Fifth Year- Course Description 2025-2026

1. Course Name:
Organic Pharmaceutical Chemistry IV
2. Course Code:
547 ChPOp4
3. Semester / Year:
1st Semester/5th Year
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
Students' signatures on attendance sheets
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours theory (30) / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Lecturer Dr. Marwan Imad Email: marwan.imad.jihad@bcms.edu.iq
8. Course Objectives

Course Objectives	• Introducing the students to advanced concepts pharmaceutical chemistry such as prodrugs, drug targeting combinatorial chemistry
9. Teaching and Learning Strategies	
Strategy	• Theory lectures with teaching aids such as videos and diagrams

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	• Understanding the concept of prodrugs	• Basic concept of prodrugs; Covalent bonds (cleavable); Prodrugs of functional groups; Types of prodrugs	• Lectures	• Paper-based exams
4-6	6	• Understanding the role of polymers as delivery systems for drugs	• Chemical delivery systems; Polymeric prodrugs; Types and structure of polymers; Cross-linking reagents	• Lectures	• Paper-based exams
7+8	4	• Understanding the concept of targeting drugs to specific tissues and organs	• Drug targeting	• Lectures	• Paper-based exams

8-15	14	• Understanding the concept of combinatorial chemistry and library design	• Combinatorial chemistry; Peptides and other linear structures; Drug like molecules; Support and linker; Solution- phase combinatorial chemistry • Detection, purification and analgesics; Encoding combinatorial libraries; High- throughput screening; Virtual screening; Chemical diversity and library design	• Lectures	• Paper-based Exams

11. Course Evaluation
• 30 M: Theoretical assessment (paper-based midterm exam, attendance) • 70 M: paper-based theoretical final exam 100 Marks total

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Wilson and Gisvold Textbook of Orga medicinal and Pharmaceutical chemis Delgado JN, Remers WA, (Eds); 12thediti 2010
Main references (sources)	Wilson and Gisvold Textbook of Orga medicinal and Pharmaceutical chemis Delgado JN, Remers WA, (Eds); 12thediti 2010
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	
Update percentage	1 % change in the theoretical lectures

Fifth Year- Course Description 2025-2026

1. Course Name:
Industrial Pharmacy I
2. Course Code:
548 PhIp2
3. Semester / Year:
first Semester
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
On campus
6. Number of Credit Hours (Total) / Number of Units (Total):
2 hours/week (Theory) , 2hours/ week (Practical), Total units=4
7. Course administrator's name (mention all, if more than one name)
Theory: Name: Prof. Dr.Alaa Abdul Hussein Email: alaa.abdulhussein@bcms.edu.iq Practical: Name: Assistant lecturer Rana Kadum Email: ranakadum@bcms.edu.iq
8. Course Objectives

Course Objectives	The subject aims to teach pharmacy students the steps and lines Upon which the Per formulation processing of pharmaceutical dosage forms. This fundamental course provides the required principles to integrate knowledge of Pharmaceutical Technology in Per formulation of perfect dosage form. It includes milling, mixing, drying and filtration, besides sterilization to achieve proper processing of dosage for
9. Teaching and Learning Strategies	
Strategy	1-Lectures and Presentation 2-Discussions 3- Laboratory experiments 4- Inverted classrooms

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand the Principles of pharmaceutical processing, mixing	fluid mixing; Flow characteristics; mechanisms of mixing; mixing equipment; batch and continuous mixing	- Lectures -White board -Data show -Power point -Explanatory diagrams -Scientific YouTube videos -laboratory experiments	-Written exams - Oral exams -Laboratory reports
2	3	Knowledge of the mixer and best selection of mixer	batch and continuous mixing; mixer selection.		
3	3	Describe the Milling	pharmaceutical application of milling; size distribution and		

			measurement; Theory of comminution		
4	3	Understand types of mills	types of mills; factors influencing milling; selection of mill techniques and techniques of milling		
5	3	Understand the Drying industrial process	Definition of drying; purpose; Psychrometry (humidity measurement); theory of drying; drying of solids,		
6	3	Define drying equipment's	classification of dryer; specialized drying methods		
7	3	Understand process of Clarification and filtration	Theory; filter media; filter aids; selection of drying method; non- sterile and sterile operations. integrity testing		
8	3	Understand the equipment's and systems (commercial and laboratory) of filtration.	equipment's and systems (commercial and laboratory) of filtration		
9	3	Describe Sterilization; validation of methods; microbial death kinetics	Sterilization; validation of methods; microbial death kinetics		
10	3	To understand Methods of sterilization	Methods of sterilization (thermal and non-thermal); mechanisms; evaluation.		
11	3	Describe Pharmaceutical Dosage forms; sterile products	development; formulation		
12	3	Learn production, processing of sterile product	production; processing; quality control.		

11. Course Evaluation	
Midterm examination 15 marks Quiz and classroom activities 5 marks Practical part 20 marks Final examination 60 Marks arks	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	The Theory and Practice of Industrial Pharmacy by Leon Lachman et al.
Main references (sources)	Pharmaceutics: The Science of Dosage Form Design, by Michael E. Aulton
Recommended books and references (scientific journals, reports...)	Ansel's Pharmaceutical Dosage Forms and Drug Deliv Systems by Loyd Allen
Electronic References, Websites	

Fifth Year- Course Description 2025-2026

1. Course Name:

Applied Therapeutics I

2. Course Code:

549 AClAt1

3. Semester / Year:

First semester/ Fifth Year

4. Description Preparation Date:

09-2025

5. Available Attendance Forms:

On campus

6. Number of Credit Hours (Total) / Number of Units (Total)

3 Hours /3 Units

7. Course administrator's name (mention all, if/ more than one name)

Name: Prof. Dr. Hayder Al-Tukmagi

E-mail: Tukmagi@bcms.edu.iq

8. Course Objectives

Course Objectives

- The course provides students with basic knowledge about pathophysiology, symptoms and aims of treatment.
- In addition to the basic knowledge on the drug's use, kinetics, drug interactions, dose calculations, side effects, treatment algorithms and patient awareness are provided.

9. Teaching and Learning Strategies

Strategy	Lectures Seminars Simple quizzes Brainstorming questions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1. Differentiate between Sensitivity and Specificity of lab tests. 2. Identify reference ranges of lab tests. 3. Identify normal and abnormal liver function tests. 4. Identify normal and abnormal renal function tests. 5. Interpretation of complete blood count test results. 6. Interpretation of urinalysis main findings. 7. Interpretation of hematological lab investigations	Interpretation of clinical laboratory data	Lectures. Discussions.	Simple quizzes.

2	2	1. Identify the common types of lipid disorders. 2. Identify the statin-benefit groups and intensity of statin therapy. 3. Recommend appropriate therapeutic lifestyle changes (TLC) and pharmacotherapy interventions for dyslipidemia. 4. Determine a patient's atherosclerotic cardiovascular disease risk and corresponding treatment goals. 5. Identify patients who are indicated for non-statin therapy. 6. Describe components of a monitoring plan to assess effectiveness and adverse effects of pharmacotherapy for dyslipidemias. 7. Educate patients about the state of the disease, appropriate TLC, and drug therapy required for effective treatment.	Dyslipidemia.	Lectures. Simple discussions.	Simple quizzes.
3	1	1. Differentiate types of cerebrovascular disease including transient ischemic attack (TIA), ischemic stroke (cerebral infarction), and hemorrhagic stroke. 2. Identify modifiable and nonmodifiable risk factors associated with ischemic stroke and hemorrhagic stroke. 3. Explain the pathophysiology of ischemic stroke and hemorrhagic stroke. 4. Describe the clinical presentation of TIA, ischemic stroke, and hemorrhagic stroke. 5. Formulate strategies for primary prevention of acute ischemic stroke. 6. Evaluate treatment options for acute ischemic stroke. 7. Determine whether fibrinolytic therapy is indicated in a patient with acute ischemic stroke. 8. Evaluate the role of endovascular therapy in a patient with acute ischemic stroke. 9. Formulate strategies for secondary prevention of acute ischemic strokes. 10. Evaluate treatment options for acute hemorrhagic stroke.	Stroke.	Lectures. Simple discussions.	Simple quizzes.

