2)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	3 2	Theory: Illustrate the beta-lactam ring structure; Detailed SAR of Penicillins; Explain acid sensitivity and bacterial resistance (beta-lactamases). Lab: Identify how	β-lactam antibiotics(penicillins) Comparative In Vitro Evaluation of Oral Absorption Potential of Tetracycline Class Antibiotics part (3)	The blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations,

		tetracyclines act as both acids and bases and how pH changes affect their charge and solubility.		E-Learning	semi-semester and semester -Conduct laboratory experiments
9	3 2	Theory: Explain the mechanism of suicide inhibitors (Clavulanic acid, Sulbactam, Tazobactam); Discuss their combination with penicillins. Lab: Purify the synthesized phenol using re-crystallization and check physical constants (melting point).	β- lactamase inhibitors; Demonstration of the Amphoteric Nature of Tetracyclines	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	3 2	Theory: Differentiate between Cephalosporin generations based on spectrum/SAR; Describe the monobactam structure and its specific utility (Aztreonam). Lab: Demonstrate the formation of insoluble chelates between tetracycline and divalent cations (Ca2+), leading to reduced drug absorption.	cephalosporins and monobactams Simulation of Tetracycline Inactivation by Calcium from Milk and Antacids part (1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
11	3 2	Theory: Discuss the aminoglycoside structure, protein synthesis inhibition, and ototoxicity/nephrotoxicity; Explain Chloramphenicol SAR and metabolism.	Aminoglycosides, and chloramphenicol Simulation of Tetracycline Inactivation by Calcium from Milk and Antacids part (2)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

					-Conduct laboratory experiments
12	3 2	Theory: Describe Tetracycline chelation and SAR; Classify Macrolides (Erythromycin) and Lincosamides; Discuss polypeptide antibiotics (Bacitracin). Lab: Examine how urinary pH influences Ciprofloxacin solubility and the risk of crystal formation (crystalluria) in the kidneys.	tetracyclines; polypeptides macrolides; Lincomycins Effect of pH on the Solubility of Ciprofloxacin and its Clinical Relevance to Crystalluria part (1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
13	3 2	Theory: Define Sulfonamide chemistry and PABA antagonism; Detail SAR, metabolism (acetylation), crystalluria, and Stevens-Johnson syndrome; Discuss Sulfones (Dapsone).	Sulfonamide: chemistry, nomenclature, mechanism of action, resistance, toxicity, side effect, metabolism protein binding, distribution and SAR) products, sulfones Effect of pH on the Solubility of Ciprofloxacin and its Clinical Relevance to Crystalluria part (2)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	3 2	Theory: Classify antivirals by viral life-cycle targets; Compare Nucleoside vs. Non-nucleoside Reverse Transcriptase Inhibitors (NRTIs vs NNRTIs); Explain Protease/Integrase inhibition. Lab: Observe the chemical interaction between	Agents Inhibiting Virus Attachment, Penetration, and Early; Agents Interfering with Viral Nucleic Acid Replication; HIV Protease Inhibitors; HIV Reverse Transcriptase Inhibitors; HIV	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Quinolones and metal ions and understand the clinical impact of co-administering these with minerals.	Integrase Inhibitors; Investigational Antiviral Agents Demonstration of Metal Ion Chelation by Quinolones (e.g., Ciprofloxacin) part (1).		-Conduct laboratory experiments
15	3 2	Theory: Identify antifungal targets (Ergosterol, Cell wall); Explain the MOA of Polyenes (Amphotericin B), Azoles, and Echinocandins.	Biochemical targets for antifungal chemotherapy; Polyene Membrane Disruptors; Ergosterol, Biosynthesis Inhibitors; Inhibitors of Cell Wall Biosynthesis—Echinocandins; miscellaneous drugs Demonstration of Metal Ion Chelation by Quinolones (e.g., Ciprofloxacin) part (2)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and written exams Editorial, reports, etc
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
methodology, if textbooks Required any	- Foye's Principles of Medicinal Chemistry Roche PhD (Author), S. William PhD Zito 7 th Edition PhD by Victoria PhD F., College of Pharmacy, Houston Uni, Texas, USA
Main references (sources)	- Wilson and Gisvolds textbook of organic medicinal and pharmaceutical chemistry, John M. B.; John H.B. (Twelfth edition). - An Introduction to Medicinal Chemistry 7th Edition by Graham L. Patrick, University of the West of Scotland, UK
Recommended supporting books and references (scientific journals, reports)	Organic Chemistry by McCurry; 5th ed.
References, websites	

1. Course Name
Clinical Pharmacy II
2. Course Code
443 CpC2
3. Semester/Year
4th year, 2nd Semester
4. Date this description was prepared
2/9/2024
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
60 hours Theory and Laboratory (45 unit)
7. Name of course coordinator(s):
Name: Ass. Prof. Ali Hameed Abd-Alhusaasin E. mail: alihamid8282@gmail.com
8. Course objectives

1. The primary goal of clinical pharmacy is to provide basic information and general principles and give the student clinical scientific information that qualifies him to deal with patients cases in pharmacies and hospitals and to know the basic diseases, their causes, and the optimal solution for their treatment.

2. Introducing pharmacy students to hypertension disease and heart diseases and the various medications used to treat these diseases.

3. Introducing pharmacy students to respiratory system diseases, inflammatory diseases, diabetes, anemia, digestive and urinary system diseases, and the various medications used to treat them.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required learning outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2 1	Define the scope, evolution, and core responsibilities of a clinical pharmacist. Classify hypertension stages according to JNC-8 or ACC/AHA guidelines. Select appropriate first-line antihypertensive agents (ACEIs, ARBs, CCBs, Thiazides) based on patient demographics and comorbidities. Identify hypertensive urgencies and	Hypertension Introduction in clinical pharmacy	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

		emergencies and their management.			
2	2 1	Explain the balance of myocardial oxygen supply and demand. Differentiate between stable angina, unstable angina, NSTEMI, and STEMI. Formulate a pharmacotherapy plan for acute coronary syndromes (MONA-B: Morphine, Oxygen, Nitrates, Aspirin, Beta-blockers). Recommend secondary prevention strategies (statins, antiplatelets, ACEIs).	Ischemic heart disease	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
3	2 1	Classify Heart Failure based on Ejection Fraction (HFrEF vs. HFpEF) and NYHA functional class. Apply the "Four Pillars" of HFrEF therapy: Beta-blockers, ARNI/ACEi, MRAs, and SGLT2 inhibitors. Manage fluid overload using loop diuretics. Recognize signs of digoxin toxicity and electrolyte	Heart Failure	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

		imbalances.			
4	2 1	Interpret complete blood count (CBC) and iron studies (Ferritin, TIBC) to diagnose anemia type. Design a treatment regimen for Iron Deficiency Anemia (oral vs. IV iron). Manage Megaloblastic anemias (B12 and Folate deficiency). Discuss the use of Erythropoiesis-Stimulating Agents (ESAs) in chronic disease.	Hematologic disorders: Anemia and sickle cell disease.	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
5	2 1	Classify asthma severity (Intermittent to Severe Persistent) using GINA guidelines. Create a step-wise treatment plan involving SABA, ICS, and LABA. Demonstrate proper inhaler technique (MDI, DPI, Spacers) to patients. Identify triggers and manage acute asthma exacerbations.	Asthma	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
6	2 1	Diagnose COPD based on spirometry (FEV1/FVC ratio < 0.70) and GOLD staging.	Chronic obstructive pulmonary disease (COPD)	the blackboard PowerPoint	Reports, assignments, oral and written theoretical

		Select appropriate bronchodilators (LAMA, LABA) and determine when to add ICS. Assess the benefits of smoking cessation, vaccinations, and pulmonary rehabilitation. Manage acute COPD exacerbations with antibiotics and systemic steroids.		slides	examinations, semi-semester and semester -Conduct laboratory experiments
7	2 1	Compare the pathophysiology of Type 1 vs. Type 2 Diabetes. Recommend oral agents (Metformin, Sulfonylureas, DPP-4i, SGLT2i, GLP-1 RAs) based on patient profile. Design insulin regimens (Basal, Bolus, Correction factor) for glycemic control. Manage diabetic emergencies (DKA, HHS, Hypoglycemia) and screen for microvascular complications.	Diabetes mellitus & Diabetic ketoacidosis (DKA)	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
8	2 1	Identify the etiology of PUD (*H. pylori*, NSAIDs, Stress). Prescribe appropriate	Peptic ulcer disease	the blackboard PowerPoint	Reports, assignments, oral and written theoretical

		H. pylori eradication regimens (e.g., Clarithromycin-based triple therapy, Bismuth quadruple therapy). Manage NSAID-induced ulcers with PPIs or Misoprostol. Counsel patients on lifestyle changes and "alarm symptoms" requiring referral.		slides	examinations, semi-semester and semester -Conduct laboratory experiments
9	2 1	Describe the transmission and pathogenesis of *Mycobacterium tuberculosis*. Outline the standard 6-month treatment regimen (Rifampin, Isoniazid, Pyrazinamide, Ethambutol). Monitor for hepatotoxicity, peripheral neuropathy, and ocular toxicity. Differentiate between Latent TB infection and Active TB disease management.	Tuberculosis	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
10	2 1	Identify common bacterial pathogens (e.g., *S. pneumoniae*, *N. meningitidis*) by age group. Select empiric antibiotics with high CNS penetration (e.g., Ceftriaxone,	Infective meningitis	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		Vancomycin). Evaluate the role of adjunctive dexamethasone therapy. Recommend chemoprophylaxis for close contacts of patients with *N. meningitidis*.			-Conduct laboratory experiments
11	2 1	Discuss the autoimmune mechanism and diagnostic criteria (ACR/EULAR) for RA. Implement "Treat to Target" strategies using DMARDs (Methotrexate, Hydroxychloroquine). Screen for tuberculosis and hepatitis before initiating Biologic DMARDs (TNF inhibitors). Manage pain with NSAIDs and bridging corticosteroids.	Rheumatoid arthritis (RA) and osteoarthritis (OA)	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
12	2 1	Interpret Bone Mineral Density (BMD) and T-scores from DEXA scans. Recommend lifestyle measures: Weight-bearing exercise, Calcium (1200mg), and Vitamin D (800IU).	Osteoporosis and other metabolic bone disease.	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct

		Prescribe pharmacotherapy: Bisphosphonates, Denosumab, or SERMs. Counsel on proper administration of oral bisphosphonates to avoid esophagitis.			laboratory experiments
13	2 1	Distinguish the pathophysiology of Gout (monosodium urate crystals) vs. Pseudogout. Treat acute gout flares with NSAIDs, Colchicine, or Corticosteroids. Manage chronic hyperuricemia with Xanthine Oxidase Inhibitors (Allopurinol, Febuxostat) to a target uric acid level. Identify modifiable risk factors (diet, alcohol, diuretics).	Gout and hyperuricemia	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments
14	2 1	Classify UTIs: Uncomplicated cystitis, Complicated UTI, and Pyelonephritis. Select first-line antibiotics (Nitrofurantoin, TMP-SMX, Fosfomycin) based on local resistance. Treat UTIs in special	Urinary tract infection (UTI)	the blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations, semi-semester and semester -Conduct laboratory experiments

1. Course Name
General Toxicology
2. Course Code
444 PtGt
3. Semester/Year
4th Class, 2nd Semester
4. Date this description was prepared
2/9/2024
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours Theory and 30 hours Laboratory
7. Name of course coordinator(s):
Ass. Prof. Haider falih shamik Email: hasaedi@alameed.edu.iq
8. Course objectives
- To study the principle of exposure to different chemicals and environmental factors, their sources, mechanisms of toxicity and their risk to human being. - It enables students to understand the required measures to protect living organisms against the suspected toxic hazards.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the Unit or Topic**	**Learning Method**	**Evaluation Method**
1	2 (Theory) 2 (Lab)	• Define the basic principles of toxicology. • Analyze how host and environmental factors influence toxicity. • Classify general toxic agents and their modes of entry.	Introduction: general consideration; host factor, environmental Factors of toxic effects Introduction of general toxic agents	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
2	2 (Theory) 2 (Lab)	• Describe the stages of chemical carcinogenesis (initiation, promotion, progression).	Carcinogenesis Acute toxicity study, determination of LD50 (part 1).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments

