

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Department**



Academic Program and Course Description Guide

1st stage Medical Chemistry 2025-2026

Academic Program Description Form

University Name: University of Al-Qadisiyah

Faculty/Institute: College of medicine

Scientific Department:

Academic or Professional Program Name: General Medicine and Surgery

Final Certificate Name: Bachelor's degree in General Medicine and Surgery

Academic System: Annual year / 2 semester

Description Preparation Date: 10/9 /2025

File Completion Date: 16/9/2025

Signature:



Head of Department Name:

Prof Dr. Nael Mohammed

Signature:



Scientific Associate Name:

Prof. Dr. Anwar jassib

The file is checked by: Prof Dr. Anwar jassib
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance

Department:

Signature:



Approval of the Dean

1. Program Vision

Seeking to make the College of Medicine in Al-Qadisyiah University a distinguished college among the medical colleges in Iraq in the field of medical education. Additionally, to make it has a clear imprint in promoting the health field in the Iraqi community and works to provide distinctive proposals and views for basic and clinical medical sciences to ensure meeting the health needs of the community at the local and national levels..

2. Program Mission

Al-Qadisyiah medical college aims at producing medical doctors that are able to participate effectively in the health care delivery system whether in Iraq or any other country
The curriculum is designed to provide students with the necessary knowledge, skills and attitudes in order to function as safe doctors and have the baseline for lifelong learning in the medical field in the future

3. Program Objectives

Continuous development of the scientific research system to identify and diagnose major health problems in the community, propose appropriate scientific solutions to them, and keep pace with development in basic and clinical medical sciences.

4. Program Accreditation

An application has been made for national accreditation for medical colleges

5. Other external influences

Advances in medical science and technology , requiring regular curriculum updates

6. Program Structure				
Program Structure	Number of semester	Credit hours	Percentage	Reviews
Institution Requirements	2	120 h for annual year ,semester I,II (60 h theory and 60 h practical) (2hrs theory+2hrs practical/week)		Basic
College Requirements	2	120 h for annual year , semester I,II (60 h theory and 60 h practical) (2hrs theory+2hrs practical/week)		Basic
Department Requirements	2	120 h for annual year semester I,II (60 h theory and 60 h practical) (2hrs theory+2hrs practical/week)		Basic
Summer Training	Not found			
Other				

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

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
1 ST year	CHR 1203	Medical chemistry	theoretical	practical
			60 h theory for annual year semester I,II (2hrs/week)	60 h theory for annual year semester I,II (2hrs/week)

8. Expected learning outcomes of the program	
Knowledge	
	<p>-Describe the structure and chemical properties , classification, and biological importance of biomolecules (carbohydrates, lipids, proteins, nucleic acids).</p> <p>-Describe the chemical nature and function of enzymes, hormones, and vitamins.</p> <p>-Describe the chemical composition of the cell membrane.</p> <p>Explain the principles of pH, buffers, acid–base balance in body fluids and the control of acid base balance in health and disease</p> <p>-Describe the structure and function of hemoglobin and porphyrins and relate them to oxygen transport and disease.</p>
Skills	
	<p>-understand how alterations in the basic processes can lead to a disease state.</p> <p>Interpret basic laboratory results and case scenarios related to –</p> <p>-diabetes, lipid disorders, protein abnormalities, and vitamin deficiencies.</p> <p>-Identify laboratory instruments, apparatuses and glass ware and their practical uses</p> <p>-Demonstrate problem–solving, communication, and self–learning skills through PBL, seminars, and logbook activities.</p> <p>-Use scientific references and self–learning skills to support understanding of medical chemistry.</p>
Ethics	
	<p>-Apply laboratory safety, quality control, and ethical principles.</p> <p>- Laboratory safety, biosafety, and chemical hazard management</p> <p>- Accuracy, honesty, and integrity in laboratory data recording</p> <p>-Professional responsibility and teamwork in laboratory environments</p>