4	1	1. Assess a patient's kidney function based on clinical presentation, laboratory results, and urinary indices. 2. Identify pharmacotherapeutic outcomes and endpoints of therapy in patients with acute kidney injury (AKI). 3. Apply knowledge of the pathophysiology of AKI to develop a treatment plan. 4. Develop strategies to minimize the occurrence of drug-induced AKI. 5. Monitor and evaluate the safety and effectiveness of the treatment plan.	Acute kidney injury	Lectures. Simple discussions.	Simple quizzes.
5	2	1. List the risk factors that increase susceptibility for chronic kidney disease (CKD). 2. Explain the mechanisms associated with the progression of CKD. 3. Outline the desired outcomes for treatment of CKD. 4. Develop a therapeutic approach to slow progression of CKD including lifestyle modifications and pharmacologic therapies. 5. Identify specific consequences associated with CKD. 6. Design an appropriate therapeutic approach for specific consequences associated with CKD.	Chronic and end-stage kidney disease.	Lectures. Simple discussions.	Simple quizzes.
6	1	1. Identify indications for dialysis. 2. List advantages and disadvantages of hemodialysis and peritoneal dialysis. 3. Describe the principles and procedures of hemodialysis and peritoneal dialysis. 4. Identify complications of hemodialysis and peritoneal dialysis and their management.	Hemodialysis and peritoneal dialysis.	Lectures. Simple discussions.	Simple quizzes.
7	1	1. Definition of pharmacovigilance. 2. Recognize who should report the pharmacovigilance reports. 3. Describe the importance of pharmacovigilance. 4. Historical events reported ADRs. 5. Describe Causality Assessment. 6. Identify terms used in pharmacovigilance. 7. Identify the importance of pharmacovigilance.	Pharmacovigilance e.	Lectures. Simple discussions.	Simple quizzes.

8	2	1. Explain the pathophysiology of cirrhosis and portal hypertension. 2. Identify signs and symptoms of cirrhosis. 3. Identify laboratory abnormalities that result from liver disease and describe the associated pathophysiology. 4. Describe the consequences associated with decreased hepatic function. 5. Identify treatment goals for a patient with complications of cirrhosis. 6. Recommend a specific treatment regimen for a patient with cirrhosis that includes lifestyle changes, nonpharmacologic measures, and pharmacologic therapy.	Cirrhosis and portal hypertension.	Lectures. Simple discussions.	Simple quizzes.
9	1	1. Differentiate the five types of viral hepatitis by epidemiology, etiology, and clinical presentation. 2. Identify modes of transmission and risk factors among the major types of viral hepatitis. 3. Evaluate hepatic serologies to understand how the type of hepatitis is diagnosed. 4. Create treatment goals for a patient infected with viral hepatitis. 5. Recommend appropriate pharmacotherapy for prevention of viral hepatitis. 6. Develop a care plan for treatment of chronic viral hepatitis.	Viral hepatitis.	Lectures. Simple discussions.	Simple quizzes.
10	1	1. Characterize the pathophysiologic mechanisms underlying inflammatory bowel disease (IBD). 2. Recognize the signs and symptoms of IBD, including major differences between ulcerative colitis (UC) and Crohn disease (CD). 3. Identify appropriate therapeutic outcomes for patients with IBD. 4. Describe pharmacological treatment options for patients with acute or chronic symptoms of UC and CD. 5. Create a patient-specific drug treatment plan based on symptoms, severity, and location of UC or CD.	Inflammatory bowel disease.	Lectures. Simple discussions.	Simple quizzes.

		6. Recommend appropriate monitoring parameters for drug treatments for IBD			
11	1	1. List the types and etiologies of shock syndromes. 2. Describe the major hemodynamic abnormalities that occur in patients with shock. 3. Describe the clinical presentation including signs, symptoms, and laboratory test measurements for the typical shock patient. 4. Prepare a treatment plan with clearly defined outcome criteria for a shock patient that includes both fluid management and pharmacologic therapy. 5. Compare and contrast the relative advantages and disadvantages of crystalloids, colloids, and blood products in the treatment of shock.	Shock syndromes.	Lectures. Simple discussions.	Simple quizzes.
12	2	1. Estimate the volumes of various body fluid compartments. 2. Identify the electrolytes primarily found in the extracellular and intracellular fluid compartments. 3. Describe the unique relationship between serum sodium concentration and total body water (TBW). 4. Review the etiology, clinical presentation, and management for disorders of sodium, potassium, calcium, phosphorus, and magnesium.	Disorders of fluids and electrolytes.	Lectures. Simple discussions.	Simple quizzes.
13	1	1. Describe the epidemiology and social impact of epilepsy. 2. Define terminology related to epilepsy, including seizure, convulsion, and epilepsy. 3. Describe the basic pathophysiology of seizures and epilepsy. 4. Differentiate and classify seizure types given a description of the clinical presentation of the seizure and electroencephalogram. 5. Identify key therapeutic decision points and therapeutic goals in the treatment of epilepsy. 6. Discuss nonpharmacologic treatments for epilepsy. 7. Recommend an appropriate	Epilepsy.	Lectures. Simple discussions.	Simple quizzes.

		pharmacotherapeutic regimen with monitoring parameters for the treatment of epilepsy. 8. Devise a plan for switching a patient from one antiepileptic regimen to a different regimen. 9. Manage potential drug interactions with antiepileptic drugs (AEDs). 10. Determine when and how to discontinue AED therapy.			
14	1	1. Identify risk factors for multiple sclerosis (MS). 2. Distinguish between forms of MS based on patient presentation and disease course. 3. Compare and contrast MS disease-modifying treatment choices for a given patient. 4. Determine appropriate symptomatic treatment choices for a given patient. 5. Develop a monitoring plan for a patient placed on specific medications.	Multiple sclerosis.	Lectures. Simple discussions.	Simple quizzes.
15	1	1. Evaluate patient-specific parameters to determine whether EN is appropriate. 2. Compare clinical efficacy, complications, and costs of EN versus parenteral nutrition (PN). 3. Describe the components of EN and their role in nutrition support therapy. 4. Develop a plan to design, initiate, and adjust an EN formulation for an adult patient based on patient- specific factors. 5. Describe the etiology and risk factors for EN-associated complications in adult patients receiving EN. 6. Select appropriate medication administration techniques for an EN patient.	Enteral nutrition.	Lectures. Simple discussions.	Simple quizzes.
16	1	1. List appropriate indications for parenteral nutrition (PN) in adult patients. 2. Describe the components of PN and their role in nutrition support therapy. 3. Develop a plan to design, initiate, and adjust a PN formulation for an adult patient based on patient- specific factors. 4. Describe the etiology and risk factors for PN macronutrient-associated complications in adult patients	Paren teral nutriti on.	Lectures. Simple discussions.	Simple quizzes.

		receiving PN. 5. Describe the etiology and risk factors for refeeding syndrome, as well as measure to prevent refeeding syndrome.			
17	1	1. Identify risk factors and signs and symptoms of deep vein thrombosis (DVT) and pulmonary embolism (PE). 2. Describe the processes of hemostasis and thrombosis. 3. Determine a patient's relative risk of developing venous thrombosis. 4. Formulate an appropriate prevention strategy for a patient at risk for DVT. 5. Select and interpret laboratory test(s) to monitor antithrombotic drugs. 6. Identify factors that place a patient at high risk of bleeding while receiving antithrombotic drugs. 7. State at least two potential advantages of newer anticoagulants (ie, low molecular weight heparins [LMWHs], fondaparinux, oral direct thrombin inhibitors [DTIs], and oral direct factor Xa inhibitors) over traditional anticoagulants (ie, unfractionated heparin and warfarin). 8. Manage a patient with toxicity secondary to warfarin (elevated international normalized ratio [INR] with or without bleeding). 9. Identify anticoagulant drug–drug and drug–food interactions. 10. Formulate an appropriate treatment plan for a patient who develops a DVT or PE.	Deep venous thrombosis.	Lectures. Simple discussions.	Simple quizzes.
18	2	1. Describe the phases of cardiac action potential. 2. Describe the modified Vaughan Williams classification of antiarrhythmic drugs. 3. Compare and contrast risk factors for and features, mechanisms, etiologies, symptoms, and goals of therapy of (a) sinus bradycardia, (b) atrioventricular (AV) block, (c) atrial fibrillation (AF), (d) paroxysmal supraventricular tachycardia (PSVT), (e) premature ventricular complexes (PVCs), (f)	Arrhythmias.	Lectures. Simple discussions.	Simple quizzes.