3	2 (Theory) 2 (Lab)	• Explain the liver's role in metabolism and its susceptibility to toxins.	Target organs and systemic toxicology; of liver Acute toxicity study, determination of LD50 (part2).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
4	2 (Theory) 2 (Lab)	• Discuss the susceptibility of the respiratory system to airborne toxins.	Target organs and systemic toxicology; Respiratory system Drug toxicity on liver (part 1).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
5	2 (Theory) 2 (Lab)	• Describe the mechanisms of nephrotoxicity and kidney damage.	Target organs and systemic toxicology; kidney Drug toxicity on liver (part 2).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
6	2 (Theory) 2 (Lab)	• Understand the skin as a barrier and a target for local and systemic toxicity. • Evaluate the effects of common environmental pollutants on dermal health.	Target organs and systemic toxicology; skin Nicotine toxicity(part 1).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments

7	2 (Theory) 2 (Lab)	• Explain neurotoxicity and how toxins affect neuronal transmission.	Target organs and systemic toxicology; nervous system Nicotine toxicity (part 2).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
8	2 (Theory) 2 (Lab)	• Describe hematotoxicity and the effects of toxins on blood components.	Target organs and systemic toxicology; blood Pesticide toxicity (part 1).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
9	2 (Theory) 2 (Lab)	• Assess the health risks associated with common food additives and contaminants.	Toxic substances: Food additive and contaminants Pesticide toxicity (part 2).	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
10	2 (Theory) 2 (Lab)	• Classify pesticides (organophosphates, carbamates) and their mechanisms of action.	Toxic substances: Pesticides Metal toxicity (part 1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
11	2 (Theory)	• Identify the clinical signs and treatment for heavy	Toxic substances: Metals	The blackboard	Reports, assignments,

	2 (Lab)	metal poisoning (Lead, Mercury, etc.).	Metal toxicity (part 2)	PowerPoint slides E-Learning	oral and written theoretical examinations Conduct laboratory experiments
12	2 (Theory) 2 (Lab)	• Understand the biological effects of ionizing radiation and radioactive materials.	Toxic substances: Radiation and radioactive materials Blood toxicity (part 1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
13	2 (Theory) 2 (Lab)	• Evaluate the impact of air, water, and soil pollution on public health. • Discuss the potential toxicity of preservatives used in canned foods.	Environmental toxicology: Air pollution, water and soil pollutants Blood toxicity (part 2)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments
14	2 (Theory) 2 (Lab)	• Describe the effects and management of exposure to riot control agents (Tear gas, Pepper spray).	Gases (Tear gas, Pepper spray) Drug-induced toxicity (part 1)	The blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments

15	2 (Theory) 2 (Lab)	• Compare the toxicity mechanisms of Hydrogen Sulfide (H2S) and Cyanide.	Environmental toxicology: CO, Cyanide(H2S) Drug-induced toxicity (part2)	The blackboard PowerPoint slides E-Learnin	Reports, assignments, oral and written theoretical examinations Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Practical exam20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Casarett and Doull, Toxicology
Main references (sources)	Casarett and Doull, Toxicology, the Basic Science of Poisons; - latest edition.
Recommended supporting books ,and references (scientific journals reports)	
References , websites	

1. Course Name
Industrial Pharmacy I
2. Course Code
548 PIp2
3. Semester/Year
2nd semester/ fourth year
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours theory and 30 hours practices
7. Name of course coordinator(s):
Name: Ass. Prf. Hassan albassam E.mail: dr.hassanalbassam80@gmail.com
8. Course objectives
- The subject aim to teach pharmacy students the steps and lines upon which the preformulation processing of pharmaceutical dosage forms. - This fundamental course provides the required principles to integrate knowledge of Pharmaceutical Technology in preformulation of perfect dosage form. - It includes milling, mixing, drying and filtration, besides sterilization to achieve a proper processing of dosage forms.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	3 (Th) 2 (Pr)	**Define** the scope of industrial pharmacy and **explain** the significance of pre-formulation studies in drug development.	Principles of pharmaceutical processing; Introduction in industrial pharmacy and pre-formulation.	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	3 (Th) 2 (Pr)	**Explain** the mechanisms of fluid mixing and **demonstrate** the preparation and characterization of effervescent granules.	Mixing; fluid mixing; flow characteristics Effervescent granules: Preparation and characterization	the blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

3	3 (Th) 2 (Pr)	**Discuss** the theories and equipment used in milling and **analyze** the flow properties and rheology of granules.	Milling; pharmaceutical application Flow properties and rheology of granules.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
4	3 (Th) 2 (Pr)	**Compare** different particle size measurement methods and **apply** rheological principles to improve granule flow.	Size measurement methods; Flow properties and rheology of granules(cont)	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
5	3 (Th) 2 (Pr)	**Define** the drying process and humidity measurement, and **outline** the steps for tablet preparation.	Drying: definition; purpose; humidity measurement Tablet dosage form: Preparation and characterization	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
6	3 (Th) 2 (Pr)	**Explain** the fundamental theories of drying and **perform** standard characterization tests on tablet dosage forms.	Theory of drying Tablet dosage form: Preparation and characterization	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

7	3 (Th) 2 (Pr)	**Analyze** drying rate periods and **synthesize** knowledge through tutorial review.	Theory of drying (cont) Review and tutorial	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
8	3 (Th) 2 (Pr)	**Distinguish** between clarification and filtration and **execute** pharmacopeial evaluation tests for tablets.	Clarification and filtration. Evaluation of tablets	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
9	3 (Th) 2 (Pr)	**Evaluate** different filter media and aids based on filtration theory and **interpret** tablet evaluation results.	Theory; filter media; filter aids; Evaluation of tablets	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
10	3 (Th) 2 (Pr)	**Select** appropriate drying methods for specific materials and **produce** aspirin tablets using wet granulation.	Selection of drying method Preparation of children aspirin by wet granulation method	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11	3 (Th) 2 (Pr)	**Classify** sterilization methods and **describe** the formulation principles of sustained-release dosage forms.	Sterilization Sustained release dosage forms: Preparation and characterization	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
12	3 (Th) 2 (Pr)	**Calculate** microbial death kinetics for validation and **assess** the release profile of sustained-release forms.	Validation of methods; microbial death kinetics Sustained release dosage forms: Preparation and characterization	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
13	3 (Th) 2 (Pr)	**Review** various pharmaceutical dosage forms and **identify** equipment used in tablet coating techniques.	Pharmaceutical dosage forms Coating techniques of tablets.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester
14	3 (Th) 2 (Pr)	**Outline** requirements for sterile product development and **differentiate** between coating techniques.	Sterile products; development;formulation; Coating techniques of tablets.	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

15	3 (Th) 2 (Pr)	**Integrate** production processing with quality control standards and **review** key course concepts.	Production; processing; quality control Review and tutorial	the blackboard PowerPoint slides E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as activities and daily exams and editorial, reports, etc	
- The mid-term exam 20 marks - Practical exam 20 marks - The final exam 60	
12. Learning and teaching resources	
Required textbooks (methodology)	The Theory and Practice of Industrial Pharmacy by Leon Lachman et al
Main references (sources)	Aulton's Pharmaceutics, The Design and Manufacture of Medicines
Recommended supporting books ,and references (scientific journals (...,reports	
References , websites	BNF, BP and USP

1. Course Name
Communication Skills
2. Course Code
446 CpCs
3. Semester/Year
4th Class, 2nd Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
6, Total academic hours
30 hours Theory
7. Name of course coordinator(s):
Ass.Prof. Dr. Abdullah Hameed Maad Email: dr.ph.abdullah.maad@gmail.com
8. Course Objectives
At the end of this course, students are expected to learn: 1) Interpersonal communication as a foundation pf patient-centered care 2) Clear messages between pharmacists and patients promotes useful and safe medication use 3) Highlighting on how the pharmacist communicate appropriately with patients as well a s other health care providers to ensue optimal outcomes. 4) Communication skill is one of the missions of pharmacy care practice, aims to develop a conventional relationship between pharmacist and patients, in which information is exchanged, hold in confidence and used to optimize patient care through appropriate drug therapy.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	2	Identify the core components of the communication model (sender, receiver, message, feedback) and analyze how interpersonal variables affect pharmacy interactions.	Principles and Elements of Interpersonal Communication.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
2	2	Distinguish between various forms of nonverbal communication (e.g., kinesics, proxemics)	Nonverbal type of communication.	The Blackboard	Reports, assignments, oral and written

		and evaluate their impact on patient trust and understanding.		PowerPoint slides	theoretical examinations
3	2	Identify environmental, personal, and administrative barriers to communication in a pharmacy setting and formulate strategies to minimize or eliminate them.	Barriers to communication.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
4	2	Demonstrate active listening techniques and differentiate between sympathy and empathy to build therapeutic alliances with patients.	Listening and empathic responding during communication.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
5	2	Compare and contrast passive, aggressive, and assertive behaviors; apply assertive techniques (e.g., fogging, broken record) in professional interactions.	Assertiveness.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
6	2	Conduct a structured patient interview to obtain a comprehensive medication history and assess patient understanding using open-ended questions	Interviewing and assessment.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
7	2	Evaluate causes of medication non-adherence and apply behavioral change models (e.g., RIM technique) to support patients in managing their therapy.	Helping patients to manage therapeutic regimens.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations

8	2	Develop the ability to provide clear, empathetic, and accurate medication information to improve patient compliance and safety.	Patient counseling; counseling check list; point-by-point discussion; counseling scenario.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
9	2	Analyze the relationship between poor communication and medication errors; demonstrate counseling techniques that ensure patient safety (e.g., teach-back method).	Medication safety and communication skills	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
10	2	Adapt communication styles to effectively counsel patients with special needs, including the elderly, terminally ill, or those with hearing/visual impairments.	Strategies to meet specific needs.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
11	2	Demonstrate age-appropriate counseling techniques for children	Communicating with children and elderly about medications.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
12	2	Apply professional communication standards (e.g., SBAR) when collaborating with physicians and nurses to resolve drug-related problems.	Communication skills and inter-professional collaboration.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
13	2	Master the use of secure electronic tools (e.g., Patient Portals, Telehealth, and Secure Messaging) to	Electronic communication in healthcare.	The Blackboard PowerPoint slides	Reports, assignments, oral and written

		facilitate provider-patient interactions.			theoretical examinations
14	2	Understand the legal and moral duty to protect patient data and discuss sensitive health information only in secure, private settings.	Ethical behavior when communicating with patients.	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations
15	2	Learn to evaluate health risks based on the traveler's destination, duration of stay, and medical history. Understand the structural differences between insurance models like HMO, PPO, and POS plans.	Travel health Health insurance	The Blackboard PowerPoint slides	Reports, assignments, oral and written theoretical examinations

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such a daily preparation and daily exams, editorial, reports, etc	
• Mid-term exam 30 marks • Final examination 70 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Robert S. Beardsley. Communication Skills in Pharmacy practice. Last edition.
Main references (sources)	Bruce A. Berger Communication Skills for Pharmacists: Building Relationships, Improving Patient Care. Last edition. (For topic no. 13)
Recommended supporting books and references (scientific journals, reports)	

References, websites	https://www.medscape.com/

1. Course Name
Organic Pharmaceutical Chemistry IV
2. Course Code
547 PcOp4
3. Semester/Year
5th Class, 1st Semester
4. Date this description was prepared
2/9/2024
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours Theory
7. Name of course coordinator(s):
Name: abbas abdulridha mehihi Email: abbas-mehihi@alameed.edu.iq
8. Course objectives

- To give the students knowledge and experience in pro-drug and drug targeting as part of their medicinal and pharmaceutical field.
- Demonstrate knowledge of classification, synthesis, biotransformation and/or formulation of certain drugs and prodrugs to improve their action as well as to avoid some side effect.
- Understand the rationale behind prodrug design to overcome pharmaceutical barriers (solubility, stability, absorption, toxicity).
- Understand the methodologies for synthesizing peptide libraries and other linear pharmacophores.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2	1. Define the concept of prodrugs and their role in optimizing ADME properties. 2. Identify the types of covalent bonds (esters, amides, carbamates) used in prodrug design. 3. Explain the mechanism of bioactivation (enzymatic vs. chemical cleavage).	Basic concept of prodrugs; Covalent bonds (cleavable)	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments

