

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

2nd stage Biochemistry 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:

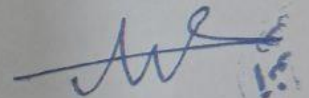


Scientific Associate Name:

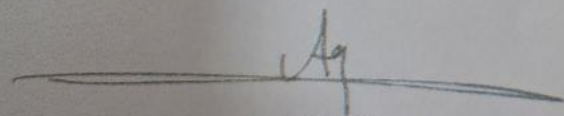
Prof. Dr. Anwar jassib

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-Qadisiyah 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 Qadisiyah 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

The teaching methods are guided by learning objectives that ensure delivering basic biomedical, behavioral and social and clinical subjects which help creating an efficient junior doctor who is competent, motivated and professional.

It is a well-established strategy that students are heard and welcomed to provide feedback about different aspects of the learning process and they are considered as an essential part in the decision making in the college used for continuous planning for improvement of the whole institution.

3. Program Objectives

Graduating distinguished doctors and rehabilitating them scientifically, professionally and ethically so that they can provide health and medical care to individuals, families and society on sound scientific bases and in accordance with the noble moral, social and humanitarian values with great interest in primary health care
- Developing curricula, teaching aids and methods to improve quality based on international quality standards and academic accreditation

- Achieving accreditation through the institutional capacity standards of the college. Achieving academic accreditation standards for student and graduate programs offered by the college

Continuous support for distinguished cadres of faculty members through an academic environment that encourages production and creativity

θ 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

	Number of semester	Credit hours	Percentage	Reviews*
Institution Requirements	2	Total hours 150 for annual year semester I, II(90 h theory and 60h practical)		Basic
College Requirements	2	Total hours 150 for annual year semester I, II(90 h theory and 60h practical)		Basic
Department Requirements	2	Total hours 150 for annual year semester I, II(90 h theory and 60h practical)		Basic
Summer Training	Not found			
Other	Basic course			

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

7. Program Description				
Year/Level	Course Code	Course Name	Credit Hours	
2 nd year	BIO 2203	Biochemistry	theoretical	practical
			Total 90h for annual year semester I, II	60h total for annual year semester I,II

8. Expected learning outcomes of the program	
Knowledge	
	<ul style="list-style-type: none"> -Acquired knowledge on metabolism of macromolecules (carbohydrates, lipids, proteins, and nucleic acids) in physiological and pathological conditions -Describe the metabolic regulation (role of enzymes and hormones) -To outline the molecular mechanisms of gene expression, the principles of the genetic organization of mammalian genome and synthesis of DNA, RNA and proteins. -To explain biochemical basis of disease. -To outline the biochemical basis of cancer & carcinogenesis. - Use scientific resources for self-learning in biochemistry
Skills	
	<ul style="list-style-type: none"> -To make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening & diagnosis. -Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates, lipid and proteins with using laboratory and diagnostic data in clinical decision-making -Correlate biochemical results with clinical conditions -Demonstrate problem-solving, communication, and self-learning skills through PBL, seminars, and logbook activities.
Ethics	
	<ul style="list-style-type: none"> -ethical use of human blood, tissues, and body fluids in biochemical investigations -Informed consent and confidentiality in clinical biochemistry testing -Accuracy, validity, and integrity in biochemical laboratory data reporting -Ethical interpretation and communication of laboratory results

	-Biosafety, biosecurity, and infection control in biochemical laboratories -
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9. Teaching and Learning Strategies
<ul style="list-style-type: none"> -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. <p>Ask the students a set of thinking questions during the lectures such as what, how, when and why</p>

10. Evaluation methods
<ul style="list-style-type: none"> - <u>Theory</u> . Written Examination - Oral Examination - <u>practical</u> - 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	
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
<ol style="list-style-type: none"> 1- Harpers Illustrated Biochemistry, 28th Ed., Hill Companies, Inc, 2009 2- Clinical biochemistry, 3ed ed. Gaw A, Cowan R, O'Reilly D, Stewart M. 2004. 3- Champe PC, Harvey RA Lippincott Illustrative review in biochemistry. Lippincott Williams &Wilkins, 4th ED, 2008.