		ventricular tachycardia (VT, including torsades de pointes [TdP]), and (g) ventricular fibrillation (VF). 4. Compare and contrast appropriate treatment options for sinus bradycardia and AV block. 5. Compare and contrast mechanisms of action of drugs used for ventricular rate control, conversion to sinus rhythm and maintenance of sinus rhythm in patients with AF. 6. Compare and contrast the advantages and disadvantages of warfarin and the non-vitamin K antagonist oral anticoagulants (NOACs) for prevention of stroke and systemic embolism in patients with AF. 7. Discuss nonpharmacologic methods for termination of PSVT, compare mechanisms of action of drugs used for acute termination of PSVT and compare appropriate treatment options for long-term prevention of PSVT recurrence. 8. Compare and contrast mechanisms of action of drugs used for treatment of acute episodes of VT and describe options and indications for nonpharmacologic treatment of VT and VF. 9. Design individualized drug therapy treatment plans for patients with (a) sinus bradycardia, (b) AV block, (c) AF, (d) PSVT, (e) PVCs, (F)VT (including TdP), and (g) VF.			
19	2	1. Identify characteristics of the types of pain: nociceptive, inflammatory, neuropathic, and functional. 2. Explain the mechanisms involved in pain transmission. 3. Select an appropriate method of pain assessment. 4. Recommend an appropriate choice of analgesic, dose, and monitoring plan for a patient based on type and severity of pain and other patient- specific parameters. 5. Perform calculations involving equianalgesic doses, conversion of one opioid to another, rescue doses, and conversion to a continuous	Pain management.	Lectures. Simple discussions.	Simple quizzes.

		infusion. 6. Educate patients and caregivers about effective pain management, dealing with chronic pain, and the use nonpharmacologic measures.			
20	1	1. Differentiate types of headache syndromes based on clinical features. 2. Recommend nonpharmacologic measures for headache treatment and prevention. 3. Determine when the pharmacologic treatment of headache is indicated. 4. Construct individualized treatment regimens for the acute and chronic management of headache syndromes. 5. Monitor headache treatment to ensure its safety, tolerability, and efficacy.	Headache.	Lectures. Simple discussions.	Simple quizzes.
21	2	1. Describe the pathophysiology of Parkinson disease (PD) related to neurotransmitter involvement and targets for drug therapy. 2. Recognize the cardinal motor symptoms of PD and determine a patient's clinical status and disease progression. 3. For a patient initiating therapy for PD, recommend appropriate drug therapy and construct patient- specific treatment goals. 4. Recognize and recommend appropriate treatment for nonmotor symptoms. 5. Formulate a plan to minimize patient "off-time" and maximize "on-time" including timing, dosage, and frequency of medications. 6. Recognize and treat various motor complications in PD. 7. Construct appropriate patient counseling regarding medications and lifestyle modifications for PD. 8. Develop a monitoring plan to assess effectiveness and adverse effects of treatment.	Parkinson's disease.	Lectures. Simple discussions.	Simple quizzes.
22	1	1. Explain the pathophysiology of benign prostatic hypertrophy (BPH). 2. Recognize the symptoms and signs of BPH. 3. List the desired treatment outcomes for BPH. 4. Identify factors that guide selection of a	Benign prostatic hyperplasia.	Lectures. Simple discussions.	Simple quizzes.

		particular α1- adrenergic antagonist for an individual patient. 5. Compare and contrast α1- adrenergic antagonists versus 5α-reductase inhibitors in terms of mechanism of action, treatment outcomes, adverse effects, and interactions. 6. Describe the indications, advantages, and disadvantages of various combination drug regimens that include an α1-adrenergic antagonist, 5α-reductase inhibitor, anticholinergic agent, tadalafil, or mirabegron. 7. Describe the indications for surgical intervention. 8. Apply the patient care process to develop an individualized treatment plan.			
23	1	1. Identify risk factors for the development of primary open-angle glaucoma (POAG) and acute angle- closure glaucoma. 2. Recommend a frequency for glaucoma screening based on patient-specific risk factors. 3. Compare and contrast the pathophysiologic mechanisms responsible for open-angle glaucoma and acute angle-closure glaucoma. 4. Outline the clinical presentation of chronic open- angle glaucoma and acute angle-closure glaucoma. 5. List the goals of managing patients with POAG suspect, POAG, and acute angle-closure glaucoma. 6. Choose the most appropriate therapy based on patient- specific data for open-angle glaucoma, glaucoma suspect, and acute angle-closure glaucoma. 7. Develop a monitoring plan for patients on specific pharmacologic regimens. 8. Counsel patients about glaucoma, drug therapy options, ophthalmic administration techniques, and the importance of adherence to the prescribed regimen.	Glaucoma.	Lectures. Simple discussions.	Simple quizzes.
11. Course Evaluation					
Midterm exam 25 marks, Quizzes and attendance 5 marks, Final exam 70 marks					

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Clinical pharmacy and therapeutics. Pharmacotherapy handbook. ACCP updates in therapeutics. Pharmacotherapy: A pathophysiologic approach. Pharmacotherapy: principles and practice. Applied therapeutics.
Main references (sources)	Pharmacotherapy: Pathophysiologic approach. Pharmacotherapy: principles and practice. Applied therapeutics. ACCP updates in therapeutics.
Recommended books and references (scientific journals, reports...)	Pharmacotherapy: A pathophysiologic approach. Pharmacotherapy: principles and practice
Electronic References, Websites	Electronic books and review articles.

Fifth Year- Course Description 2025-2026

1. Course Name:
Clinical Chemistry
2. Course Code:
550 AClCc
3. Semester / Year:
First semester / Fifth
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
In-person attendance
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hours theory+ 2 hours practical (75) / 4 units
7. Course administrator's name (mention all, if more than one name)
Theory: Name: Assistant prof. Dr. Zainab Al-Shamaa Email: z.alshamma@bcms.edu.iq Practical: Name: Assistant lecturer Yousef Alwan Email: yousefalwan@bcms.edu.iq
8. Course Objectives

Course Objectives	1) Understanding of human body chemistry in both healthy and diseased states, enabling to diagnose, monitor, and manage disease through laboratory data analysis. 2) Interpreting the results of biochemistry analyses that augment the clinical examination to achieve definite diagnosis of the disease. 3) Evaluating data accuracy and applying this knowledge to therapeutic decision-making and patient care.

9. Teaching and Learning Strategies

Strategy	• Presentation and recitation • Reading & research • Interactive discussions • Brainstorming

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Disorders of Carbohydrates metabolism, Hyperglycemia & Diabetes mellitus, Hypoglycemia	Carbohydrates disorders	Lectures, discussions, and reports	Theoretical exam, and classroom activities
2	3	Understanding the abnormalities in the metabolism of lipids and the laboratory assessment	Disorders of lipid metabolism	=	=

3	3	Understanding of the metabolic, synthetic and excretory functions of the liver and the related disorders; and the laboratory assessment of liver functions	Liver function tests	=	=
4	3	Understanding of the excretory functions of the kidney and its role in maintaining blood hemostasis and elimination of waste products Study of the acute and chronic kidney diseases and the laboratory tests of kidney functions; and types of kidney stones	Kidney function tests	=	=
5	3	Study of different diseases associated with change in Enzymatic Activity in blood	Diagnostic enzymology	=	=
6-7	6	Understand of hormone types, functions and regulation, with special emphasis on the hypothalamic hormones The pituitary gland hormones actions and disorders; and the laboratory analyses of pituitary gland disorders The adrenal gland hormones actions and disorders; and the laboratory analyses of adrenal gland disorders	Hypothalamus & pituitary endocrinology, adrenal gland	=	=
8-9	6	The male and female reproductive glands hormones and the physiologic and pathologic alterations in their levels	Reproductive glands hormones and diseases		
10	3	The thyroid gland hormones actions and disorders; and the laboratory analysis of thyroid gland disorders	Thyroid gland hormones and diseases	=	=
11	3	Drug interaction with	Drug interaction	=	=

		laboratory Tests	with laboratory Tests		
12	3	Disorders of calcium metabolism	Disorders of calcium metabolism		
13	2	Study of different tumor markers in blood that can be used for detection and monitoring tumors	Tumor markers		
14-15	6	Inborn errors of metabolism	Inborn errors of metabolism		

11. Course Evaluation
Midterm examination 15 marks Quiz and classroom activities 5 marks Practical part 20 marks Final examination 60 Marks arks