2	2	1. Design specific prodrug strategies for masking hydroxyl, carboxyl, amino, and carbonyl groups. 2. Explain how functional group modification affects lipophilicity and water solubility. 3. Predict the stability of different functional group derivatives in vivo.	Prodrugs of functional groups	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
3	2	1. Classify prodrugs into carrier-linked (bipartite, tripartite) and bioprecursors. 2. Differentiate between mutual prodrugs and double prodrugs. 3. Analyze the activation mechanisms for oxidative or reductive bioprecursors.	Types of prodrugs	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
4	2	1. Define Chemical Delivery Systems (CDS) and distinguish them from standard prodrugs. 2. Explain the mechanism of "lock-in" for site-specific targeting (e.g., brain targeting using redox systems). 3. Discuss the concept of retrometabolic drug design.	Chemical delivery systems	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
5	2	1. Explain the rationale for conjugating drugs to polymers (solubility, stability, half-life). 2. Describe the Enhanced Permeability and Retention (EPR)	Polymeric prodrugs	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester).

		effect in tumor targeting. 3. Identify the components of a polymeric prodrug (backbone, spacer, solubilizing group).			Conduct laboratory experiments
6	2	1. Classify polymers used in drug delivery (synthetic vs. natural; biodegradable vs. non-biodegradable). 2. Discuss the chemistry of cross-linking and its effect on drug release rates. 3. Compare linear polymers, branched polymers, and dendrimers.	Types and structure of polymers; Cross-linking reagents	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
7	2	1. Differentiate between passive and active drug targeting strategies. 2. Explain the role of homing devices (monoclonal antibodies, folic acid, peptides) in active targeting. 3. Analyze the challenges of intracellular drug delivery.	Drug targeting	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
8	2	1. Apply theoretical knowledge to analyze a specific prodrug or delivery system from recent literature. 2. Demonstrate skills in scientific research, critical thinking, and presentation. 3. Evaluate the clinical success or failure of the assigned case study.	Project	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
9	2	1. Define Combinatorial Chemistry and its		The blackboard,	Oral and written theoretical

		historical evolution from peptide synthesis. 2. Describe the principles of Solid Phase Peptide Synthesis (SPPS) (Merrifield synthesis). 3. Compare the efficiency of combinatorial synthesis vs. traditional linear synthesis.	Combinatorial chemistry; Peptides and other linear structures	PowerPoint slides, E-Learning	examinations (semi-semester and semester). Conduct laboratory experiments
10	2	1. Apply "Lipinski's Rule of 5" to assess the "drug-likeness" of library compounds. 2. Evaluate different types of solid supports (resins) used in synthesis. 3. Explain the function and cleavage conditions of various linkers.	Drug like molecules; Support and linker	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
11	2	1. Contrast solution-phase combinatorial chemistry with solid-phase methods. 2. Explain purification strategies in solution phase (e.g., use of scavenger resins). 3. Discuss the advantages of solution-phase regarding reaction scale and analysis.	Solution-phase combinatorial chemistry	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
12	2	1. Describe deconvolution methods to identify active compounds in a mixture. 2. Explain encoding strategies (chemical tagging, physical barcoding) for tracking library members.	Detection, purification and analgesics; Encoding combinatorial libraries	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments

		3. Discuss the purification and identification of analgesic leads from libraries.			
13	2	1. Define High-Throughput Screening (HTS) and its role in drug discovery. 2. Explain the workflow of an HTS campaign (assay development, robotics, data analysis). 3. Differentiate between "hits," "leads," and "drug candidates."	High-throughput screening	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
14	2	1. Define Virtual Screening and its advantages in reducing cost and time. 2. Differentiate between Structure-Based (Docking) and Ligand-Based (Pharmacophore) drug design. 3. Interpret scoring functions used to predict binding affinity.	Virtual screening	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments
15	2	1. Explain the concept of "Chemical Space" and the importance of diversity in library design. 2. Discuss metrics for measuring library diversity (scaffold diversity, substituent diversity). 3. Design a theoretical combinatorial library to maximize structural variation.	Chemical diversity and library design	The blackboard, PowerPoint slides, E-Learning	Oral and written theoretical examinations (semi-semester and semester). Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily oral and editorial exams and reports, etc	
- Daily activities and exams 5 marks - The mid-term exam 25 marks - Final -term exam 70 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Wilson and Gisvold Textbook of Organic Medicinal and Pharmaceutical Chemistry; Delgado JN, Remers WA, (Eds.); 10th ed., 2004.
Main references (sources)	Applications of absorption spectroscopy of organic compounds by Dyer JR.
Recommended supporting books and references (scientific journals, reports)	Organic Chemistry by McMurry; 5thed; Thomason learning CA, USA 2000.
References, websites	

1. Course Name	
Industrial Pharmacy II	
2. Course Code	
548 PIp2	
3. Semester/Year	
1st semester/ fifth year	
4. Date this description was prepared	
2/9/2025	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
45 hours theory and 30 hours practices	
7. Name of course coordinator(s):	
Ass. Prf. Hassan albassam	E.mail: dr.hassanalbassam80@gmail.com
8. Course objectives	
	The course enables technical setup for coordination of standards for formulation of typical dosage forms and the principles needed to learn mass production of different pharmaceutical dosageforms. The syllabus includes different dosage forms like tablets, capsules, aerosols, emulsion, etc, besides the advanced techniques like enteric coating and micro-encapsulation.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the Unit or Topic**	**Learning Method**	**Evaluation Method**
1	3 2	1. Define pharmaceutical dosage forms and classify them by physical state and route of administration. 2. Discuss the advantages of tablets as a dosage form. 3. Explain the principle of Direct Compression and identify suitable APIs for this method.	Pharmaceutical dosage forms: Tablets; role in therapy; advantages. *(Lab)* Direct compression method for preparation of tablets.	Blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations
2	3 2	1. List the disadvantages and technical challenges of tablet manufacturing. 2. Describe the function of various excipients (diluents, binders, disintegrants, lubricants). 3. Explain the mechanism of tablet compression and the parts of a tablet press.	Tablets (Cont.): Disadvantages; formulation; properties; evaluation; machines. *(Lab)* Direct compression method for preparation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams

		4. Perform standard quality control tests (hardness, friability, weight variation).			
3	3 2	1. Differentiate between Wet and Dry granulation techniques. 2. Describe the steps of Wet Granulation (mixing, wetting, screening, drying). 3. Troubleshoot common tableting problems (capping, lamination, sticking, picking). 4. Identify quality control parameters for granules (flowability, bulk density).	Tablets (Cont.): Used in tableting; quality control; problems; granulation methods; excipients. *(Lab)* Wet granulation method for preparation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
4	3 2	1. Compare and contrast sugar coating and film coating. 2. Explain the film coating process (polymer, plasticizer, solvent). 3. Identify coating defects (orange peel, bridging, cracking) and their remedies. 4. Discuss the equipment used for coating (pan coaters, fluidized bed).	Tablet coating: Principles; properties; equipments; processing; types (sugar and film); quality control and problems. *(Lab)* Wet granulation method for preparation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
5	3 2	1. Describe the composition and physicochemical properties of hard gelatin shells. 2. Explain the industrial process of capsule filling (rectification, separation, filling, closing). 3. Discuss dry granulation (slugging and roller compaction)	Capsules: Hard gelatin capsules; materials; production; filling equipments; formulation. *(Lab)* Dry granulation method for preparation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams

		for moisture-sensitive drugs.			
6	3 2	1. Differentiate between hard and soft gelatin capsules. 2. Explain the Rotary Die process for softgel manufacturing. 3. Discuss the nature of the capsule content (liquids, suspensions, semi-solids) and stability concerns. 4. Evaluate capsule disintegration and dissolution.	Soft gelatin capsules: Manufacturing methods; nature of capsule shell and content; processing; control; stability. *(Lab)* Dry granulation method for preparation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
7	3 + 2	1. Define micro-encapsulation and its pharmaceutical applications (taste masking, controlled release). 2. Describe encapsulation techniques (coacervation, spray drying, pan coating). 3. Select appropriate core and coating materials.	Micro-encapsulation: Core and coating materials; stability; equipments and methodology. *(Lab)* Review and tutorial.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
8	3 2	1. Explain the mechanism of Sustained Release (SR) and Controlled Release (CR) systems. 2. Differentiate between matrix and reservoir systems. 3. Discuss the advantages of modified release over immediate release. 4. Perform evaluation tests for finished tablets.	Modified (sustained release) dosage forms: Theory and concepts; evaluation and testing; formulation. *(Lab)* Evaluation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams

9	3 2	1. Classify liquid dosage forms (monophasic vs. biphasic). 2. Discuss solubility enhancement techniques (cosolvency, pH adjustment). 3. Explain stability issues in liquids (hydrolysis, oxidation) and preservation methods. 4. Describe manufacturing equipment for liquid mixing and filtration.	Liquids: Formulation; stability and equipments. *(Lab)* Evaluation of tablets.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
10	3 2	1. Define pharmaceutical suspensions and their ideal properties. 2. Apply Stokes' Law to prevent sedimentation. 3. Differentiate between flocculated and deflocculated systems. 4. Explain the use of suspending agents and wetting agents.	Suspensions: Theory; formulation and evaluation. *(Lab)* Capsules dosage form.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
11	3 2	1. Define emulsions and distinguish between O/W and W/O types. 2. Select emulsifying agents using the HLB (Hydrophile-Lipophile Balance) system. 3. Discuss theories of emulsification (surface tension, oriented wedge, interfacial film). 4. Identify signs of emulsion instability (creaming, cracking, phase inversion).	Emulsions: Theory and application; types; formulation; equipments and QC. *(Lab)* Capsules dosage form.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
12	3	1. Describe the anatomy of the skin and factors affecting percutaneous absorption.	Semisolids: Percutaneous absorption; formulation; types of	Blackboard, PowerPoint	Oral and written theoretical exams

	2	2. Classify ointment bases (oleaginous, absorption, water-removable, water-soluble). 3. Discuss the formulation of creams, gels, and pastes. 4. Select appropriate preservatives and antioxidants for semisolids.	bases (vehicles); preservation; processing and evaluation. *(Lab)* Preparation and evaluation.	slides, E-Learning	
13	3 2	1. Explain the physiological factors affecting rectal drug absorption. 2. Compare systemic vs. local effects of suppositories. 3. Classify suppository bases (fatty bases like Cocoa butter vs. water-soluble bases like PEG). 4. Discuss the handling and storage of different suppository bases.	Suppositories: Rectal absorption; uses; types of bases. *(Lab)* Parenteral dosage forms.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
14	3 2	1. Describe manufacturing methods for suppositories (fusion/molding vs. compression). 2. Calculate Displacement Values for dosage accuracy. 3. Perform quality control tests (melting range, liquefaction time, breaking strength). 4. Identify common problems in suppository manufacturing.	Suppositories (Cont.): Manufacturing processes; problems and evaluation. *(Lab)* Parenteral dosage forms.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams
15	3	1. Define pharmaceutical aerosols and their advantages. 2. Explain the function of propellants (liquefied	Pharmaceutical aerosols: Propellants; containers; formulation; types; components;	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams

	2	gases vs. compressed gases). 3. Describe the components of an aerosol system (container, valve, actuator, dip tube). 4. Discuss quality control tests for aerosols (spray pattern, leakage, particle size).	stability; manufacturing; QC. *(Lab)* Review and tutorial.		