Program Development Plan

1. Focusing mainly on making biochemistry lectures more interactive by asking the fundamental questions in biochemistry “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
2 nd year	BIO 2203	Biochemistry	Basic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

Course Description Form

1. Course Name:	
biochemistry	
2. Course Code:	
BIO 2203	
3. Semester /	
Annual year , 2 semester / Year: 2nd year	
4. Description Preparation	
Date:15/9/2025	
5. Available Attendance Forms:	
Official working hours	
6. Number of Credit Hours (Total) / Number of Units (Total)	
150h for annual year , semester I,II (90 h theory and 60h practical) / 8 unit total	
7. Course administrator's name (mention all, if more than one name)	
<p>Name: Anwar Jasib AlmzaieI Email: anwar.almzaieI@qu.edu.iq Name: Ferdous. A. Alturaih Email:Ferdous.alturaihy@qu.edu.iq q Name: Buthainah A..alazzawi buthainah.alazzawi@qu.edu.iq Name: Ajil A. alzamily Email:"ajil_alzamily@qu.edu.iq Name: ajil_alzamily Name: haider. A Jabbar alammar Email:haider.alammar@qu.edu.iq</p>	
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 style="text-align: center;">This course also discusses the rol biochemistry in the clinical diagn and diagnostic analyzes of m diseases affecting organs u different methods, and interpretation of laboratory results...</p> <ul style="list-style-type: none"> •
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	
<p>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.</p>	

Ask the students a set of thinking questions during the lectures such as what, how, when and why

The grading system for the course will be as follows: -Pass mark = 50%

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

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Harpers Illustrated Biochemistry, 28th Ed., Hill Companies, Inc, 2009
Main references (sources)	Martin A Crook , Clinical biochemistry and metabolic medicine , Hodder Arnold , 4th ed. Lippincott's Illustrated Reviews: Biochemistry integrates summarizes the essentials of medical biochemistry, 4th Ed
Recommended books and references (scientific journals, reports...)	www.chemicalprocessing.com
Electronic References, Websites	AMBOSS https://pubchem.ncbi.nlm.nih.gov/

Course structure

Blue print for biochemistry /grade two/college of medicine /university of college										
Week NO.	lecture name	Specific objective	hours	Assessment Method						Total weight (marks)
First semester				Summative			formative			
				Writ ten	pra ctical	log bo ok	qu izz es	Group discus sion	ho me wor k	
1st, 2nd, 3rd, 4th and 5th, Week)	Carbohydrate CHO Metabolism	Explain the digestion of dietary CHO and how this is accomplished	2	x	x	x	x	x	x	17
		Illustrate the overall purpose of glycolysis • Definition and explanation of aerobic and anaerobic glycolysis and citric acid cycle	2	x	x	x	x	x	x	
		Definition of glycogen, its sites and role in glucose homeostasis	1	x	x	x	x	x	x	
		Describe the overall purpose of glycogenesis and glycogenolysis and their contribution to blood glucose regulation	2	x	x	x	x	x	x	
		explanation of glycogen storage disease and its types.	1	x	x	x	x	x	x	
		Explain hormonal regulation of blood glucose	2	x	x	x	x	x	x	
		Illustrate the Pentose phosphate pathway	1	x	x	x	x	x	x	
		Definition of Glucose 6 Phosphate Dehydrogenase Deficiency (G6PDD) disease	1	x	x	x	x	x	x	
		Explain the role of liver and other organs in buffering of	1	x	x	x	x	x	x	

		blood glucose								
		Diabetes mellitus types and complications	2							
	LIPID Metabolism	Illustrate how lipid, are digested and absorbed	1	x		x	x	x		
6th, 7th and 8th. Weeks	SYNTHESIS OF TRIGLYCERIDE	The students are learned to understand the Triglycerides metabolism including the following points: -Synthesis of Triglycerides - Source of glycerol -3- Phosphate	1	x		x	x	x	x	
		- Function of TG		x		x	x	x	x	
	fatty acids	The students are learned to understand the SYNTHESIS OF THE FATTY ACIDS including the following points:Transportation of acetyl CoA. -Formation of malonyl CoA. -Fatty acid synthase multienzyme complex Interrelationship between glucose metabolism and palmitate synthesis - Elongation and Desaturation of the fatty acids chain -Regulation of lipogenesis -Illustrate NADPH Sources	1	x	x	x	x	x	x	
				1	x		x	x	x	x
				1	x		x	x	x	x
				1	x		x	x	x	x
		Explain the OXIDATION OF THE FATTY ACIDS including the following Carnitine shuttle and causes of carnitine deficiency - Beta oxidation pathway - Oxidation of the Fatty Acids with Odd Number of C atoms - Oxidation of the unsaturated Fatty Acids Ketone bodies, Ketogenesis	1	x		x	x	x	x	
				1	x		x	x	x	x
					x		x	x	x	x