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1) Crook, Clinical Chemistry & Metabolic Medicine, 8th edition 2) Tietz Clinical Chemistry& Molecular Diagnostics 6th edition; 2018 3) Kaplan,Clinical Chemistry, 5th edition
Main references (sources)	Tietz Clinical chemistry& Molecular Diagnostics 7th edition; 2015.
Recommended books and references (scientific journals, reports...)	Clinical Chemistry, Kaplan 2012
Electronic References, Websites	

Fifth Year- Course Description 2025-2026

1. Course Name:
Hospital training
2. Course Code:
551 AClHt
3. Semester / Year:
Second semester/ Fifth
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
Training in hospital
6. Number of Credit Hours (Total) / Number of Units (Total)
Four hours practical (60) / 2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Kawther Faris Email: kawther.kf@gmail.com Name: Assistant lecturer Ibraheem Kais Email: ibraheem.kais0@bcms.edu.iq Name: Assistant lecturer Ameer Ali Kazal Email: ameerali@bcms.edu.iq
8. Course Objectives

Course Objectives	To teach students the application of pharmacy practice in differ hospital wards; it includes • Training in case evaluation and follow up • Evaluation oftherapeutic regimens and registration of err related to drug therapy and presenting ideas to solve problems
9. Teaching and Learning Strategies	
Strategy	Explaining cases of patients in different hospital wards Discussions with board students in hospital Brainstorming questions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-4	4	To provide the students the essential clinical pharmacy skills with emphasis on dealing with patients, medical charts laboratory information, and clinical monitoring. Thefollowing topics will be covered: (Cardiology, Nephrology, Gastroenterology, Pulmonology, and Endocrinology)	Internal medicine	Explanation of patients cases and discussion with Board students	Quizzes and case presentation

5-8	4	To provide the students the essential clinical pharmacy skills with emphasis on dealing with patients, medical charts, laboratory information, and clinical monitoring. The following topics will be covered: Pediatric Neonatology, Pediatric Nephrology, Pediatric Infections, Pediatric Neurology, Pediatric Cardiology, Pediatric Gastroenterology, Pediatric Respiratory Disorders, and pediatric endocrinology	pediatrics	Explanation of patients cases and discussion with Board students	Quizzes and case presentation
9-12	4	To provide the students the essential clinical pharmacy skills with emphasis on dealing with patients, medical charts, laboratory information, and clinical monitoring. The following topics will be covered: Surgical Prophylaxis, Types of Surgical Operations, Preoperative bowel preparation, Intravenous fluid therapy, Blood transfusion and blood products, Peri-operative care and diabetes, Perioperative medication management, Acute appendicitis, Gallstones, Common bile duct stones, Thyroidectomy, Bowel Obstruction, Pancreatitis, Hernia, Guidelines on Parenteral Nutrition in Surgery.	surgery	Explanation of patients cases and discussion with Board students	Quizzes and case presentation

13-16	4	To provide the students the essential clinical pharmacy skills with emphasis on dealing with patients, medical charts, laboratory information, and clinical monitoring. The following topic will be covered: Abortion, Common Complications of Pregnancy, Induction and Augmentation of labor, Obstetric hemorrhage, Caesarean section, Ectopic Pregnancy, Heavy and irregular Menstruation, Polycystic Ovarian Syndrome, Molar Pregnancy, some drugs that are used in obstetrics and gynecology	Obstetrics gynecology	Explanation of patients cases and discussion with Board students	Quizzes and case presentation

11. Course Evaluation	
34 quizzes, 6 case presentation, 60 final exams.	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Manuals for Clinical Training Adopted by the
Main references (sources)	Manuals for Clinical Training Adopted by Department
Recommended books and references (scientific journals, reports...)	Pharmacy times (journal) Us pharmacist (journal)
Electronic References, Websites	UpToDate resource, Medscape

Fifth Year- Course Description 2025-2026

1. Course Name
Clinical Toxicology
2. Course Code
552 AClCt
3. Semester / Year
1st semester / Fifth year
4. Description Preparation Date:
9-2025
5. Available Attendance Forms
on campus
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours theoretical + 2 hours practical (60) / 3 units
7. Course administrator's name (if more than one name)
Theory: Name: Assistant prof. Elham Mahmood Email: elham.mahmood@bcms.edu.iq practical: Name: Assistant lecturer Muhee Nimma Email: muhee.nimma.salman@bcms.edu.iq

8. Course Objectives	
Course Objectives	Clinical toxicology aims to study the harmful effects of agents and drugs on humans, Study how to diagnose, treat and prevent the harmful effects of toxic substances.

9. Teaching and Learning Strategies	
strategy	Lecturing Homework Quiz

10. Course Structure

The week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Students will be able to study how to assess the general physical health of a person, give clues to possible diseases, and show progress toward recovery.	Vital signs	Lectures	Oral and written exams
2	2	Students will be able to study how to analyses the symptomology, clinical interventions and outcomes of	Metformin toxicity		

		patients presenting with severe metformin toxicity.			
3	2	Students will be able to study *the etiology of* hydrocarbon toxicity .and the typical presentation of a patient with hydrocarbon toxicity.	Hydrocarbon Toxicity		
4	2	Students will be able to study the signs and symptoms of toxicity and treatment of toxicity.	ACEI poisoning		
5	2	Students will be able to study the objective of poison centers and how to reduce morbidity and mortality associated with poisonings.	Poison centers		
6	2	Students will be able to study the caustics and corrosives and how cause tissue injury by a chemical reaction.	Caustics and corrosives		
7	2	Students will be able to study the sign and symptom of toxicity and antidote of toxicity.	Opioid toxicity		
8		Students will be able to study the potential toxicity of NSAIDs	NSAID toxicity		
9	2	Students will be able to study the sign and symptoms of toxicity and treatment of toxicity.	Adrenergic toxicity		
10	2	Students will be able to study the toxicokinetic of cocaine toxicity, physical exam findings for a patient with cocaine toxicity and the management options for cocaine toxicity. the management options for cocaine toxicity	Cocaine toxicity		
11	2	Students will be able to study the most common drugs and chemicals associated with ventricular dysrhythmias and their outcomes.	Dysrhythmia toxicity		
12	3	Students will be able to study the etiology of digoxin toxicity, the	Digoxin toxicity		

		pathophysiology of digoxin toxicity. And the management of digoxin toxicity.			

11. Course Evaluation
15 marks: Theoretical Midterm Exam: 20 marks: Practical 5 marks: Daily Exams Marks arks: final exam 60

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Goldfrank's Toxicologic Emergencies, Ninth Edition
Main references (sources)	Toxicology Recall Toxicology Recall 1st Edition
Recommended books and references (scientific journals, reports...)	
Web sites	

Fifth Year- Course Description 2025-2026

1. Course Name:
Pharmacoeconomics
2. Course Code:
554 AClPco
3. Semester / Year:
2nd semester/ 5th year students
4. Description Preparation Date:
2-9-2025
5. Available Attendance Forms:
Class attendance (on-campus)
6. Number of Credit Hours (Total) / Number of Units (Total)
Two hours theory (30) /2 Units
7. Course administrator's name (mention all, if more than one name)
Name: Lecturer Dr. Humam Tawfiq Hadi Email: humam.hadi@bcms.edu.iq Name: Lecturer Dr. Nawfel Ayad Email: nawfel.ayad@bcms.edu.iq
8. Course Objectives

Course Objectives	Understand the basic terms of Pharmacoeconomics, how to build the model for economic feasibility studies, and how to extract statistical data from clinical studies to include them in the model for the economic feasibility study.