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily oral and editorial exams and reports, etc ,	
- The mid-term exam 20 marks - Practical exam 20 marks - The final exam 60	
12. Learning and teaching resources	
Required textbooks (methodolog, if (any	The Theory and Practice of Industrial Pharmacy by Leon Lachman et al
Main references (sources)	Aulton's Pharmaceutics The Design and Manufacture of Medicines
Recommended supporting books ,and references (scientific journals (...,reports	
References , websites	BNF, BP and USP

1. Course Name
Applied Therapeutics I
2. Course Code
549 CpAt1
3. Semester/Year
First Semester / Fifth stage
4. Date this description was prepared
2/9/2024
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Ass. Prof. ali hamid abd-alhassain Email: alihamid8282@gmail.com
8. Course objectives
1 -The primary goal of therapeutics is to give the student scientific lectures that qualify him to know the treatment of clinical conditions and how to deal with basic diseases and their common symptoms, as well as providing basic information and general principles upon which the optimal use of medications in treating patients is based. 2 -Introducing pharmacy students to clinical diseases that affect the heart, how to deal with them, and identifying the optimal solution to treat them. 2 -Identify diseases related to the urinary system, how to deal with them, and the best solution to treat them. 3 -Identify diseases related to the nervous system, how to deal with them, and the optimal solution to treat them. 4- Study of diseases related to the digestive system and what groups of medications are used to treat these diseases.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of Unit or Topic**	**Learning Method**	**Evaluation Method**
1	3	**Differentiate** between prerenal, intrinsic, and postrenal failure and **explain** the principles of renal replacement therapies.	Acute renal failure (ARF) & Hemodialysis and peritoneal dialysis	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral & Written Exams • Semi-semester & Semester
2	3	**Manage** complications of chronic kidney disease (CKD) and **interpret** arterial blood gases to identify acid-base imbalances.	Chronic renal failure (CRF) Acid – base disorders	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
3	3	**Assess** and **treat** common fluid and electrolyte abnormalities (e.g.,	Disorders of fluid and electrolytes	• Blackboard	• Oral & Written Exams

		hyponatremia, hyperkalemia).		• PPT Slides • E-Learning	• Semi-semester & Semester
4	3	**Evaluate** symptom severity and **recommend** pharmacotherapy (alpha-blockers, 5-ARIs) for prostate enlargement. **Classify** types of urinary incontinence and **design** treatment plans for pediatric enuresis.	Benign prostatic hyperplasia (BPH) Urinary incontinence and pediatric enuresis	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
5	3	**Differentiate** between the pathophysiology and clinical presentation of Primary Open-Angle Glaucoma (POAG) and Angle-Closure Glaucoma. Compare the transmission routes, incubation periods, and chronicity risks of Hepatitis A, B, C, D, and E.	Glucoma Viral hepatitis	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
6	3	**Distinguish** between STEMI and NSTEMI/Unstable Angina and **apply** acute management guidelines (MONA, reperfusion).	Acute coronary syndrome	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
7	3	**Identify** common cardiac arrhythmias on ECG and **select** appropriate anti-arrhythmic agents.	Arrhythmias	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
8	3	**Assess** risk factors for VTE and **manage** anticoagulant therapy (heparins, warfarin, DOACs).	Thrombosis Dyslipidemia	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams

					• Semi-semester & Semester
9	3	**Differentiate** ischemic from hemorrhagic stroke and **optimize** secondary prevention strategies.	Stroke	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
10	3	**Compare** pathophysiology of Ulcerative Colitis vs. Crohn's Disease and **formulate** stepwise treatment regimens.	Inflammatory bowel diseases Systemic lupus erythematosis (SLE)	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
11	3	**Manage** sequelae of liver failure including ascites, esophageal varices, and hepatic encephalopathy.	Liver cirrhosis	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
12	3	**Classify** seizure types and **select** antiepileptic drugs based on mechanism of action and side effect profiles.	Epilepsy and status epilepticus	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
13	3	**Recommend** disease-modifying therapies for MS and **treat** various headache types (migraine, tension, cluster).	Multiple sclerosis & Headache disorders	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester
14	3	**Explain** the dopamine pathway pathophysiology and **optimize**	Parkinson's disease	• Blackboard • PPT Slides	• Oral & Written Exams

		pharmacotherapy (Levodopa, agonists) for motor symptoms.		• E-Learning	• Semi-semester & Semester
15	3	**Apply** the WHO analgesic ladder to manage acute, chronic, and neuropathic pain effectively.	Pain management Parenteral nutrition	• Blackboard • PPT Slides • E-Learning	• Oral & Written Exams • Semi-semester & Semester

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily exams and classroom Editorial, reports, etc
- Daily exams and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks

12. Learning and teaching resources	
Required textbooks (methodology (if any	- Clinical Pharmacokinetics Concepts and Applications, Third Edition, 1995 by Malcolm Rowland and Thomas Tozer.
Main references (sources)	- Clinical Pharmacy & Therapeutics, Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy hand book 7th Edittion - Applied Clinical Pharmacokinetics, Second Edition, 2008 by Larry A. Bauer.
Recommended supporting books ,and references (scientific journals (...,reports	- British National Formulary - Pharmacotherapy hand book 7th Edittion
References , websites	FDA

1. Course Name
Clinical Chemistry
2. Course Code
550 ClCc
3. Semester/Year
5th Class, 1st Semester
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
45 hours Theory (3hrs/wk) and 30 hrs practical (2hrs/wk)
7. Name of course coordinator(s):
Name: Rithab Ibrahim Mohammed E-mail: risamawi@alameed.edu.iq Name: Najah Hamza Kadim E-mail: najahaboalhassan6@gmail.com
8. Course objectives
• Understanding of human body chemistry in both healthy and diseased states, enabling to diagnose, monitor, and manage disease through laboratory data analysis . • Interpreting the results of biochemistry analyses that augment the clinical examination to achieve definite diagnosis of the disease . • Evaluating data accuracy, and applying this knowledge to therapeutic decision-making and patient care.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	4 2	• Define and classify Diabetes Mellitus and Hypoglycemia. • Explain glucose metabolism disorders. • Demonstrate proper blood specimen collection techniques.	· Disorders of Carbohydrates metabolism, Hyperglycemia & Diabetes mellitus, Hypoglycemia · Preparation of patient, Blood withdrawal, Handling of sample	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
2	3 2	• Classify disorders of lipid metabolism (dyslipidemias). • Perform enzymatic estimation of blood glucose and interpret results.	· Disorders of lipid metabolism · Blood Glucose measuring	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
3	3 2	• Evaluate liver function through specific biomarkers.	· Liver Function Tests	Blackboard	Reports, assignments,

		• Conduct and interpret the Oral Glucose Tolerance Test (OGTT).	· Glucose Tolerance Test	PowerPoint slides E-Learning	oral and written exams -Conduct laboratory experiments
4	3 2	• Analyze kidney function parameters. • Determine Blood Urea Nitrogen (BUN) levels to assess renal health.	· Kidney Function Tests · Determination of Urea level.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
5	3 2	• Correlate serum enzyme levels with tissue damage. • Measure Creatinine for renal and muscular assessment.	· Diagnostic enzymology · Creatinine Estimation.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
6	3 2	• Explain the hormonal regulation of the HPA axis. • Measure serum Triglycerides (TG) as part of a lipid profile.	· Hypothalamus & pituitary endocrinology, adrenal gland. · Lipid profile: TG	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
7	3 2	• Assess disorders of male and female gonadal function. • Perform estimation of Total Cholesterol.	· Hypothalamus & pituitary endocrinology, adrenal gland (cont.) · Total cholesterol.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
8	3 2	• Discuss hormonal regulation of the reproductive system.	· Reproductive system, disorders of gonadal function in males & females.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams

		• Estimate HDL ("good") cholesterol levels.	· HDL-Cholesterol.		-Conduct laboratory experiments
9	3 2	• Discuss clinical implications of reproductive hormones. • Correlate AST activity with liver and cardiac pathology.	· Reproductive system, disorders of gonadal function (cont.) · AST estimation	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
10	3 2	• Interpret Thyroid Function Tests (T3, T4, TSH). • Perform ALT estimation to assess liver hepatocellular damage.	· Thyroid function tests. · ALT Estimation	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
11	3 2	• Identify mechanisms of drug interference in laboratory tests. • Measure ALP activity for liver and bone pathology evaluation.	· Drug interaction with laboratory Tests · ALP Estimation	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
12	3 2	• Discuss the pathophysiology of calcium and phosphate metabolism. • Estimate Acid Phosphatase (ACP) activity.	· Disorders of calcium metabolism · ACP Estimation	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
13	3 2	• Categorize clinical tumor markers and their diagnostic utility. • Determine serum Bilirubin levels for jaundice assessment.	· Tumor markers · Bilirubin estimation	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments

14	3 2	• Describe common inborn errors of metabolism (e.g., PKU). • Measure Total Protein to evaluate nutritional and organ status.	· Inborn errors of metabolism · Total protein	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
15	3 2	• Explain diagnostic screening methods for metabolic disorders. • Estimate Plasma Albumin to assess liver synthesis.	· Inborn errors of metabolism (cont.) · Plasma albumin	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and mid exams Editorial, reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	- Crook,Clinical Chemistry & Metabolic Medicine, 8th edition - Manual of clinical chemistry
Main references (sources)	- Tietz Clinical chemistry& Molecular Diagnostics 6th edition; 2018 - Kaplan,Clinical Chemistry, 5th edition
Recommended supporting books and references (scientific journals, reports)	lippincott's biochemistry 7th, 2017
References, websites	

1. Course Name	
Clinical laboratory Training	
2. Course Code	
551 ClCl	
3. Semester/Year	
5th Class, 1st Semester	
4. Date this description was prepared	
2/9/2025	
5. Available attendance forms	
Attendance	
Number of academic hours (total) / number of units (total)	
60 hours/ 3 units	
7. Name of course coordinator(s):	
Name: Rithab Ibrahim Mohammed	E-mail: risamawi@alameed.edu.iq
Name: Najah Hamza Kadim	E-mail: najahaboalhassan6@gmail.com
8. Course objectives	

- It provides general information about the biochemical basis of disease and about the principles of laboratory diagnosis;

- it supplies specific guidance on the clinical value of chemical investigations, indicating their range of application and limitations as well as relating results of laboratory tests to the process of clinical diagnosis and management as these might applied to individual patients.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy -Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

11. Course structure					
Week	**Hours**	**Learning Objective**	**Name of the unit or topic**	**Learning Method**	**Evaluation Method**
1	4	• Demonstrate proper techniques for venipuncture and specimen collection (urine/stool). • Explain guidelines for specimen transport and handling.	Diagnostic test basics, collecting & transporting specimens, venipuncture, urine specimen, stool specimen.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
2	4	• Perform glucose estimation (Fasting and Post-Prandial). • Conduct and interpret the Oral Glucose Tolerance Test (OGTT).	Biochemical tests: Fasting blood glucose, post-prandial glucose, Oral glucose tolerance test.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
3	4	• Analyze renal function through Blood Urea and Creatinine levels.	Blood urea, Blood creatinine, Creatinine clearance, Uric acid.	Blackboard PowerPoint slides	Reports, assignments, oral and written

		• Calculate Creatinine Clearance to assess GFR.		E-Learning	theoretical examinations, and semester exam.
4	4	• Measure lipid profile components (Cholesterol, Triglycerides). • Assess cardiovascular risk using lipoprotein analysis.	Cholesterol, Lipoproteins, triglycerides.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
5	4	• Determine serum total protein levels. • Measure Bilirubin (Total/Direct) to evaluate liver function and jaundice.	Blood proteins, Bilirubin.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
6	4	• Estimate serum Calcium and Inorganic Phosphate levels. • Analyze electrolyte balance via Serum Chloride measurement.	Calcium, Inorganic phosphate, Serum chloride.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
7	4	• Assay liver enzymes (ALT, AST, ALP) to detect hepatocellular damage. • Measure cardiac/muscle enzymes (LDH, CPK).	Alkaline phosphatase, Acid phosphatase, Alanine aminotransferase, Aspartate aminotransferase, Lactate dehydrogenase, Creatine phosphokinase.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
8	4	• Perform VDRL screening for Syphilis. • Conduct serological tests for Streptococcal infection (ASO) and Hepatitis.	Serological tests: VDRL, ASO-Titer, Hepatitis tests.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
9	4	• Detect inflammatory markers (CRP, RF).	C-reactive protein test, Rheumatic factor test,	Blackboard	Reports, assignments,

		• Perform agglutination tests for Typhoid (Widal) and Brucellosis (Rose Bengal).	Rosebengal test, Typhoid fever test (Widal test), Pregnancy Test.	PowerPoint slides E-Learning	oral and written theoretical examinations, and semester exam.
10	4	• Perform physical, chemical, and microscopic examination of urine. • Identify artifacts and crystals in urine sediment.	General urine examination, urine specimen collection.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
11	4	• Conduct Complete Blood Count (CBC) including RBC and WBC counts. • Calculate RBC indices and evaluate Platelet count.	Hematological tests: RBC count, Hb, PCV, RBC indices, WBC count, Platelets count.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
12	4	• Determine ABO blood groups and Rh factor. • Perform Coomb's test, ESR, and Bleeding Time assessments.	Blood typing, Coombs test, Bleeding time, ESR.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
13	4	• Apply Gram staining and other staining techniques. • Perform basic bacterial culture and sensitivity procedures.	Microbiological tests: culture and sensitivity tests, Staining methods.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
14	4	• Prepare and sterilize various culture media. • Distinguish between enriched, selective, and differential media.	Culture media, Enriched culture media for general use.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.