9. Teaching and Learning Strategies

- The method of lecture and the use of the smart board
 - Readings, self-learning, panel discussions.
 - Exercises and activities in the classroom.
 - Guide students to some websites to benefit from them to develop abilities.
- Ask the students a set of thinking questions during the lectures such as what, how, when and why

10. Evaluation methods

-Theory

- . Written Examination
- . Oral Examination
- practical
- Small group
- reports and activities

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
prof	chemistry	Clinical Biochemistry			3	
prof	MBBS	Clinical Biochemistry			1	
Ass.prof	MBBS	Clinical Biochemistry			1	
Ass.prof.	chemistry	Medical chemistry			1	
Ass. lecturer	chemistry	Inorganic chemistry			1	

Professional Development

Mentoring new faculty members

processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students.

Professional development of faculty members

creating or sustaining a culture of teaching excellence; advancing new initiatives in teaching and learning; and supporting individual faculty members' goals for professional development.

12. Acceptance Criterion

According to the student's central acceptance rate

13. The most important sources of information about the program

- 1- the chemical basis of life by George H schmid
- 2- Clinical biochemistry, 3ed ed. Gaw A, Cowan R, O'Reilly D, Stewart M. 2004.
- 3- Medical biochemistry

14. Program Development Plan

1. Focusing mainly on making medical chemistry lectures more interactive by asking the fundamental questions in medical chemistry "how & why "
2. Reliance on clinical tutors; we recruit recent medical graduates for small groups in teaching lab
3. Focusing more on Sample questions: that should be posted weekly based on the learning objectives for the week for the students to study by themselves.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
1st year	MCH 1203	Medical chemistry	Basic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Course Description Form

1. Course Name:	
Medical chemistry	
2. Course Code:	
MCH 1203	
3. course	
Year: 1st year / annual year 2 semester	
4. Description Preparation	
Date:10/9/2025	
5. Available Attendance Forms:	
Attendance sheet	
6. Number of Credit Hours (Total) / Number of Units (Total)	
60 h theoretical +60 h practical(for semester I, II) / 6 unit	
7. Course administrator's name (mention all, if more than one name)	
Name: Anwar Jasib Almzaiel Email: anwar.almzaiel@qu.edu.iq Name :Ahmed G alziyady Ahmed.Alzaiyady@qu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> • Introduce students to the chemical reactions of life molecules and the metabolic processes that occur inside the human body and how they are in normal and pathological conditions <p>This course also discusses the role of biochemistry in the clinical diagnosis and diagnostic analysis of major diseases affecting organs using different methods, and the interpretation of laboratory results.....</p>
9. Teaching and Learning Strategies	
Strategy	<ul style="list-style-type: none"> • Manage the lecture in a way that feels the importance of time. • The method of lecture and the use of the smart board • Readings, self-learning, discussion panels. • Exercises and activities in the classroom. • Guiding students to some websites to benefit from them to develop capabilities. • Asking students a set of thinking questions during the lectures such as what, how, when and why for specific topics • Sudden daily and weekly continuous tests. • Allocate a percentage of the class for group activities.
10. Course Evaluation	
The method of lecture and the use of the smart board Readings, self-learning, panel discussions. Exercises and activities in the classroom. - Guide students to some websites to benefit from them to develop abilities. Ask the students a set of thinking questions during the lectures such as what, how, when and why	

Type of exam	1 st semester		Mid exam	2 nd semester		final	total
Theoretical	6		20	6	45	100	
Practical	4		0	4	15		
total	10		20	10	60		

11. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Thee chemical basis of life by George H Schmid Armutak, E.I. (2021).
Main references (sources)	Champe PC, Harvey RA Lippincott Illustrative review biochemistry. Lippincott Williams & Wilkins, 4th ED, 2008.
Recommended books and references (scientific journals, reports...)	www.chemicalprocessing.com
Electronic References, Websites	AMBOSS https://pubchem.ncbi.nlm.nih.gov/