9. Teaching and Learning Strategies	
Strategy	Lecturing Quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1. Introducing Pharmacoeconomic principles. 2. Demonstrate types of healthcare costs with examples 3. Learn about ECHO models for the 3 patient outcome types. 4. Explain and differentiate among the 4 methods of Pharmacoeconomic analyses.	Basic principle of Pharmacoeconomics	Interactive lectures and related articles	Simple quizzes
2	4	1. Identifying costs 2. Types of costs (Direct Medical Costs, Direct Nonmedical Costs, Indirect costs, Intangible costs) 3. Incremental costs and marginal	Cost analysis	Interactive lectures and related articles	Simple quizzes

		costs 4. Opportunity costs 5. How are costs valued? Timin Adjustments for Costs			
3	4	1. Understand the Cost-effectiveness analysis 2. Outcome measures in cost-effectiveness analysis 3. Knowing how to calculate Cost-effectiveness Ratios	Cost-minimizing analysis and Cost effectiveness analyses (CEA).	Interactive lectures and related articles	Simple quizzes
4	4	1. Understand the Cost- Benefit Analysis method. 2. Knowing how to calculate the indirect cost of the disease and indirect benefit of the intervention/program 3. Using Huma Capital Method (HCM). 4. Using HCM to calculate Daily wage rate and Missed days to find out the indirect benefit of the intervention/ management. 5. Describe in detail the Willingness-to-Pay Method (WTP): Hypothetical Scenario & Bidding Vehicles 6. Formats for presenting Cost-Benefit Analysis (CBA) When we should select 7. Cost-Benefit or Cost-Effectiveness Analysis?	Cost-benefit analysis (CBA)	Interactive lectures and related articles	Simple quizzes
5	4	1. Use of decision analysis to design economic evaluations 2. Decision Analysis Structure or tree	Critical assessment of economic evaluation	Interactive lectures and related articles	Simple quizzes
6	4	1. Define Cost of illness 2. Knowing how to calculate Cost of illness 3. Understand the difference between healthcare costs and the cost of illness	Drug-focused versus disease-focused framework for conducting Pharmacoeconomic analyses.	Interactive lectures and related articles	Simple quizzes

7	4	the students should be able to: 1. define epidemiology, describe basic terminology and concepts of epidemiology. 2. identify types of data sources. 3. Identify basic methods of data collection and interpretation.	Introduction to epidemiology.	Interactive lectures and related articles	Simple quizzes
8	2	Cost-Effectiveness project can be assigned to teach students how to understand the terminologies used in published Pharmacoeconomic studies.	Project presentation.		Presentation skills

11. Course Evaluation
4 points for quizzes, 5 points for assignments, 20 points for midterm exam and 70 points for the final exam

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Bootman JL, Townsend RJ, McGhan WF, (Eds.), Principles Pharmacoeconomics, 2nd ed., Harvey Whitney Books Compa Cincinnati, Oh, latest edition Renée J.G. Arnold. Pharmacoeconomics From Theory to Practice. Second Edition, 2021. CRC Press, Boca Raton, FL, USA
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Value in Health Journal Value in Health | Journal | ScienceDirect.com by Elsevier Value in Health Journal Regional Issues https://www.valuehealthregionalissues.com/
Electronic References, Websites	Value in Health Journal and Value in Health Journal Regional Issues

Fifth Year- Course Description 2025-2026

1. Course Name:	
Applied Therapeutics II	
2. Course Code:	
555 AClAt2	
3. Semester / Year:	
Second semester/ Fifth Year	
4. Description Preparation Date:	
9- 2025	
5. Available Attendance Forms:	
On campus	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2 Hours theory (30) /2 Units	
7. Course administrator's name (mention all, if more than one name)	
Name: Prof. Dr. Hayder Al-Tukmagi E-mail: Tukmagi@bcms.edu.iq	
8. Course Objectives	
Course Objectives	• It provides students with basic knowledge about pathophysiology, symptoms and aims of treatment for some cancers, endocrine, gynecological, psychiatric, and neurological disorders • It provides students with basic knowledge about medications use, dose considerations, side effects, treatment algorithms and evaluation of therapeutic outcomes for the disorders
9. Teaching and Learning Strategies	
Strategy	Lectures Seminars Simple quizzes Brainstorming questions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	1. Explain the regulation and physiological roles of hormones produced by the adrenal glands. 2. Recognize the clinical presentation of adrenal insufficiency. 3. Describe the pharmacologic management of acute and chronic adrenal insufficiency. 4. Recommend therapy monitoring parameters for adrenal insufficiency. 5. Recognize the clinical presentation of	Adrenal gland disorders	Lectures and Discussions	Simple quizzes

		Cushing syndrome and the physiological consequences of cortisol excess. 6. Describe the pharmacologic and nonpharmacologic management of Cushing syndrome. 7. Recommend strategies to prevent the development of hypercortisolism and hypercortisolism. 8. Recommend therapy monitoring parameters for Cushing syndrome.			
2	2	1. Explain the major components of the hypothalamic–pituitary– thyroid axis and interaction among these components. 2. Discuss the relationship between serum thyroid- stimulating hormone (TSH) levels and primary thyroid disease, and advantages for the use of TSH levels over other tests such as serum T4 (thyroxine) and T3 (triiodothyronine) levels. 3. Identify typical signs and symptoms of hypothyroidism and consequences of suboptimal treatment. 4. Describe clinical use of levothyroxine (LT4) in the treatment of hypothyroidism. 5. Discuss issues regarding LT4 product bioequivalence and reasons for maintaining patients on the same product. 6. Describe the management of hypothyroidism and hyperthyroidism in special populations, including pregnant women. 7. Identify typical signs and symptoms of hyperthyroidism and consequences of inadequate treatment. 8. Discuss the pharmacotherapy of hyperthyroidism, including advantages and disadvantages of antithyroid drugs	Thyroid gland disorders	Lectures and Discussions	Simple quizzes

		versus radioactive iodine, adverse effects, and patient monitoring.			
3	1	1. Describe the pathophysiology, including genetic and environmental factors that may be associated with AD. 2. Detail the clinical presentation of the typical patient with AD. 3. Explain how nonpharmacologic therapy is combined with pharmacologic therapy for patients with AD. 4. Recognize and recommend treatment options for disease- specific symptoms as well as behavioral/ noncognitive symptoms associated with AD. 5. Educate patients and/or caregivers about the expected outcomes for patients with AD and provide contact information for support/advocacy agencies.	Alzheimer disease	Lectures and Discussions	Simple quizzes
4	2	1. Recognize signs and symptoms of schizophrenia 2. Explain potential pathophysiologic mechanisms that are thought to underlie schizophrenia. 3. Identify treatment goals for a patient with schizophrenia. 4. Recommend appropriate antipsychotic medications based on patient-specific data. 5. Compare side effect profiles of individual antipsychotics. 6. Educate patients and families about schizophrenia, treatments, and the importance of adherence to antipsychotic treatment.	Schizophrenia nia	Lectures and Discussions	Simple quizzes
5	2	1. Explain the etiology and pathophysiology of major depressive disorder (MDD). 2. Identify the signs and symptoms of MDD. 3. Outline the treatment goals for a patient with MDD.	Depressive disorders	Lectures and Discussions	Simple quizzes

		4. Recommend pharmacotherapy given a specific patient with MDD. 5. Develop a monitoring plan for a specific patient with MDD that includes the assessment of efficacy as well as adverse effects. 6. Educate patients and caregivers on the proper use of antidepressant therapy.			
6	1	1. Explain the pathophysiologic mechanisms underlying anxiety disorders. 2. Recognize common presenting symptoms of generalized anxiety disorder (GAD) 3. List treatment goals for patients with GAD. 4. Identify appropriate lifestyle modifications and over-the-counter medication use in these patients. 5. Design a patient-specific pharmacotherapy treatment plan for patients. 6. Develop a monitoring plan for patients with anxiety disorders.	Anxiety	Lectures and Discussions	Simple quizzes
7	1	1. Describe the pathophysiology and characteristic features of insomnia. 2. Recommend and optimize appropriate sleep hygiene and nonpharmacologic therapies for the management and prevention of sleep disorders. 3. Recommend and optimize appropriate pharmacotherapy for insomnia. 4. Describe the components of the patient care process to implement and assess safety and efficacy of pharmacotherapy for insomnia.	Sleep disorders (insomnia)	Lectures and Discussions	Simple quizzes

8	1	1. Discuss the physiology of the female reproductive system. 2. Compare the efficacy of oral contraceptives with that of other methods of contraception. 3. State the mechanism of action of hormonal contraceptives. 4. Discuss adverse effects, risks, and contraindications associated with the use of contraceptives and recommend strategies for minimizing or eliminating such risks. 5. Describe advantages and disadvantages of various contraceptives, including oral and nonoral formulations. 6. Cite important drug interactions that may occur with oral contraceptives. 7. Provide appropriate patient education regarding the use of oral and barrier methods of contraception. 8. Discuss how emergency contraception may be employed to prevent unintended pregnancy.	Contraception	Lectures and Discussions	Simple quizzes
9	2	1. Explain the physiological changes associated with menopause. 2. Identify the signs and symptoms associated with menopause. 3. Determine the desired therapeutic outcomes for patients taking menopausal hormone replacement therapy (MHRT). 4. Explain how to evaluate a patient for the appropriate use of MHRT. 5. Recommend appropriate nonpharmacologic and pharmacologic interventions for menopausal symptoms. 6. Design a monitoring plan to assess the safety and effectiveness of pharmacotherapy	Hormone replacement therapy n post-menopausal women	Lectures and Discussions	Simple quizzes