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	CHOLESTROL METABOLISM	Illustrate the Cholesterol Metabolism regarding the following points: - Biosynthesis of Cholesterol and degradation and metabolism	1	x	x	x	x	x	x
				x		x	x	x	x
9th 10th Weeks	Lipoproteins	Definition of lipoproteins; their structure, classification, composition, and functions	1	x	x	x	x	x	X
		Explain the Metabolism of Lipoprotein	1	x		x	x	x	x
	SPHINGOLIPID S	The students are learned to understand the Sphingolipids metabolism	1	x		x	x	x	
	PHOSPHOLIPIDS	Definition of phospholipid, its types, synthesis, function, and degradation	1	x		x	x	x	x
	. Disorders of lipid metabolism	-illustrate types of hyperlipidemia and explanation of each type -Description of fatty liver and illustrate the effect of alcohol on the lipid metabolism	2	x		x	x	x	x
	AMINO ACID metabolism	Amino acid pool, Transamination, Mechanism of transamination, Deamination-Catabolism of amino acids including amino acids pool and removal of amino group by transamination	1	x		x	x	x	x
(11th., 12th., 13th. 14 th Weeks		-diagnostic importance of aminotransferase enzymes	1	x		x	x	x	x
	Urea Cycle	Describe the Urea Cycle, Reaction, regulation, Integration of Urea Cycle - Disposal of urea, Metabolic disorders of urea cycle	1	x	x	x	x	x	x
	AMINO ACID CARBON SKELETON	Define ketogenic and glucogenic amino acids, and list them as exclusively ketogenic, glucogenic, or both	1	x		x	x	x	
									15

	BIOSYNTHESIS OF NONESSENTIAL AMINO ACIDS	Define the nonessential a.a and list them • Explain the biochemical reactions of nonessential a.a synthesis	1	x		x	x	x	x
	AMINO ACID METABOLISM DISORDERS	Explain The biochemical basis of inborn errors of amino acid metabolism including the deficient enzyme,	1	x		x	x	x	x
	Conversion of amino acids to specialized products	Describe porphyrin and heme synthesis • Definition of porphyria and its types	1	x		x	x	x	x
	OTHER NITROGEN - CONTAINING COMPOUNDS	Describe Other nitrogen containing compounds catecholamine, its biological role ,its synthesis and catabolism	1	x		x	x	x	x
	inborn errors of amino acid metabolism	explain The biochemical basis of inborn errors of amino acid metabolism including the deficient enzyme,	1	x		x	x	x	x
	15 th week								
Second semester									
1st., 2nd., 3rd. Weeks		definition of hormones and their general functions		x		x	x	x	x
	Introduction to	To illustrate the classification of hormones.		x		x	x	x	x
									10

	hormones	To verify the second messengers of hormones. • study the basic principles of hormone action		x		x	x	x	x
		Explanation of feedback control mechanism		x		x	x	x	x
				x		x	x	x	x
	Hypothalamic	Listing hormones released by the hypothalamic gland and their control of the pituitary gland		x		x	x	x	x
		Hypothalamic and pituitary hormones, hypothalamic hormones		x		x	x	x	x
	Pituitary hormones	To study the control of pituitary hormones secretion. Describe the anterior pituitary hormone secretion regarding chemistry, control, effects and pathophysiology		x		x	x	x	x
	. Posterior Pituitary	To study the chemistry, control, effects and pathophysiology of oxytocin secretion		x		x	x	x	x
	Thyroid gland	Describe thyroid hormone secretion regarding chemistry, control, effects and pathophysiology.		x	X	x	x	x	x
	The adrenal gland	To explain the biosynthesis of hormones that secreted from the adrenal cortex and their function		x		x	x	x	x
		The Pancreas	study the pancreatic islet hormone secretion. • study the control of insulin secretion and effects of insulin. • Illustrate the secretion and effect of glucagon secretion		x		x	x	x
4th.and 5th. Weeks									
	Water, electrolyte and acid-base balance	to explain Water and life, Functions and Distribution of water, water turnover and balance	1	x	x	x	x	x	x
		to explain Electrolyte Osmolarity and osmolality of body fluids	1	x	x	x	x	x	x
illustrated Acid-base balance, Maintenance of blood pH, Blood buffers		2	x	x	x	x	x	x	
									5