Course structure					
Week NO.	Unite name or subject	Required Learning Outcomes	NO of hours /week	Learning method	Evolution methods
First semester					
1st, and 2 nd Week	Aromatic hydrocarbons - Structure of benzene, formulas and nomenclature, properties - Reactions of aromatic hydrocarbons, - Heterocyclic and heteroaromatic compounds Alcohols, Phenols and Ethers - structures, nomenclature, classification, properties and reactions -Oxidation of alcohol in living system	-Explain the structure og aromatic compounds Illustrate the reaction of aromatic compound -Definition and explanation aromatic groups - Heterocyclic and heteroaromatic compounds	2	Theoretical Lectures and practical(PBL) EBM	Summative And formative exam(written, log book ,quizzes
			2		
			2		
3th, and 4th. Weeks	Aldehydes, ketones, Amines and Amides structures, nomenclature, classification, properties and reactions -Addition reaction oAldehydes and ketones in living system		2		
			2		
			2		
3th, and 4th. Weeks	Carboxylic acids, Acid halides and Esters - structures, nomenclature, classification, properties and reactions Condensation reaction in living system	The students are learned to understand the structure of Carboxylic acids and its reactions -	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizzes
			2		

	Aqueous solution and Colloids	Explain the Aqueous solution and Colloids	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizzes
	Acids and Bases	Illustrate the acid and base regarding the following points: - The pH scale, Buffer solutions, Acid-base balance in blood	2		
7th and 8th weeks	Functions of and Classification of carbohydrates - Monosaccharides, Polysaccharides - Optical activity of sugars, Structure of glucose - Reactions of monosaccharides, Glycosides	The students are learned to understand the carbohydrate classification and reactions Explain the glycosides and their importance in living system	2	Theoretical Lectures and practical (PBL)	Summative And formative exam(written, log book ,quizzes
9 th and 10 the weeks	Lipids - Classification of lipids, Functions of lipids - Fatty acids (Saturated and unsaturated fatty acids), Essential fatty acids - Triacylglycerols, Properties - Phospholipids, Glycerophospholipids, Sphingomyelins, cholesterol and heart diseases	Definition and Classification of lipids, Functions of lipids, its types, -describe the fatty acid classification -illustrated the properties of triglycerides , cholesterol and	2		
			2		
(11th., 12th., Weeks	- Structure of proteins (Primary, secondary, tertiary and quaternary structure) - Peptide bond, α -Helix, β -Pleated sheet, Denaturatio	-explain Classification of amino acids, Properties of amino acids - illustrated	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizzes

	Biologically important peptides Classification of Proteins (Functional, chemical nature, Nutritional) - Biologically important peptides	Structure of proteins (Primary, secondary, tertiary and quaternary structure)- - define Biologically important peptides Classification of Proteins (Functional, chemical nature, Nutritional) - Biologically important peptides			
			2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizzes
13 and 14 th weeks	Vitamin vitamins) - Chemistry, absorption, transport, mobilization, biochemical functions, dietary sources, deficiency and hypervitaminosis of Vitamin (A, D, E, K, C	Define vitamins and its biological role Explain the classification of vitamins -illustrated dietary sources, deficiency and hypervitaminosis of Vitamin (A, D, E, K, C	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizzes
			2		
15 th week		review			
Second term					
		Hours			
1st., 2 nd . 3 rd Weeks		-define enzyme and its function -To illustrate the classification of enzymes. -To study t the inhibition and regulation of enzymes -to study the importance of isoenzyme in medicine	2	Theoretical 1 Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizz
	<u>Enzymes</u>		2	EBM	
	- Nomenclature and classification of enzymes				

	<ul style="list-style-type: none"> - Chemical nature and properties of enzymes - Coenzymes, Mechanism of enzyme action - Enzyme inhibition (Reversible, irreversible and allosteric inhibition) - Competitive inhibition, Non-competitive, Enzyme specificity -- Regulation of enzyme activity, Units of enzyme activity, Isoenzymes 				
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4th. 5th.and 6 th Weeks	<p>Nucleic acid Introduction / DNA and RNA structure composition of DNA and RNA Nucleotide & nucleoside structure Structure of DNA Therapeutic applications of nucleosides and oligonucleotides Heredity and DNA replication Translation and the genetic code Mutation</p>	<p>to explain structure of DNA and RNA to explain Therapeutic applications of nucleosides and oligonucleotides illustrated Heredity and DNA replication describe mutation and genetic code</p>	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizz z
			2		
			2		
7th. And 8 th Week	<p>Plasma proteins Separation and components of plasma proteins - Synthesis and functions of Albumin, Clinical significance of Albumin - Globulins, Haptoglobin, Ceruloplasmin, Transferrin and C-reactive protein - Immunoglobulins,</p>	<p>-Define plasma proteins illustrated the synthesis and function of plasma proteins</p>	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, logbook ,quizz
			2		