10	1	1. Describe the underlying etiology of dysmenorrhea, amenorrhea, and anovulatory bleeding. 2. Explain the physiological changes associated with dysmenorrhea, amenorrhea, and anovulatory bleeding. 3. Identify the signs and symptoms associated with dysmenorrhea, amenorrhea, and anovulatory bleeding. 4. Determine the desired therapeutic outcomes for patients with dysmenorrhea, amenorrhea, and anovulatory bleeding. 5. Recommend appropriate nonpharmacologic and pharmacologic interventions for dysmenorrhea, amenorrhea, and anovulatory bleeding. 6. Design a monitoring plan to assess the safety and effectiveness of pharmacotherapy.	Menstruation related disorders	Lectures and Discussions	Simple quizzes
11	2	1. Describe the pathophysiology of cancer. 2. Define the tumor, nodes, metastases (TNM) system of cancer staging. 3. Define prevention and treatment strategies for cancer. 4. Outline actions for all healthcare professionals to prevent medication errors with cancer treatments.	Cancer chemotherapy and treatment	Lectures and Discussions	Simple quizzes
12	2	1. Explain the pathophysiology of certain types of leukemia. 2. Explain the signs/symptoms and laboratory disorders associated with leukemias. 3. Identify underlying considerations that would determine the most appropriate chemotherapeutic regimens for patients having leukemia.	Leukemias	Lectures and Discussions	Simple quizzes

		4. Describe the available treatment options of certain types of leukemias 5. Recognize the treatment complications associated with the therapy of leukemias.			
13	1	1. Explain the risk factors associated with developing breast cancer. 2. Recognize signs and symptoms related to early and late stages of the disease. 3. Distinguish between good and poor prognostic factors. 4. Determine treatment goals for early-stage, locally advanced, and metastatic breast cancers. 5. Explain the available treatment options for breast cancer. 6. Describe the relevance of hormone, HER2, and PD- 1 receptors. 7. Discuss the benefits and risks associated with various therapies.	Breast cancer	Lectures and Discussions	Simple quizzes
14	1	1. Identify risk factors associated with prostate cancer development. 2. Appraise the prognostic- and patient-specific data needed to determine appropriate treatment options. 3. Evaluate pharmacotherapeutic treatment options for different types of prostate cancer. 4. Recognize common adverse effects and formulate a monitoring plan for patients receiving androgen deprivation therapy for prostate cancer based on patient- specific factors and the prescribed regimen. 5. Recognize the common adverse effects and formulate a monitoring plan for patients receiving treatment for metastatic prostate cancer. 6. Provide recommendations for bone health for patients undergoing treatment for prostate cancer.	Prostate cancer	Lectures and Discussions	Simple quizzes

15	1	1. Introduction about common and problematic adverse effects of chemotherapy 2. Recognizing the clinically significant adverse effects 3. Explaining the preventive measures of certain adverse effects 4. Discussing the available therapeutic options of some adverse effects.	Adverse effects of chemotherapy	Lectures and Discussions	Simple quizzes
16	2	1. Explain the pathophysiologic mechanisms underlying bipolar disorder. 2. Recognize the symptoms of a manic episode in patients with bipolar disorder. 3. Identify common psychiatric comorbidities of bipolar disorder. 4. List the desired therapeutic outcomes for patients with bipolar disorder. 5. Identify the optimal use of medications as first-line therapy in bipolar disorder, including appropriate dosing. 6. Recommend drug therapy for acute treatment of mania and depressive episodes. 7. Recommend baseline and routine monitoring for assessment of adverse effects of medications used in the treatment of bipolar disorder. 8. Identify general treatment differences for agents used to treat bipolar disorder in the pediatric population	Bipolar disorders	Lectures and Discussions	Simple quizzes
17	1	1. Identify the risk factors for colorectal cancer. 2. Outline preventive and screening strategies for individuals at average and high risk for colorectal cancer. 3. Recognize the signs and symptoms of colorectal cancer. 4. Describe the treatment options for colorectal cancer based on patient-specific factors, such as stage of	Colorectal cancer	Lectures and Discussions	Simple quizzes

		disease, age of patient, genetic mutations, and previous treatment received. 5. Outline the pharmacological principles for agents used to treat colorectal cancer. 6. Develop a monitoring plan to assess the efficacy and toxicity of agents used in colorectal cancer. 7. Educate patients about the adverse effects of chemotherapy that require specific patient counseling.			
18	2	1. Explain the routes of transmission for human immunodeficiency virus (HIV) and its natural disease progression. 2. Identify typical and atypical signs and symptoms of acute and chronic HIV infection. 3. Identify the desired therapeutic outcomes for patients living with HIV. 4. Recommend appropriate first-line pharmacotherapy interventions for patients with HIV infection. 5. Describe the components of a monitoring plan to assess effectiveness and adverse effects of pharmacotherapy for HIV infection. 6. Educate patients about the state of the disease, appropriate lifestyle modifications, and drug therapy required for effective treatment.	Human immunodeficiency virus	Lectures and Discussions	Simple quizzes
	2	1. Discuss the underlying pathophysiologic mechanisms of the lymphomas and how they relate to presenting symptoms of the disease. 2. Differentiate the pathologic findings of Hodgkin lymphoma (HL), follicular indolent non-Hodgkin lymphoma (NHL), and diffuse aggressive NHL and how this information yields a specific diagnosis.	Lymphoma and multiple myeloma	Lectures and Discussions	Simple quizzes

		3. Describe the general staging criteria for the lymphomas and how it relates to prognosis; evaluate the role of the prognostic systems such as the International Prognostic Score for HL, the Follicular Lymphoma International Prognostic Index (IPI), and the IPI for diffuse, aggressive NHL. 4. Compare and contrast the treatment algorithms for early and advanced stage disease for HL. 5. Assess the role of autologous hematopoietic stem-cell transplantation for relapsed lymphomas. 6. Delineate the clinical course of follicular indolent and diffuse aggressive NHL and the implications for disease classification schemes and treatment goals. 7. Outline the general treatment approach to follicular indolent and diffuse aggressive NHL for localized and advanced disease. 8. Interpret the current role for monoclonal antibody therapy in NHL			
20	1	1. Explain the pathophysiology of Endometriosis. 2. Explain the signs/symptoms of Endometriosis. 3. Outline the general treatment approach	Endometriosis	Lectures and Discussions	Simple quizzes

11. Course Evaluation	
Midterm exam 25 marks, Quizzes and attendance 5 marks, Final exam 70 marks	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if a	Pharmacotherapy Handbook
	1- ACCP Updates in Therapeutics 2- Applied therapeutics
Recommended books and references (scientific journals, reports...)	Review articles
Electronic References, Websites	Medscape

Fifth Year- Course Description 2025-2026

1. Course Name:
Therapeutic drug monitoring
2. Course Code:
556 PhTdm
3. Semester / Year:
Second semester/ Fifth Year
4. Description Preparation Date:
2-2025
5. Available Attendance Forms:
On campus
6. Number of Credit Hours (Total) / Number of Units (Total)
2Hours theory +2-hour practical (60) /3Units
7. Course administrator's name (mention all, if more than one name)
Theory: Name: Assistant lecturer Hussein Ali Email: husseinali@bcms.edu.iq Practical: Name: Assistant lecturer Rana Kadum Email: ranakadum@bcms.edu.iq

8. Course Objectives	
Course Objectives	At the end of this unit, the student should be able to: recognize characteristics of drugs that make them good candidates for TDM, describe appropriate indications for TDM, understand the factors that may affect the measured concentrations list, and discuss the importance of information needed when requesting drug concentration interpret measured drug concentrations adjust dose based on TDM....