15	4	• Identify bacteria using biochemical and morphological tests. • Perform antibiotic susceptibility testing (Disk Diffusion) and interpret zones of inhibition.	Tests for identification of bacteria, Disk diffusion tests of sensitivity to antibiotics, Choice of drugs for disk test, bacterial disease and their laboratory diagnosis.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and exams, ande ditorial, reports, etc
- Practical and daily exam 20 - The midterm exam is 20 marks - The final exam 60 marks

12. Learning and teaching resources	
Required textbooks (methodology (if any	- WHO Collaborating center for Applied Biosafety program and research, Lab. Biosafety principle, and practice, an instruction guides for Biosafety training.
Main references (sources)	- Clinical biochemistry and metabolic medicine. - A laboratory guide to clinical hematology. - Laboratory hematology practice Kandice kottke marchant. - laboratory manual and workbook in microbiology application to patient care
Recommended supporting books ,and references (scientific journals (...,reports	- F.J.Baker, R.E.Silverton. Introduction to medical laboratory technology 7th ed 1998. - Laboratory Quality management system Handbook, WHO, CLSI and CDC.
References , websites	MedlinePlus - Health Information from the National Library of Medicine

1. Course Name
Clinical Toxicology
2. Course Code
552 PtCt
3. Semester/Year
5th Class, 1st Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
6.Number of academic hours (total) / number of units (total)
30 hours
7. Name of course coordinator(s):
Asst. Prof. Haider falih shamik Email: hasaedi@alameed.edu.iq
8. Course objectives
1. The primarygoal of Toxicology is to provid students the ability to understand the concept of toxicology by providing them with the principles and skills required to deal with the toxicity of chemicals and drugs in clinical settings. 2. Also, it provides the students the ability to correlate signs and symptoms of toxicity with the analytical data, and know how to establish preventive and therapeutic measures for poisoning cases. 3. Introducing pharmacy students to the different drug groupstoxicity that affect thebody different system and learn different strategies that used in treating these toxicity.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning Method**	**Evaluation Method**
1	2 2	• Assess and stabilize the poisoned patient using ABCs. • Perform toxicological screening procedures. • Recognize special considerations for pediatric and geriatric poisoning.	Initial Evaluation and Management of the Poisoned Patient. Including pediatric poisoning and special consideration in the geriatric patient Laboratory Principles or Toxicological Screening.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
2	2 2	• Identify symptoms of caffeine and theophylline toxicity. • Analyze case studies of Acetaminophen and Salicylate overdose.	· Drug Toxicity: Over the counter drugs; caffeine; theophylline; antihistamine and decongestant; · Over the counter drugs: Case on Acetaminophen poisoning; Salicylates;	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
3	2	• Discuss the toxicity mechanisms of	· Drug Toxicity: non-steroidal anti-inflammatory drugs; vitamins.	Blackboard	Reports, assignments,

	2	NSAIDs and vitamins. • Perform qualitative urine analysis for salicylates.	· Over the counter drugs: Salicylates; evaluation of urine salicylates.	PowerPoint slides E-Learning	oral and written exams -Conduct laboratory experiments
4	2 2	• Evaluate toxicity of Beta-blockers and ACE inhibitors. • Perform urinalysis to detect chemical toxins.	· Prescription Medications: Cardiovascular drugs; beta blockers; ACE inhibitors; · Urine analysis of toxins and chemicals.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
5	2 2	• Manage Digoxin and Calcium Channel Blocker overdoses. • Interpret urinalysis results for toxic substances.	· Prescription Medications: Cardiovascular drugs; Digoxin; Calcium channel blocker; · Urine analysis of toxins and chemicals (cont.).	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
6	2 2	• Diagnose antiarrhythmic drug toxicity. • Recognize clinical signs of digitalis toxicity.	· Prescription Medications: Cardiovascular drugs; Antiarrhythmic agents; · Cardiac glycosides toxicity: Digitalis.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
7	2 2	• Treat hypoglycemia induced by oral hypoglycemic agents. • Identify food-borne toxins and supplement toxicity.	· Prescription Medications: hypoglycemic drugs; Opiods; · Cases on toxicity with foods and dietary supplements.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
8	2 2	• Assess CNS depressant and TCA overdose symptoms. • Analyze complex cases of dietary supplement toxicity.	· Prescription Medications: CNS depressants; tricyclic antidepressants · Cases on toxicity with foods and dietary supplements (cont.)	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments

9	2 2	• Explain the toxidrome of anticholinergic drugs. • Detect Arsenic, Cyanide, and Strychnine in biological samples.	· Prescription Medications: anti-cholinergic phenothiazines; · Identification of some common poisons in biological samples: Arsenic; cyanide; strychnine; Salicylates;	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
10	1 2	• Identify signs of CNS stimulant abuse/toxicity. • Screen for Phenothiazines and Barbiturates in samples.	· Prescription Medications: CNS stimulant. · Identification of some common poisons in biological samples: Phenothiazine derivatives; barbiturates	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
11	2 2	• Differentiate between Opioid, Cocaine, and PCP intoxication. • Confirm presence of Barbiturates in biological fluids.	· Drug of Abuse: Opioids; Cocaine; phencyclidine. · Phenothiazine derivatives; barbiturates.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
12	2 2	• Recognize psychological and physiological effects of Marijuana and LSD. • Evaluate toxicity cases involving anti-parkinsonian drugs.	· Drug of Abuse: marijuana; Lysergic acid. · Evaluation of cases of toxicity with anti-parkinsonian drugs.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
13	2 2	• Manage hydrocarbon and household chemical ingestions. • Discuss treatment for camphor and moth repellent toxicity.	· Chemical and Environmental Toxins: Hydrocarbones; Household toxins; Antiseptic; Disinfectants; Camphor; moth repellents. · Evaluation of cases of toxicity with anti-parkinsonian drugs.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments

14	2 2	• Identify common toxic plants and their active principles. • Assess the impact of drug toxicity on human organ systems.	Botanicals and plants-derived toxins; Toxic Plants. Evaluation of drug toxicity on human.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments
15	2 2	• Classify poisonous mushrooms based on toxin type. • Summarize long-term effects of drug toxicity on human health.	· Poisonous mushrooms · Evaluation of drug toxicity on human.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written exams -Conduct laboratory experiments

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Practical exam 20 marks. - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Gossel TA, Bricker TD, (Eds.); Principles of Clinical Toxicology; latest Edition
Main references (sources)	Casarett & Doull's -Toxicology : The Basic Science of Poisons: 9 th Edition.
Recommended supporting books ,and references (scientific journals reports)	
References , websites	

1. Course Name
pharmacoeconomic
2. Course Code
554 CpPm
3. Semester/Year
5th Class, 2nd Semester
4. Date this description was prepared
2/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours Theory
7. Name of course coordinator(s):
Asst. Proff. Ali hamid abd-alhussain Email: alihamid8282@gmail.com
8. Course objectives
1. The present course will give students the basic understanding of the tools needed to assess the costs and outcomes of medications and pharmaceutical care services. 2. It will enable participants to evaluate the pharmacoeconomic and quality of life literature for the purpose of rational decision-making. 3. Students will be exposed to the drug-focused approaches to pharmacoeconomic research and the fundamentals of quality-of-life research. 4. Students will be able to know the principle of marketing, Promotion Strategies and digital marketing.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the unit or topic**	**Learning method**	**Evaluation method**
1	2	1. Define Pharmacoeconomics and explain its role in healthcare decision-making. 2. Describe the "ECHO" model (Economic, Clinical, and Humanistic Outcomes). 3. Differentiate between efficacy, effectiveness, and efficiency.	Course overview & basic principle of pharmacoeconomics	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
2	2	Define the perspective of a study (societal, payer, provider, patient).	Cost analysis	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
3	2	Classify costs into Direct Medical, Direct Non-Medical, Indirect, and Intangible costs.	Cost analysis (cont.)	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical

					examinations, semi-semester and semester
4	2	Distinguish between "cost," "price," and "charge."	Cost analysis (cont.)	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
5	2	1. Calculate the Average Cost-Effectiveness Ratio (ACER) and Incremental Cost-Effectiveness Ratio (ICER). 2. Interpret the Cost-Effectiveness Plane (quadrants of dominance and trade-off). 3. Apply decision rules based on Willingness-To-Pay (WTP) thresholds.	Cost effectiveness analyses (CEA).	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
6	2		1st mid-term examination.	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
7	2	Differentiate CUA from CEA based on the outcome measure .	Cost utility analyses (CUA).	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
8	2	Explain how outcomes are monetized in Cost-Benefit Analysis	Cost-benefit analysis (CBA)	The blackboard, PowerPoint	Reports, assignments, oral and written

				slides, E-Learning	theoretical examinations, semi-semester and semester
9	2	Evaluate the transparency of study assumptions and methodology.	Critical assessment of economic evaluation	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
10	2	Assess the internal and external validity of published economic studies.	Critical assessment of economic evaluation (cont.)	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
11	2		2nd mid-term examination.	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
12	2	Compare the structural designs and data sources used in drug-focused (trial-based) versus disease-focused (natural history) pharmacoeconomic models. Select the appropriate modeling framework based on the decision-making context (e.g., assessing a single product launch vs. developing	Drug-focused versus disease-focused frame work for Conducting pharmacoeconomic analyses.	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

		long-term disease management guidelines).			
13	2		Introduction to epidemiology.	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
14	2	1. Analyze the ethical codes of conduct (e.g., IFPMA) governing interactions with healthcare professionals. 2. Discuss regulations regarding off-label promotion and direct-to-consumer advertising (DTCA).	Project presentation.	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester
15	2	1. Define Digital Marketing and its growing importance in pharma (e-detailing, webinars). 2. Discuss the compliance challenges of social media marketing in healthcare.	Project presentation	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and exams, editorial, reports, etc
- Daily exams and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks

12. Learning and teaching resources	
methodology, if textbooks Required any	Pharmacoeconomics: From Theory to Practice by Renee J.G. R. Arnold, 2nd Edition, 2021.
Main references (sources)	Bootman JL, Townsend RJ, McGhan WF, (Eds.), Principles of Pharmacoeconomics, 2nd ed., Harvey Whitney Books Company, Cincinnati, Oh, latest edition
Recommended supporting books and references (scientific journals, reports)	Pharmaceutical Marketing by Matthew Perri & Brent L. Rollins, 2014
References , websites	

1. Course Name
Applied Therapeutics II
2. Course Code
556 CpTd
3. Semester/Year
Second semester/ fifth year
4. Date this description was prepared
2/9/2024
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours theory / **2 units**
7. Name of course coordinator(s):
Ass. Prof. ali hamid abd-alussain Email: alihamid8282@gmail.com
8. Course objectives
- To improve the knowledge and practice of students in the clinical application of drugs in the treatment of diseases and disorders in different organ systems as well as their causes and diagnosis, and - enable students to integrate clinical pharmacy practice with other health care providers in the clinical setting.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Week	Hours	Required Learning Outcomes	Name of Unit or Topic	Learning Method	Evaluation Method
1	2	**Analyze** the Hypothalamic-Pituitary-Adrenal (HPA) axis and **manage** disorders like Cushing's syndrome and Addison's disease.	Adrenal disorders	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
2	2	**Interpret** thyroid function tests (TSH, T4) and **optimize** pharmacotherapy for hypothyroidism and hyperthyroidism.	Thyroid disorders	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
3	2	**Explain** the pathophysiology of amyloid plaques and tau tangles and	Alzheimer disease	• Whiteboard	• Oral & Written Assignments

		evaluate the efficacy of cholinesterase inhibitors.		• PPT Slides • E-Learning	• Theoretical Exams • Semi-semester & Semester
4	2	**Assess** GAD diagnostic criteria and **compare** first-line treatments (SSRIs, SNRIs) versus benzodiazepines.	Generalized anxiety disorders	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
5	2	**Differentiate** between classes of antidepressants (TCA, MAOI, SSRI) and **monitor** for suicidality and serotonin syndrome.	Depressive disorders	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
6	2	**Contrast** typical and atypical antipsychotics regarding mechanism of action and metabolic side effects.	Schizophrenia	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
7	2	**Recommend** non-pharmacological sleep hygiene techniques and **select** appropriate sedative-hypnotics for short-term use.	Insomnia	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams

					• Semi-semester & Semester
8	2	**Counsel** patients on the efficacy, adherence, and contraindications of combined oral contraceptives vs. LARC methods.	Contraception	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
9	2	**Evaluate** the risks (VTE, breast cancer) versus benefits (vasomotor symptom relief) of Hormonal Replacement Therapy (HRT).	Hormonal replacement therapy	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
10	2	**Design** treatment plans for dysmenorrhea, PMS/PMDD, and amenorrhea using NSAIDs and hormonal agents.	Menstruation related disorders	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
11	2	**Classify** chemotherapeutic agents (alkylating agents, antimetabolites) based on their action within the cell cycle.	Cancer chemotherapy and treatment	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
12	2	**Distinguish** between acute (ALL, AML) and chronic (CLL, CML) leukemias and	Leukemia	• Whiteboard	• Oral & Written Assignments

		discuss targeted therapies like tyrosine kinase inhibitors.		• PPT Slides • E-Learning	• Theoretical Exams • Semi-semester & Semester
13	2	**Interpret** receptor status (ER/PR/HER2) to **guide** adjuvant hormonal (Tamoxifen, AIs) and biological therapy.	Breast cancer	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
14	2	**Review** PSA screening controversies and **manage** Androgen Deprivation Therapy (ADT) for advanced disease.	Prostate cancer	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester
15	2	**Prevent** and **treat** common toxicities including chemotherapy-induced nausea/vomiting (CINV), mucositis, and myelosuppression.	Adverse effects of chemotherapy	• Whiteboard • PPT Slides • E-Learning	• Oral & Written Assignments • Theoretical Exams • Semi-semester & Semester

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, e

- Quizzes and assignments exam 5 M - The mid-term exam 25 marks - The final exam 70 M	
12. Learning and teaching resources	
Required textbooks (methodology, if (any	
Main references (sources))	Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics .
Recommended supporting books and ,references (scientific journals (...,reports	Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy hand book 7th Edittion
References , websites	BNF, Bp and USP

1. Course Name
Therapeutic Drug Monitoring
2. Course Code
556 CpTd
3. Semester/Year
5th Class, 2nd Semester
4. Date this description was prepared
2/9/2025
5. Available Attendance Forms
Physical attendance
Number of units (total) / Number of academic hours (total)
Three units. Two hours of theoretical per week.
7. Name of course coordinator(s):
Ass.Prof. Dr. Abdullah Hameed Maad Email: dr.ph.abdullah.maad@gmail.com
8. Course Objectives

At the end of this course, students are expected to learn

1. How to select the most appropriate medication for an individual.

2. Recommend the dosage regimen that is most likely to achieve the desired therapeutic response with minimum risk of toxic effects and monitor the effect of drug, if appropriate

3. How to manage the dose and dosing regimen in special population with disorders that affect drug pharmacokinetics.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept Mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Example-presentation strategy

10. Course structure

Week	Hour	Required Learning Outcomes	Name of the topic or unit	Learning method	Evaluation method
1	3 2	Apply fundamental PK parameters (Vd, CL, t1/2) to solve dosage calculations. Differentiate between linear and non-linear pharmacokinetics.	Review of basic pharmacokinetic (PK) and pharmacodynamic (PD) Problems in basic Pharmacokinetics (PK)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
2	3 2	Adjust dosage regimens for patients with renal or hepatic impairment. Describe PK changes associated with pediatrics, geriatrics, and obesity.	Clinical PK in special population and cases Problems in basic pharmacodynamic (PD)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
3	2 2	Design initial dosage regimens for Aminoglycosides (e.g., Gentamicin). Calculate peak and trough levels to ensure	Clinical PK/PD for Aminoglycosides Clinical PK equations and calculations	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams

		efficacy and avoid toxicity.			
4	2 2	Optimize Vancomycin dosing based on renal function and body weight. Interpret drug concentration data to adjust therapy in special populations.	Clinical PK/PD for Vancomycin Clinical PK in special population and cases	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
5	2 2	Calculate Digoxin loading and maintenance doses for CHF and AFib. Solve complex clinical cases involving Aminoglycoside and Vancomycin adjustments.	Clinical PK/PD for Digoxin Problems in Clinical PK for Antibiotics (e.g., Aminoglycosides, Vancomycin)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
6	3 2	Manage Phenytoin therapy using Michaelis-Menten (non-linear) kinetics. Correct total Phenytoin levels for hypoalbuminemia and renal failure	Clinical PK/PD for Phenytoin Problems in Clinical PK for Antibiotics (e.g., Aminoglycosides, Vancomycin) cont.	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
7	3 2	Personalize dosing for Carbamazepine (accounting for auto-induction) and Valproic Acid. Solve dosing problems involving Digoxin drug interactions.	Clinical PK/PD for other Anticonvulsants (e.g., Carbamazepine, Valproic Acid, Phenobarbitone/Primidone, Ethosuxsimide Problems in Clinical PK/PD for Cardiovascular agents (e.g., Digoxin, Lidocaine,)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams

8	2 2	Adjust Theophylline dosage for factors like smoking, heart failure, and drug interactions. Analyze Procainamide and NAPA levels to minimize toxicity.	Clinical PK/PD for Theophylline Problems in Clinical PK/PD for Cardiovascular agents (e.g., Procainamide/N-Acetyl Procainamide)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
9	2 2	Monitor Cyclosporine and Tacrolimus trough levels to prevent organ rejection. Apply population PK data to solve non-linear anticonvulsant problems.	Clinical PK/PD for Immunossprasants (e.g., Cyclosporine, Tacrolimus Problems in Clinical PK/PD for Anticonvulsants (e.g., Phenytoin, Carbamazepine, Valproic Acid)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
10	2 4	Calculate IV infusion rates for Lidocaine to achieve steady-state concentrations. Design regimens for long-acting anticonvulsants like Phenobarbital.	Clinical PK/PD for other Cardiovascular agents (e.g., Lidocaine, Procainamide/N-Acetyl Procainamide Problems in Clinical PK/PD for Anticonvulsants (e.g., Phenobarbitone /Primidone, Ethosuxsimide)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
11	2 2	Interpret Lithium serum concentrations for acute vs. maintenance therapy. Solve dose adjustment cases for transplant patients on immunosuppressants.	Clinical PK/PD of other drugs (e.g., Lithium), Anticancer agents, and Anticoagulats Problems in Clinical PK/PD for Immunossprasants (e.g., Cyclosporine, Tacrolimus)	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams
12	2 6	Discuss TDM strategies for Methotrexate and Warfarin (INR monitoring). Integrate PK/PD concepts to manage patients on multiple high-alert medications	Clinical PK/PD of other drugs (e.g., Lithium), Anticancer agents, and Anticoagulats (cont.) Clinical PK/PD of other drugs (e.g., Lithium, Theophylline, Anticancer agents, Anticoagulats	Black board, PowerPoint slides, E-learning, Workshops	Reports, assignment, oral & written exams, mid & final-term exams

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the students such as daily preparation and daily exams, reports, editorials, etc..	
Midterm exam 30 marks Final exam 70 marks	
12. Learning and teaching resources	
Textbooks (if any required)	Bauer LA (Ed.), Applied Clinical Pharmacokinetics. McGraw Hill, New York, 2014
Main references (sources)	- Applied Clinical Pharmacokinetics, Second Edition, 2008 by Larry A. Bauer. - Clinical Pharmacokinetics Concepts and Applications, Third Edition, 1995 by Malcolm Rowland and Thomas Tozer
Recommended supporting books and references (reports, scientific journals)	Winter's Basic Clinical Pharmacokinetics, 7th Edition. Paul Beringer, 2024
Websites, references	

1. Course Name	
Advanced Pharmaceutical Analyses	
2. Course Code	
557 PcAp	
3. Semester/Year	
5th Class, 2nd Semester	
4. Date this description was prepared	
2/9/2024	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
45 hours Theory and Laboratory	
7. Name of course coordinator(s):	
Name: abbas abd-alridha mehihi	Email: abbas-mehihi@alameed.edu.iq
8. Course objectives	
Objectives of the study subject	To study spectrometric methods used for identification and characterization of organic compounds, including UV, IR, MASS and NMR spectroscopy; it enables students to understand the applications of these techniques for qualitative and quantitative analysis of organic compounds.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of Unit or Topic**	**Learning Method**	**Evaluation Method**
1	Th: 3 Lab: 2	Understand the fundamental principles of electronic transitions and describe the components of a UV/Vis spectrophotometer.	• UV / visible spectroscopy; Sample handling and instrumentation; • Introduction & demonstration to visible spectrophotometry.	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
2	Th: 3	Identify chromophores and auxochromes and	• Characteristic absorption of organic compounds;	• lackboard	• Reports, assignments

	Lab: 2	analyze the absorption characteristics of organic compounds.	• Absorption spectra of known colored solution.	• PPT Slides • E-Learning	• Oral/Written Exams • Lab Conduct
3	Th: 3 Lab: 2	Apply Woodward-Fieser rules to calculate the lambda max for conjugated systems.	• Rules for calculation of lambda max and application • Absorption spectra of unknown colored solution.	• lackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
4	Th: 2 Lab: 2	Perform quantitative analysis using Beer-Lambert's Law and solve related spectroscopic problems.	• Application of UV/visible; spectroscopy; Problems and solutions. • Beer's law plot of known solution	• lackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
5	Th: 3 Lab: 2	Explain the theory of molecular vibrations and the physical basis of Infrared (IR) spectroscopy.	• Infra Red spectroscopy (theory) • Beer's law plot of unknown solution.	• lackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
6	Th: 3 Lab: 2	Evaluate the effects of Hydrogen bonding on IR absorption frequencies and	• H-bonding effect; Sampling	• lackboard • PPT Slides	• Reports, assignments

		demonstrate proper sampling techniques.	• Colorimetric assay of tetracycline (FeCl3), known sample.	• E-Learning	• Oral/Written Exams • Lab Conduct
7	Th: 3 Lab: 2	Interpret basic IR spectra to identify the presence or absence of specific chemical bonds.	• Techniques and interpretation of spectra • Colorimetric assay of tetracycline (FeCl3), unknown sample	• lackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
8	Th: 3 Lab: 2	Distinguish characteristic group frequencies for major functional groups (carbonyls, hydroxyls, amines, etc.).	• Characteristic group frequencies of organic compounds • Colorimetric assay of tetracycline (acid), known sample.	• lackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
9	Th: 3 Lab: 2	Deduce chemical structures by integrating IR spectral data with chemical knowledge.	• Application of IR spectroscopy. • Colorimetric assay of tetracycline (acid), unknown sample.	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
10	Th: 3 Lab: 2	Solve complex structural problems using combined spectroscopic data.	• Problems and solutions.	• Blackboard • PPT Slides	• Reports, assignments

			• Colorimetric assay of streptomycin (maltol, known sample).	• E-Learning	• Oral/Written Exams • Lab Conduct
11	Th: 3 Lab: 2	Define the principles of Nuclear Magnetic Resonance (NMR) and distinguish between ^1H and ^{13}C techniques.	• H1 –Nucleomagnetic Resonance (NMR) and C13-NMR spectroscopy; • Colorimetric assay of streptomycin (maltol, unknown sample).	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
12	Th: 3 Lab: 2	Analyze chemical shifts, integration, and spin-spin splitting patterns to determine proton environments.	• Introduction, the nature of NMR absorption, chemical shifts and factors affecting them, information obtained from NMR spectra, more complex spin-spin splitting patterns, application of H1-NMR spectroscopy • Colorimetric assay of streptomycin (oxidized, known sample).	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
13	Th: 3 Lab: 2	Interpret C13-NMR and DEPT spectra to classify carbon atoms (methyl, methylene, methine, quaternary).	• C13-NMR spectroscopy: introduction and characteristics, DEPT C13- NMR spectroscopy. • Colorimetric assay of streptomycin (oxidized, unknown sample).	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct

14	Th: 3 Lab: 2	Describe the ionization process and instrumentation involved in Mass Spectrometry (MS).	• Mass spectroscopy: Introduction and interpreting Mass spectra; • Colorimetric assay of tetracycline (basic, known sample).	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct
15	Th: 3 Lab: 2	Predict fragmentation patterns and identify molecular ions to propose structures for unknown compounds.	• interpreting Mass spectra fragmentation patterns, Mass behavior of some common functional groups.. • Colorimetric assay of tetracycline (basic unknown sample).	• Blackboard • PPT Slides • E-Learning	• Reports, assignments • Oral/Written Exams • Lab Conduct

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Practical exam 20 - The midterm exam is 20 marks - The final exam 60 marks	
12. Learning and teaching resources	
methodology, if textbooks Required any	Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill;
Main references (sources)	Applications of absorption spectroscopy of organic compounds by Dyer JR. 3. Organic Chemistry by McMurry; 5thed; Thomason learning CA, USA 2000.