		describe Disorders of acid-base balance, Metabolic and respiratory acidosis	2	x	x	x	x	x	x	
6 th week	Liver functions	Describe the basic function of the liver related to metabolic , synthetic and excretory functio	1	x	x	x	x	x	x	
		Illustrate the metabolism of bilirubin and it types • Definition of jaundice	1	x	x	x	x	x	x	
		Describe the various types of hepatitis, their pathology and investigations that asses in diagnosis	1	x	x	x	x	x	x	5
7th. Week	Kidney functions	Definition of renal glomerular test and explanation of how to determine GFR	1	x	x	x	x	x	x	
		Definition of clearance tests and mention the common types • Definition of tubular function and illustrate the Isosmotic transport and Ion exchange processes	1	x	x	x	x	x	x	
		Definition of Chronic kidney disease ,its causes and biochemical changes	1							5
8th week	Cancer and tumor markers	Define Chemical carcinogens, Radiation energy, Molecular basis of cancer	1	x		x	x	x	x	
		Mechanism of action of oncogenes, Antioncogenes		x		x	x	x	x	
		explain Tumor markers, characteristics of growing tumor cells	1	x		x	x	x	x	
		illustrated Metabolic aspect of malignant disease	1	x		x	x	x	x	
		Cancer therapy, Prevention of cancer		x		x	x	x	x	
									5	
9th and 10th week	Plasma enzymes in diagnosis (clinical enzymology	Enzymes will be discussed regarding their biochemistry, sites ,causes of abnormal level and their role in diagnosis of different diseases a) Amylase b) b. Lipase c) c. Alkaline	1	x	x	x	x	x	x	5

		phosphatase							
		Illustrate the role of cardiac enzymes in the diagnosis of myocardial infarction the time sequence of their changes	1	x	x	x	x	x	x
		Illustrate Enzyme in Bone disease, and hepatic disease	1	x	x	x	x	x	x
		Enzyme in malignancy and hematological disease		x	x	x	x	x	x
11th and 12th Weeks	Metabolism of nucleotides	Definition of Functions of nucleic acids, Components of nucleic acids - Nucleotides(Structure, Nomenclature) (Sugars, Purines and pyrimidines)	1	x		x	x	x	x
		Describe the biosynthesis of the purine and pyrimidine.	1	x		x	x	x	x
		Explain the salvage pathways for purine and pyrimidin	1	x		x	x	x	x
		Regulation of purine and pyrimidines nucleotide biosynthesis	1	x		x	x	x	x
		- Degradation of purine and pyrimidines nucleotides	1	x		x	x	x	x
		inborn errors and disorders of purine and pyrimidines metabolism	1	x		x	x	x	x
									10
13th and 14th Weeks	Nucleic acid DNA-replication, Transcription, Translation genetic code	Explain Expression of genetic information		x		x	x	x	x
		illustrated DNA Replication and repair		x		x	x	x	x
		describe RNA Synthesis, Processing & Modification		x		x	x	x	x
		illustrated Protein Synthesis and genetic code		x		x	x	x	x
		define Recombinant DNA& Genomic Technology		x		x	x	x	x
									5
15 th week									

List of Experiments and PBL Activities

No.	Title	Remarks / Signature
1	Introduction and Principles of Spectrophotometer (Measuring of Sample)	
2	Estimation of Blood Sugar	
3	Oral Glucose Tolerance Test (OGTT)	
4	Estimation of HbA1c	
5	PBL: Type 2 Diabetes Mellitus (Case Scenario)	
6	Estimation of Serum Triglycerides	
7	Serum HDL Test	
8	Serum LDL Test	
9	Serum Total Cholesterol	
10	PBL: Hyperlipidemia (Case Scenario)	
11	Estimation of Ketone Bodies	
12	Estimation of Serum Total Proteins	
13	Blood Urea Test	
14	Serum Creatinine Test	
15	Serum Bilirubin Test	
16	PBL: Jaundice (Case Scenario)	
17	Thyroid Function Tests	
18	Serum LDH Test	
19	Serum AST and ALT Tests	
20	Serum Creatine Kinase Test	
21	PBL: Myocardial Infarction (Case Scenario)	
22	Serum Calcium Test	
23	Serum Inorganic Phosphate Test	
24	Serum Uric Acid Test	
25	PBL: Gout (Case Scenario)	

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)
4. 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

The minimum passing grades (Faculty bylaws) is 50 marks.

Re-sit Examinations :- Students who fail in a in the annual year assessment will be required to re-sit (second sitting) the Final examination (theory and practical exam) .