9. Teaching and Learning Strategies	
Strategy	Lecture s Seminar Simple quizzes Brainstorming questions

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	1. Discuss the goal of therapeutic drug monitoring. 2. Discuss the need for therapeutic drugs. 3. Identify the four principle biological events associated with	Chapter one: (Clinical Pharmacokinetic and Pharmacodynamic Concepts)	Lectures, Discussions	Simple quizzes

		pharmacokinetics. 4. Identify route(s) that drugs can be eliminated. 5. Define the following: a. TDM b. linear and nonlinear pharmacokinetics c. Pharmacokinetics parameters d. Half-life e. volume of distribution f. clearance			
3-4	4	1. Discuss the applied equations that are used to measure the drug concentration 2. Discuss the applied equations that are used to measure the individualized pharmacokinetic parameters 3. Discuss the equations that are used to measure the dose and loading dose	Chapter two: Clinical Pharmacokinetic Equations and Calculations	Lectures, Discussions	Simple quizzes
	4	1.Discuss the effect of kidney, liver disease, and heart disease on the drug's pharmacokinetics. 2.Discuss the effect of obesity on the pharmacokinetics o f the drug	Chapter Three: Drug dosing in special population	Lectures, Discussions	Simple quizzes
5-6	4	1. Identify why we need to monitor drug concentration for aminoglycoside 2. Determine the applied pharmacokinetics methods and equations to calculate the initial dose 3. Determine the applied pharmacokinetics methods and equations to calculate the individualized dose	Chapter four: Aminoglycoside	Lectures, Discussions	Simple quizzes
7-8	4	1. Identify why we need to monitor drug concentration for vancomycin 2. Determine the applied pharmacokinetics methods and equations to calculate the initial dose 3. Determine the applied pharmacokinetics methods and	Chapter five: vancomycin	Lectures, Discussions	Simple quizzes

		equations to calculate the individualized dose			
9-10	3	1. Identify why we need to monitor drug concentration for digoxin 2. Determine the applied pharmacokinetics methods and equations to calculate the initial dose 3. Determine the applied pharmacokinetics methods and equations to calculate the individualized dose	Chapter six: Digoxin	Lectures, Discussions	Simple quizzes
11-12	3	1. Identify why we need to monitor drug concentration for phenytoin 2. Determine the applied pharmacokinetics methods and equations to calculate the initial dose 3. Determine the applied pharmacokinetics methods and equations to calculate the individualized dose	Chapter seven: phenytoin	Lectures, Discussions	Simple quizzes
13-14	3	1. Identify why we need to monitor drug concentration for valproic acid 2. Determine the applied pharmacokinetics methods and equations to calculate the initial dose 3. Determine the applied pharmacokinetics methods and equations to calculate the individualized dose	Chapter eight: valproic acid		

11. Course Evaluation	
20 midterm exam + 20 Laboratory + 60 Final exam	
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Applied Clinical Pharmacokinetics by Larry
Main references (sources)	Applied Clinical Pharmacokinetics by Larry
Recommended books and references (scientific journals, reports...)	Applied therapeutics
Electronic References, Websites	Review articles

Fifth Year- Course Description 2025-2026

1. Course Name:	
Advanced Pharmaceutical Analysis	
2. Course Code	
557 ChPApa	
3. Semester / Year:	
Second Semester / Fifth Stage	
4. Description Preparation Date:	
9-2025	
5. Available Attendance Forms	
On campus	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours theory +2 hours practical (75)/ 4 units	
7. Course administrator's name (if more than one name)	
Theory Name: Lecturer Dr. Imad Muneeb Email: imad.muneeb@bcms.edu.iq Practical: Name: Assistant lecturer Hasan Fadhil Email: hasan.fadhil@bcms.edu.iq	
8. Course Objectives	
Course Objectives	• Learn about the principles of spectrum • Identify the different spectrum types (UV-FIS), IR, NMR, and Mass. • Uses of the spectrum in identifying organic compounds and medicines. • Enable the student to gain the necessary skills and knowledge to use different spectrometers in order to benefit from them after graduation in drug control laboratories and pharmaceutical factories. • Gain the skills and knowledge necessary to operate advanced devices and interpret the results to prepare qualified pharmacists capable of conducting scientific research. • Training in practical methods for different spectrometry
9. Teaching and Learning Strategies	
Strategy	1- Theoretical lectures covering all aspects of each method 2- Conducting reports and research on the applications of the mentioned methods on chemical compounds and pharmaceutical preparations 3- Display applied videos to help understand the material and gain skill 4- Use of methodological and supporting books 5- Holding scientific sessions in the form of discussions or

	seminars

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3+2	UV / visible spectroscopy	Introduction & demonstration to visible spectrophotometry	Lectures Labs &	Paper exams
2	3+2	UV / visible spectroscopy	Determination of KMnO4/ Beers law	Lectures Labs &	Paper exams
3	3+2	UV / visible spectroscopy	Unknown of KMnO4 + Quiz	Lectures Labs &	Paper exams
4	3+2	Mass Spectrometry	Colorimetric assay of tetracycline using FeCl3	Lectures Labs &	Paper exams
5	3+2	Mass Spectrometry	Unknown of tetracycline using FeCl3method + Quiz	Lectures Labs &	Paper exams
6	3+2	Infrared Spectrometry	Determination of tetracycline in acidic medium	Lectures Labs &	Paper exams
7	3+2	Infrared Spectrometry	Determination of tetracycline in basic medium	Lectures Labs &	Paper exams
8	Midterm Exam				
9	3+2	Infrared Spectrometry	Colorimetric assay of streptomycin by maltol method	Lectures Labs &	Paper exams
10	3+2	Infrared Spectrometry	Colorimetric assay of streptomycin by maltol method	Lectures Labs &	Paper exams
11	3+2	Proton NMR Spectrometry	Unknown of streptomycin by maltol method + Quiz	Lectures Labs &	Paper exams
12	3+2	Proton NMR Spectrometry	IR chart tutorial	Lectures Labs &	Paper exams
13	3+2	C13 NMR	IR chart tutorial	Lectures	Paper exams

		Spectrometry		Labs &	
14	3+2	C13 NMR Spectrometry	IR chart tutorial	Lectures Labs &	Paper exams
15	Review				

11. Course Evaluation

Mid-term written exams 17%

Daily preparation and daily and oral exams 3%

Practical side 20 marks

Final Exam 60 Marks arks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Spectrometric Identification of Organic Compounds by Silverstein, Bassler and Morrill. Applications of absorption spectroscopy of organic compounds by Dyer JR.
Main references (sources)	like mention above
Recommended books and references (scientific journals, reports...)	Organic Chemistry by McMurry; 5thed; Thomason learning CA, USA 2000
Web sites	Google scholar, ResearchGate

Fifth Year- Course Description 2025-2026

1. Course Name:
Clinical Laboratory Training
2. Course Code:
558 AClCl
3. Semester / Year:
2nd semester/5th year
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
Sheets signed by students (training in hospital)
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hours Practical/ 2 unites
7. Course administrator's name
Name: Kawther Faris Email: kawther.kf@gmail.com Name: Lecturer Dr. Nawfel Ayad Email: nawfel.ayad@bcms.edu.iq Name: Assistant lecturer Ibraheem Kais Email: ibraheem.kais0@bcms.edu.iq

8. Course Objectives	
Course Objectives	Learning students about various Tests applied in hospital labs (Biochemical, Hematological, Bacteriological, Virological, General urine exam, general stool exam). Show them the normal values of each studied parameter and teach them how to explain abnormalities in association with clinical symptoms and diseases.
9. Teaching and Learning Strategies	
Strategy	Explain work principles+ Applying the lab examinations + making weekly reports + written and practical quiz+ Visiting specific laboratories in general hospitals to take a look on status situation in lab work field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Importance of laboratory tests, how to make sampling	Diagnostic test basis, collecting and transporting specimen.	Practical	Exam & report
2	4	Glucose situation in the body	Biochemical test: fasting blood glucose, Post prandial glucose, oral glucose tolerance test.	practical	Exam & report

3	4	Kidney function	Blood urea, blood creatinine, creatinine clearance, uric acid.	practical	Exam & report
4	4	Blood lipids situation	Cholesterol, lipoprotein, triglycerides.	practical	Exam & report
5	4	Liver function	Blood proteins, bilirubin.	practical	Exam & report
6	4	Testing blood minerals	Calcium, inorganic phosphate, serum chloride.	practical	Exam & report
7	4	Analysis of protein metabolism	Alkaline phosphatase, acid phosphatase, alanine aminotransferase, aspartate amino transferase, lactate dehydrogenase, creatinine phosphokinase.	practical	Exam & report
8	4	Virology test	Serological tests: VDRL, ASO-titer, hepatitis test.	practical	Exam & report
9	4	Serological tests for infections	C-reactive protein test, Rheumatic factor test, Ros Bengal test, typhoid fever test (Widal test), Pregnancy test, TORCH test.	practical	Exam & report
10	4	Urinalysis	General urine exam, urine specimen collection.	practical	Exam & report
11	4	Stool analysis	General stool exam, stool specimen collection	practical	Exam & report
12	4	Blood analysis	Hematological tests: RBC count, Hb, PCV, RBC indices, WBC count, Platelet count.	practical	Exam & report
13	4	Blood analysis	Blood typing, COMB test, Bleeding time, ESR.	Practical	Exam & report
14	4	Bacteriological and sensitivity test	Microbiological tests: culture and sensitivity test, staining methods, enriched media. VITEK II system	practical	Exam & report
15	4	Applications of Clinical Microbiology	Identifying the most prevalent lab techniques that can be used in diagnostic microbiology	practical	Exam & report

			and correlate that with the most clinical prevalent infections		

11. Course Evaluation
• 40 Marks Quest Practical: (10% Class activity and reports + 5% Oral exam. + 15% practical exam %10+written exam) • 60 Marks final exam _____ • 100 Marks total