Recommended supporting books and references (scientific journals, reports)	
References, websites	

1. Course Name	
Hospital training	
2. Course Code	
558 CpHt	
3. Semester/Year	
5st Class	
4. Date this description was prepared	
2/9/2024	
5. Available attendance forms	
Physical attendance	
Number of academic hours (total) / number of units (total)	
60 hours Theory and Hospital wards	
7. Name of course coordinator(s):	
Asst. Lecturer.Ali mohammed jafer Asst. Lecturer Elaaf fadhil hassaan Asst. Lecturer Ahmed Nizar	E. mail: ali.m.jaafar89@gmail.com E. mail: elaaf.fadhil@gmail.com E. mail: ahmad52nazar@gmail.com
8. Course objectives	
Objectives of the study subject	- This module bridges the gap between theoretical knowledge and practical clinical application in a healthcare setting. - Master the daily workflow of the hospital pharmacy, including accurate prescription validation, sterile compounding (IVs/TPN), inventory control, and the strict legal handling of controlled substances. - Apply therapeutic knowledge to identify drug interactions, adjust dosages based on lab results/organ function, and manage adverse drug reactions to ensure patient safety.

	- Develop professional skills in counseling patients on medication use and collaborating effectively with doctors and nurses to optimize treatment plans.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Practical field training strategy -
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure

Wk	Hours	Required Learning Outcomes	Name of the Unit or Topic	Learning Method	Evaluation Method
1	4	1. Define hypertension and classify stages based on current guidelines 2. Explain the pathophysiology of essential and secondary hypertension. 3. Design an individualized pharmacologic and non-pharmacologic treatment plan. 4. Identify first-line agents and compelling indications for specific drug classes.	Hypertension	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
2	4	1. Explain the compensatory mechanisms in heart failure.	Heart Failure	Whiteboard, PowerPoint	Assignments, Oral and written

		2. Apply Guideline-Directed Medical Therapy (GDMT) including Beta-blockers, ACEi/ARNI, MRAs, and SGLT2i. 3. Monitor for drug-related adverse effects and electrolyte imbalances.		slides, Case study	theoretical exams
3	4	1. Explain the balance of myocardial oxygen supply and demand. 2. Differentiate between stable angina, unstable angina, and Prinzmetal's angina. 3. Select appropriate anti-anginal therapy (Nitrates, Beta-blockers, CCBs) for symptom relief. 4. Discuss secondary prevention strategies (statins, antiplatelets).	Ischemic Heart Disease	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
4	4	1. Interpret ECG changes and biomarkers for UA, NSTEMI, and STEMI. 2. Formulate immediate management plans (MONA-B protocol) for ACS. 3. Compare fibrinolytic therapy vs. PCI strategies. 4. Manage long-term dual antiplatelet therapy (DAPT) and anticoagulation.	Acute Coronary Syndrome	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
5	4	1. Compare the pathophysiology and etiology of Type 1 vs. Type 2 Diabetes. 2. Interpret diagnostic criteria (A1C, FPG, OGTT). 3. Design insulin regimens (basal-bolus, sliding scale) and select appropriate oral hypoglycemic agents. 4. Manage acute complications (DKA/HHS) and chronic micro/macrovascular complications.	Diabetes Mellitus	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams

6	4	1. Identify risk factors for Surgical Site Infections (SSI). 2. Select appropriate antimicrobial prophylaxis based on the type of surgery (clean, clean-contaminated, etc.). 3. Determine the correct timing for antibiotic administration and duration of prophylaxis. 4. Discuss the impact of antibiotic resistance in surgical settings.	Surgical site infection and antimicrobial prophylaxis	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
7	4	1. Assess VTE risk using validated scoring systems (e.g., Caprini, Padua). 2. Differentiate between mechanical and pharmacological prophylaxis. 3. Select appropriate agents (LMWH, UFH, DOACs) based on renal function and bleeding risk. 4. Monitor for Heparin-Induced Thrombocytopenia (HIT).	VTE Prophylaxis	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
8	4	1. Identify indications for Stress Ulcer Prophylaxis (SUP) in critically ill patients. 2. Compare the efficacy and safety of PPIs vs. H2RAs. 3. Evaluate the risk of complications associated with acid suppression (e.g., C. diff, pneumonia). 4. Formulate a deprescribing plan when prophylaxis is no longer indicated.	Prophylaxis from GIT Symptoms (Stress Ulcer Prophylaxis)	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
9	4	1. Evaluate perioperative risks for patients with chronic conditions (cardiac, respiratory, endocrine). 2. Determine which medications to hold (e.g., anticoagulants,	Perioperative Medications in Patients with Chronic Diseases	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams

		hypoglycemics) and which to continue pre-operatively. 3. Manage bridging therapy for anticoagulated patients. 4. Assess risk for perioperative adrenal insufficiency.			
10	4	1. Differentiate between crystalloid and colloid solutions for resuscitation. 2. Calculate fluid requirements for burn patients using the Parkland formula. 3. Explain the pathophysiology of burn shock and the systemic response to thermal injury. 4. Manage pain and infection control in burn patients.	Perioperative fluids administration and Burn injuries	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
11	4	1. Describe physiological pharmacokinetic changes during pregnancy (absorption, distribution, metabolism, excretion). 2. Interpret FDA pregnancy risk categories and PLLR labeling. 3. Identify common teratogenic medications to avoid. 4. Discuss general principles of safe medication use during lactation.	Overview of pregnancy	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
12	4	1. Differentiate between threatened, inevitable, and incomplete abortion. 2. Compare medical (e.g., Methotrexate, Misoprostol) vs. surgical management for ectopic pregnancy and abortion. 3. Identify contraindications and monitoring parameters for Methotrexate therapy. 4. Manage Rh incompatibility (Anti-D immune globulin).	Abortion and Ectopic pregnancy	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams

13	4	1. Differentiate Gestational Diabetes (GDM) from pre-existing diabetes. 2. Apply screening and diagnostic criteria for GDM. 3. Design a treatment plan prioritizing lifestyle modifications, Insulin, or Metformin/Glyburide. 4. Discuss maternal and fetal complications of uncontrolled hyperglycemia.	Diabetes Mellitus in pregnancy	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
14	4	1. Classify hypertensive disorders of pregnancy (Chronic HTN, Gestational HTN, Preeclampsia, Eclampsia). 2. Select safe antihypertensives for pregnancy (e.g., Labetalol, Methyldopa, Nifedipine). 3. Manage severe preeclampsia and prevent seizures with Magnesium Sulfate. 4. Recognize signs of HELLP syndrome.	HTN in pregnancy	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams
15	4	1. Identify the stages of labor and agents used for induction (Oxytocin, Prostaglandins). 2. Define Postpartum Hemorrhage (PPH) and its 4 T's etiology (Tone, Trauma, Tissue, Thrombin). 3. Formulate a pharmacologic management plan for PPH (Oxytocin, Methylergonovine, Carboprost, TXA). 4. Discuss pain management options during labor (epidural vs. systemic opioids).	Obstetric hemorrhage and labor	Whiteboard, PowerPoint slides, Case study	Assignments, Oral and written theoretical exams

12. Learning and teaching resources	
methodology, if textbooks Required any	- Pharmacotherapy handbook 12th edition.
Main references (sources)	- Ten Teachers obstetric and gynecology - Andersen D, Billiar T, Brunicardi F, Dunn D, Hunter J, Kao L et al. Schwartz's principles of surgery. 11th ed 2019. - Zeind C., Carvalho M. Applied therapeutics. 11th ed. 2018.
Recommended supporting books and references scientific journals, reports))	
References , websites	

1. Course Name
Drug Delivery Systems
2. Course Code
559 PDdsd
3. Semester/Year
2nd semester/ fifth year
4. Date this description was prepared
27/9/2025
5. Available attendance forms
Physical attendance
Number of academic hours (total) / number of units (total)
30 hours theory and 30 hours practices
7. Name of course coordinator(s):
Name: kamil kareem atyia Email: kamil_altameemi@alameed.edu.iq
8. Course objectives
By the end of this course, students will be able to: 1) Explain the process of new drug development, including drug discovery, preclinical evaluation, early formulation studies, and regulatory submission of INDs, NDAs, and ICH guidelines. 2) Explore the principles and applications of pharmaceutical nanotechnology, including the design and use of liposomes, dendrimers, micelles, solid nanoparticles, and lipid-based delivery systems in modern therapeutics. 3) Describe the anatomical and physiological considerations for non-oral routes of drug delivery, including nasal, ocular, transdermal, and pulmonary routes.

4) Analyze formulation challenges and strategies for improving drug solubility, permeability, bioavailability, and patient adherence across various advanced delivery systems.

5) Evaluate the design, function, and clinical considerations of innovative delivery platforms such as patches, inhalers, eye drops, and nanoparticle-based systems.

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

10. Course structure					
Week	**Hours**	**Required Learning Outcomes**	**Name of the Unit or Topic**	**Learning Method**	**Evaluation Method**
1-3	6	• Differentiate between various methods of drug discovery. • Define pharmacology, drug metabolism, and toxicology. • Describe cGMP organization and personnel. • Identify types of tamper-evident packaging. • Describe preformulation studies needed to characterize a drug substance.	**New Drug Development and Approval Process** Introduction, Drug discovery and drug design, Biologic characterization, Early formulation studies, the investigational new drug application, the new drug application (supplemental, abbreviated), ICH guidelines. *(Ref: Ansel's Ch 2)*	The blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written theoretical examinations, semi-semester and semester [5]
4-7	7	• Explain the principles and applications of pharmaceutical nanotechnology. • Differentiate between nanocarriers such as liposomes, dendrimers, and micelles. • Discuss the formulation of solid nanoparticles and polymer-drug conjugates.	**Pharmaceutical Nanotechnology and Nanomedicines** Introduction, Applications of pharmaceutical nanotechnology, Polymer-drug conjugates, Dendrimers, Micelle systems, Solid nanoparticles, Liposomes, bilayer vesicles and lipid nanoparticles, Microcapsules and	The blackboard, PowerPoint slides, E-Learning [8]	Oral and written theoretical exams, semi-semester and semester [9]