	Classes of Immunoglobulins (Ig G, Ig A, Ig M, Ig D and Ig E)				
9th and 10th week	Biological Membranes and Transport - Chemical composition and structure of membranes - Transport across membranes - Passive diffusion, Facilitated diffusion and Active transport. - Transport systems, Passive transport of water-osmosis - Transport of macromolecules, - Diseases due to loss of membrane transport systems	Illustrate the structure of plasma membrane Illustrate transport across plasma membrane To describe diseases associated with loss of membrane transport system	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizz
			2		
12th ,13 th and 14th Weeks	Hemoglobin and porphyrins) - Structure of hemoglobin, Myoglobin, Functions of hemoglobin - Binding and transport of O2 and CO2 by hemoglobin, Bohr effect - Hemoglobin derivatives (Methemoglobin and Carboxyhemoglobin) - Structure and nomenclature of porphyrins, Biosynthesis of Heme	explain the structure of hemoglobin illustrated the Bohr effect	2	Theoretical Lectures and practical(PBL)	Summative And formative exam(written, log book ,quizz
			2		
14 th week review					
15 th week	review				

Practical medical chemistry: (60 h Practical + PBL + EBM)

No. of week	Title
1	General Lab. Equipments
2	Biomedical Instruments and Techniques)
3	Biochemical Lab. Safety
4	Qualitative analysis of alcohol
5	Qualitative analysis of aldehyde and ketones
6	Qualitative analysis of carboxylic acid
7	acid -base balance, titration acid –base
8	Qualitative tests for Carbohydrates I ((Molisch, Benedict, Barfoed, Seliwanoff) Differentiation between Reducing and Non-Reducing Sugars
9	Qualitative test of Carbohydrates II ()Detection of Monosaccharides, Disaccharides, and Polysaccharides
10	Clinical Interpretation of Glucose Levels (Diabetes Mellitus Case Scenario Study)
11	Qualitative tests for amino acids I (Biuret, Xanthoproteic, Millon’s, Ninhydrin Tests)
12	Qualitative analysis of amino acids II (Precipitation Reactions of Proteins (pH and Salt Effects)
13	Clinical Interpretation of protein Levels(case scenario study)
14	Separation of amino acids by chromatography
15	Mid exam
16	Qualitative Tests for Lipids (Solubility, Sudan III, Emulsification Tests)
17	Estimation of Total Cholesterol (Enzymatic Method)
18	Clinical Significance of Lipid Profile in heart diseases (case scenario study)
19	- Determination of Enzyme Activity (e.g.of Amylase in Serum
20	Determination of lipase in serum
21	Estimation of gamma globulin in the serum
22	C-reactive protein test
23	Estimation of transferrin
24	Estimation of iron
25	Estimation of copper
26	Estimation of cerulplasmin
27	Estimation of Vit-D in blood
28	Estimation of Vit-C in blood
29	Nucleic acid extraction
30	EBM

Assessment Methods:

the following assessment methods:

1. Written exams (short essay questions ,long essay) to assess the students' knowledge and understanding of the theory.
2. Practical exams (Conduct clinical chemical analyzes (manually) to diagnose associated diseases and determine their concentrations inside the body.
3. Logbook (documentation of the performance of the practical procedure)

1. Formative assessment :

- Examination of the first , second semesters, theoretical and practical - Daily or quick theoretical and practical exams
- Theoretical half-year exams - Theoretical and practical year-end exams - Research evaluation