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Oxford handbook of Clinical and Laboratory investigation. By: Drew Provan, 4th ed. 2018
Main references (sources)	Manual for laboratory training adopted by the department
Recommended books and references (scientific journals, reports...)	Laboratory tests in general practice. K reports 59 C. By: Gillet Pierr, et al 2007
Web sites	https://labtestsonline.org.uk

Fifth Year- Course Description 2025-2026

1. Course Name:
Drug Delivery Systems Design
2. Course Code:
559ACIDds
3. Semester / Year:
Second semester/ Fifth Year
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
Students' signature on attendance sheet
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours Theoretical /2 units
7. Course administrator's name
Name: Lecturer Dr. Mohammed Jassim Email: mohammed-jassim-neamah@bcms.edu.iq

8. Course Objectives

Course Objectives	1. By the end of this course, students will be able to: 2. Explain the process of new drug development, including drug discovery, preclinical evaluation, early formulation studies, and regulatory submission of INDs, NDAs, and ICH guidelines. 3. 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. 4. Describe the anatomical and physiological considerations for non-oral routes of drug delivery, including nasal, ocular, transdermal, and pulmonary routes. 5. Analyze formulation challenges and strategies for improving drug solubility, permeability, bioavailability, and patient adherence across various advanced delivery systems. 6. 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

Strategy	Lecturing Homework Quiz

10. Course Structure

Week	hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	Introduction, Drug discovery and drug design, Biologic characterization, Early formulation studies, The	New Drug Development and Approval Process Chapter 2	Presentation of lecture Interactive discussions	Discussion Paper-based exams

		investigational new drug application, The new drug application, supplemental, abbreviated, and other applications, international conference on Harmonization of technical Requirements for registration of pharmaceuticals for Human use.	(Pharmaceutical Dosage Forms and Drug Delivery Systems by Howard A. Ansel; 11th edition, 2017)		
4-7	7	Introduction, Applications of pharmaceutical nanotechnology, Polymer-drug conjugates, Dendrimers, Micelle systems, Solid nanoparticles, Liposomes, bilayer vesicles and lipid nanoparticles, Microcapsules and microspheres, Ongoing developments.	Pharmaceutical Nanotechnology and Nanomedicines Chapter 46 (Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022)		
8-9	4	Introduction, Anatomy and physiology, Drug delivery, Nasal delivery systems	Nasal Drug Delivery Chapter 40 (Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022)		
10-11	4	Introduction, Anatomy and physiology of the eye, Some common ocular conditions and pharmacological interventions, Topical ophthalmic preparations, formulating ophthalmic preparations, Topical, liquid ophthalmic preparations, Barriers to topical ocular drug absorption, Increasing drug solubility and absorption in topical ophthalmic preparations, Sterility of ophthalmic preparations, Ocular drug pharmacokinetics. Targeting the posterior segment of the eye. Problems with traditional and new ocular drug delivery	Ocular Drug Delivery Chapter 41(Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022)		

		systems, Patient adherence and instillation of eye drops.			
12-13	4	Introduction, Factors affecting percutaneous absorption, Percutaneous absorption enhancers, Percutaneous absorption models, Design features of transdermal drug delivery systems, Advantages and disadvantages of TDDSs, Examples of transdermal drug delivery systems, General clinical considerations in the use of transdermal and TDDSs, Patches (not systems), Tapes, Examples of transdermal preparations.	Transdermals and Transdermal Drug Delivery Systems Chapter 11 (Pharmaceutical Dosage Forms and Drug Delivery Systems by Howard A. Ansel; 11th edition, 2017)		
14-15	4	Inhaled drug delivery, Formulating and delivering therapeutic inhalation aerosols, Methods of aerosol size analysis.	Pulmonary Drug Delivery Chapter 39 (Aulton's Pharmaceutics; The Design and Manufacture of Medicines; 6th edition, 2022)		

11. Course Evaluation
• 30 Marks Theoretical assessment. (paper-based mid-term exam + quiz + attendance + seminar) • 70 Marks paper-based theoretical final exam _____ Total 100 Marks

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	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.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Fifth Year- Course Description 2025-2026

1. Course Name:
Pharmaceutical Biotechnology (Theoretical)
2. Course Code:
560 Phpb
3. Semester / Year:
2nd Semester/5th year
4. Description Preparation Date:
9-2025
5. Available Attendance Forms:
Students' signature on attendance sheet
6. Number of Credit Hours (Total) / Number of Units (Total)
1 hour Theoretical /1 units
7. Course administrator's name
Theory Name: Assistant lecturer Rana Kadum Email: ranakadum@bcms.edu.iq
8. Course Objectives
Course Objectives Identify the most common therapeutic peptides and proteins derived from biotechnological sources Knowing structure details, formulation requirements, and pharmacist role.
9. Teaching and Learning Strategies

Strategy	Lecturing Homework Quiz

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	Importance and Definition of Biotechnology History of Biotechnology derived product	Biotechnology - introduction	Theoretical lectures.	Paper-based exams
2	1	Recombinant DNA biotechnology.	Formulation biotechnology prod (biopharmaceutical consideration)	Theoretical lectures.	Paper-based exams
3	1	Sterilization (chemical + physical Methods). Chemotherapy.	Microbial consideration-sterile pyrogen ν decontamination	Theoretical lectures.	Paper-based exams

4	1	Types and specifications of excipients used in biotechnological formulation	Excipients of parenteral products –soluble enhancer anti-adsorption age buffer component preservatives – osmotic agents.	Theoretical lectures.	Paper-based exams
5	1	Types and specifications of excipients used in biotechnological formulation	Excipients of parenteral products soluble enhancer anti-adsorption age buffer component preservatives – osmotic agents.	Theoretical lectures.	Paper-based exams
6	1	Formulation requirements according to route of administration	Route of administration Parenteral route Oral route.	Theoretical lectures.	Paper-based exams
7	Mid-term exam				
8	1	Formulation requirements according to route of administration	Route of administration Parenteral route Oral route	Theoretical lectures	Paper-based exams
9	1	Formulation requirements according to route of administration	Route of administration Parenteral route Oral route	Theoretical lectures.	Paper-based exams
10	1	Formulation requirements according to route of administration	Route of administration Alternative routes (nasal-pulmonary rectal-buccal transdermal	Theoretical lectures.	Paper-based exams
11	1	Formulation requirements according to route of administration	Route of administration Alternative routes (nasal-pulmonary rectal-buccal transdermal	Theoretical lectures.	Paper-based exams
12	1	ADME of peptides and proteins Assessments and relationships to pharmacodynamics action	Pharmacokinetic of peptides and protein (Elimination of proteins (proteolysis excretion-metabolism	Theoretical lectures.	Paper-based exams
13	1	ADME of peptides and proteins Assessments and relationships to pharmacodynamics action	Pharmacokinetic of peptides and protein (Elimination of proteins (proteolysis excretion-metabolism	Theoretical lectures.	Paper-based exams

14	1	ADME of peptides and proteins Assessments and relationships to Pharmacodynamics action	Pharmacokinetic of peptides and protein (Elimination of proteins (proteolysis excretion-metabolism	Theoretical lectures.	Paper-based exams
15	Question and answers (Corse review)				

11. Course Evaluation

- 30 MarksTheoretical assessments; (paper-based mid-term exam)
- 70 Markspaper-based theoretical final exam

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100 Marks total

12. Learning and Teaching Resources

Required textbooks	1. pharmaceutical biotechnology Crommelin, Robert D. Syinder
Main references (sources)	1. pharmaceutical biotechnology Crommelin, Robert D. Syinder
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	