		• Evaluate the use of microcapsules and lipid-based systems[6].	microspheres, Ongoing developments. *(Ref: Aulton's Ch 46)*		
7-9	4	• Describe the anatomy and physiology of the nasal cavity relevant to drug absorption. • Explain the mechanisms and barriers of nasal drug delivery. • Evaluate the design and function of various nasal delivery systems[10].	**Nasal Drug Delivery** Introduction, Anatomy and physiology, Drug delivery, Nasal delivery systems. *(Ref: Aulton's Ch 40)* [11]	The blackboard, PowerPoint slides, E-Learning [12]	Oral and written theoretical exams, semi-semester and semester [13]
9-11	5	• Describe ocular anatomy and barriers to topical absorption. • Formulate liquid and solid ophthalmic preparations. • Explain techniques to increase ocular drug solubility and absorption. • Discuss sterility requirements and patient adherence challenges. • Compare traditional versus	**Ocular Drug Delivery** Introduction, Anatomy/physiology, Common conditions, Topical ophthalmic preparations, Formulating preparations, Barriers to absorption, Increasing solubility/absorption, Sterility, Pharmacokinetics, Targeting posterior segment, Patient adherence. *(Ref: Aulton's Ch 41)*	The blackboard, PowerPoint slides, E-Learning [16]	Oral and written theoretical exams, semi-semester and semester

		new ocular delivery systems.			
12-13	4	• Analyze factors and enhancers affecting percutaneous absorption. • Describe the design features and models of Transdermal Drug Delivery Systems (TDDS). • Evaluate the advantages and disadvantages of TDDS. • Differentiate between transdermal patches, tapes, and systems[18].	**Transdermals and Transdermal Drug Delivery Systems** Introduction, Factors affecting percutaneous absorption, Enhancers, Models, Design features of TDDS, Advantages/disadvantages, Examples of TDDS, Clinical considerations, Patches (not systems), Tapes. *(Ref: Ansel's Ch 11)* [19]	The blackboard, PowerPoint slides, E-Learning [20]	Oral and written theoretical exams, semi-semester and semester
14-15	4	• Explain the physiological principles of inhaled drug delivery. • Formulate therapeutic inhalation aerosols. • Apply methods for aerosol size analysis and evaluation[22].	**Pulmonary Drug Delivery** Inhaled drug delivery, Formulating and delivering therapeutic inhalation aerosols, Methods of aerosol size analysis. *(Ref: Aulton's Ch 39)* [23]	The blackboard, PowerPoint slides, E-Learning [24]	

11. Course evaluation	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams Editorial, reports, etc	
- Daily exams and classroom activities 5 marks - Mid-term exam 25 marks - The final exam 70	
12. Learning and teaching resources	
Required textbooks (methodology, if any)	Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022.
Main references (sources)	Pharmaceutical Dosage forms and Drug Delivery Systems by Howard A. Ansel; 11th edition, 2017.
Recommended supporting books and references (scientific (...,journals, reports	
References , websites	BNF, BP and USP

1. Course Name :
Pharmaceutical biotechnology
2. Course Code:
560 PPb
3. Semester/year:
Second semester/ fifth year
4. The date this description was prepared:
2/9/2025
5. Available attendance forms:
Theoretical
6. Number of academic hours (total) / Number of units (total):
15 hours
7. Name of the course leader (if more than one name is mentioned):
Name: Kamil K. Atiyah Altameemi Email : kamil_altameemi@alameed.edu.iq
8. Course objectives:
- The basic concepts behind biotechnology and its use in providing many therapeutic solutions for many diseases are discussed throughout the course. - Emphasis will be placed on the principles and mechanisms used in developing biotechnology-derived products. - This will be achieved through interactive class discussions. - Prior knowledge of the basics of microbiology and immunology is essential for this course .

9. Teaching and learning strategies:	
- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy - Inductive teaching strategy - Conceptual mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy	**Education strategies**
- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Strategy for providing examples	**Learning strategies**

10. Course structure:

Week	Hours	Required Learning Outcomes	Name of the unit or topic	Learning method	Evaluation method
1	1	• Define biotechnology and its scope in the pharmaceutical industry. • Summarize the historical development of biopharmaceuticals.	Biotechnology-introduction	Blackboard, PowerPoint slides, E-Learning	Reports, assignments, oral and written exams
2	1	• Identify physical and chemical instability issues in biopharmaceuticals. • Discuss pre-formulation requirements for protein drugs.	Formulation considerations of biotechnology product (biopharmaceutical consideration)	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
3	1	• Describe methods for sterilization and depyrogenation. • Explain viral clearance and validation strategies.	Microbial consideration-sterility-pyrogen viral decontamination	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester

4	1	• Select appropriate excipients for protein stabilization. • Evaluate the impact of pH and temperature on formulation.	Formulation materials and considerations	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
5	1	• Explain the mechanism of anti-adsorption agents. • Design buffer systems to maintain protein solubility and stability.	Solubility enhancer-anti adsorption agents buffer components	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
6	1	• Explain the role of osmotic agents in maintaining isotonicity. • Select suitable preservatives for multi-dose biologic formulations.	Preservatives – osmotic agents	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
7	1	• Analyze the advantages and limitations of parenteral delivery. • Discuss formulation requirements for IV, SC, and IM routes.	Route of administration: Parentral route	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
8	1	• Explain enzymatic and permeation barriers to oral protein delivery. • Evaluate strategies to improve oral bioavailability.	Route of administration: Oral route	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
9	1	• Compare nasal and pulmonary routes for systemic delivery. • Discuss absorption mechanisms for transmucosal delivery.	Route of administration: Alternative routes (nasal-pulmonary-rectal-buccal transdermal)	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
10	1	• Evaluate transdermal technologies (e.g.,	Route of administration: Alternative routes	Blackboard, PowerPoint	Oral and written theoretical

		microneedles, iontophoresis). • Assess the feasibility of buccal delivery for peptides.	(nasal-pulmonary-rectal-buccal transdermal) cont.	slides, E-Learning	exams, semi-semester and semester
11	1	• Differentiate PK of large molecules vs. small molecules. • Define key parameters: volume of distribution and clearance for proteins.	Pharmacokinetics of peptides and proteins: Introduction	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
12	1	• Describe the major pathways of protein elimination. • Explain the role of receptor-mediated endocytosis in clearance.	Pharmacokinetic of peptides and proteins: Elimination of proteins	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
13	1	• Explain the mechanism of proteolysis in blood and tissues. • Discuss factors influencing proteolytic degradation rates.	Pharmacokinetic of peptides and proteins: (proteolysis-excretion)	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
14	1	• Analyze specific peptidase activities in different organs. • Evaluate chemical modifications (e.g., PEGylation) to reduce proteolysis.	Pharmacokinetic of peptides and proteins: (proteolysis) cont.	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester
15	1	• Describe renal filtration and metabolism of proteins. • Discuss the impact of molecular size and charge on renal excretion.	Pharmacokinetic of peptides and proteins: (excretion)	Blackboard, PowerPoint slides, E-Learning	Oral and written theoretical exams, semi-semester and semester

11. Course evaluation:	
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and daily, oral, and monthly exams, editorial, reports and etc.	
- Daily exams and classroom activities 5 marks -The mid-term exam is 25 marks - Final exam: 70 marks	
12. Learning and teaching resources:	
Required textbooks (methodology, if any)	Pharmaceutical biotechnology (J A Crommelin Robert D. Syinder)
Main references (sources)	Pharmaceutical biotechnology Fundamentals and Applications 4th Edition by Daan J. A. Crommelin, Robert D. Sindelar, bernd Meibohm. 2013
Recommended supporting books and references (scientific journals, reports,)	https://link.springer.com/978-981-10-4702-2
Electronic references, websites	http://www.sciencedirect.com/science/book/9781907568282

9. Teaching and learning strategies	
Education strategies	- Brainstorming strategy - Teamwork strategy - Discussion strategy - Case study strategy -Inductive teaching strategy - Concept mapping strategy - Practical field training strategy - Self-learning strategy - E-learning strategy
Learning strategies	- Study strategy - Conclusion strategy - Spaced practice strategy - Strategy for switching between ideas - Examples strategy

11. Course structure					
Week	**Hours**	**Learning Objective**	**Name of the unit or topic**	**Learning Method**	**Evaluation Method**
1	4	• Demonstrate proper techniques for venipuncture and specimen collection (urine/stool). • Explain guidelines for specimen transport and handling.	Diagnostic test basics, collecting & transporting specimens, venipuncture, urine specimen, stool specimen.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
2	4	• Perform glucose estimation (Fasting and Post-Prandial). • Conduct and interpret the Oral Glucose Tolerance Test (OGTT).	Biochemical tests: Fasting blood glucose, post-prandial glucose, Oral glucose tolerance test.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
3	4	• Analyze renal function through Blood Urea and Creatinine levels.	Blood urea, Blood creatinine, Creatinine clearance, Uric acid.	Blackboard PowerPoint slides	Reports, assignments, oral and written

		• Calculate Creatinine Clearance to assess GFR.		E-Learning	theoretical examinations, and semester exam.
4	4	• Measure lipid profile components (Cholesterol, Triglycerides). • Assess cardiovascular risk using lipoprotein analysis.	Cholesterol, Lipoproteins, triglycerides.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
5	4	• Determine serum total protein levels. • Measure Bilirubin (Total/Direct) to evaluate liver function and jaundice.	Blood proteins, Bilirubin.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
6	4	• Estimate serum Calcium and Inorganic Phosphate levels. • Analyze electrolyte balance via Serum Chloride measurement.	Calcium, Inorganic phosphate, Serum chloride.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
7	4	• Assay liver enzymes (ALT, AST, ALP) to detect hepatocellular damage. • Measure cardiac/muscle enzymes (LDH, CPK).	Alkaline phosphatase, Acid phosphatase, Alanine aminotransferase, Aspartate aminotransferase, Lactate dehydrogenase, Creatine phosphokinase.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
8	4	• Perform VDRL screening for Syphilis. • Conduct serological tests for Streptococcal infection (ASO) and Hepatitis.	Serological tests: VDRL, ASO-Titer, Hepatitis tests.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
9	4	• Detect inflammatory markers (CRP, RF).	C-reactive protein test, Rheumatic factor test,	Blackboard	Reports, assignments,

		• Perform agglutination tests for Typhoid (Widal) and Brucellosis (Rose Bengal).	Rosebengal test, Typhoid fever test (Widal test), Pregnancy Test.	PowerPoint slides E-Learning	oral and written theoretical examinations, and semester exam.
10	4	• Perform physical, chemical, and microscopic examination of urine. • Identify artifacts and crystals in urine sediment.	General urine examination, urine specimen collection.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
11	4	• Conduct Complete Blood Count (CBC) including RBC and WBC counts. • Calculate RBC indices and evaluate Platelet count.	Hematological tests: RBC count, Hb, PCV, RBC indices, WBC count, Platelets count.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
12	4	• Determine ABO blood groups and Rh factor. • Perform Coomb's test, ESR, and Bleeding Time assessments.	Blood typing, Coombs test, Bleeding time, ESR.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
13	4	• Apply Gram staining and other staining techniques. • Perform basic bacterial culture and sensitivity procedures.	Microbiological tests: culture and sensitivity tests, Staining methods.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.
14	4	• Prepare and sterilize various culture media. • Distinguish between enriched, selective, and differential media.	Culture media, Enriched culture media for general use.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.

15	4	• Identify bacteria using biochemical and morphological tests. • Perform antibiotic susceptibility testing (Disk Diffusion) and interpret zones of inhibition.	Tests for identification of bacteria, Disk diffusion tests of sensitivity to antibiotics, Choice of drugs for disk test, bacterial disease and their laboratory diagnosis.	Blackboard PowerPoint slides E-Learning	Reports, assignments, oral and written theoretical examinations, and semester exam.

11. Course evaluation
Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation and exams, ande ditorial, reports, etc
- Daily exams,preparation and classroom activities 5 marks - The midterm exam is 25 marks - The final exam is 70 marks

12. Learning and teaching resources	
Required textbooks (methodology (if any	- WHO Collaborating center for Applied Biosafety program and research, Lab. Biosafety principle, and practice, an instruction guides for Biosafety training.
Main references (sources)	- Clinical biochemistry and metabolic medicine. - A laboratory guide to clinical hematology. - Laboratory hematology practice Kandice kottke marchant. - - laboratory manual and workbook in microbiology application to patient care
Recommended supporting books ,and references (scientific journals (...,reports	- F.J.Baker, R.E.Silverton. Introduction to medical laboratory technology 7th ed 1998. - Laboratory Quality management system Handbook, WHO, CLSI and CDC.
References , websites	MedlinePlus - Health Information from the National Library of Medicine