



الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة ٢١ سبتمبر للعلوم الطبية والتطبيقية
كلية الطب المخبري
قسم الكيمياء الحيوية
وحدة التطوير وضمان الجودة

Republic of Yemen
Ministry of Higher Education & Scientific Research
21 SEPTEMBER UMAS
Faculty of Faculty of Laboratory medicine.
Department of Biochemistry
Unite of Development & Quality assurance

Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIED SCIENCES



Faculty of Laboratory medicine.

Department Of Biochemistry and Molecular Biology

**Course Specification of Medical Biochemistry II
(Metabolism)**

**Course No. (03.01.313)
2023/2022**

Course name : Medical Biochemistry II (Metabolism)

I. Course Identification and General Information:					
1	Course Title:	Medical Biochemistry II (Metabolism)			
2	Course Code & Number:	03.01.313			
3	Credit Hours:	Theory Hours			
		Lecture	Exercise	Practical	Credit Hours
		2	0	2	3
4	Study Level/ Semester at which this Course is offered:	2 nd Level / 2 nd Semester			
5	Pre –Requisite (if any):	Biochemistry I			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Laboratory Medicine			
8	Language of Teaching the Course:	English			
9	Study System:	Semester			
10	Mode of Delivery:	Regular			
11	Location of Teaching the Course:	University Campus			
12	Prepared by:	Dr.Nawal Al-Henhena			
13	Date of Approval:	2022-2023			

	II. Course Description:
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This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:		
a1	Describe the metabolic pathways of carbohydrates, lipids, proteins and nucleotides.	A1
a2	Mention the steps and regulatory mechanisms of metabolic pathways	A3
a3	Define the related metabolic disorders and their clinical prints on biochemical and molecular basis	A3
B. Intellectual Skills: Upon successful completion of the course, students will be able to:		
b1	Interpret symptoms, signs, biochemical laboratory finding of some metabolic disorders	B3
b2	Correlate causes, mechanisms and effects of diseases based on knowledge of metabolism	B1
C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to and Assessment Strategies:		
c1	Perform clinical laboratory tests commonly encountered in metabolic pathway	C1
D. Transferable Skills: Upon successful completion of the course, students will be able to:		
d1	Use information technology in laboratory medicine and scientific research.	D1

C. Alignment Course Intended Learning Outcomes with Teaching Strategies and Assessment methods :		
(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies

a1	Describe the metabolic pathways of carbohydrates, lipids, proteins and nucleotides.	Lectures	Exam
a2	Mention the steps and regulatory mechanisms of metabolic pathways	Lectures	Exam
a3	Define the related metabolic disorders and their clinical prints on biochemical and molecular basis	Lectures	Exam
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1	Interpret symptoms, signs, biochemical laboratory finding of some metabolic disorders	Lectures	exam
b2	Correlate causes, mechanisms and effects of diseases based on knowledge of metabolism	Lectures	exam
C Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
c1	Perform clinical laboratory tests commonly encountered in metabolic pathway	Practical session	Practical exam
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1	Use information technology in laboratory medicine and scientific research.	Practical session	Practical exam

IV. Course Content:

A – Theoretical Aspect:

NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	Introduction.	Introduction			
2	1.Carbohydrate Metabolism:	(a) Introduction, Importance, Classification (b) Digestion and absorption	5	10	a1,a2,b1

		(c) Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis (d) Disorders of carbohydrate metabolism.			
3	2. Protein Metabolism:	(a) Introduction, Importance, Classification (b) Properties of Protein (c) Digestion & absorption of Proteins (d) Protein synthesis (e) Metabolism of proteins (f) Disorders of Proteins metabolism and urea cycle	5	10	a1 ,b1,b2,a2
4	3. Lipid Metabolism:	(a) Introduction & Classification (b) Digestion & absorption of fats (c) Lipoproteins (d) Fatty acid biosynthesis & fatty acid oxidation -Cholesterol biosynthesis -ketone bodies (formation, utilization, and oxidation)	4	8	a 1 ,b2,a3
5	4. Nucleic Acid Metabolism	a) Introduction (b) Functions of nucleic acid (c) functions of energy carriers	2	4	a1 ,b1,b2,a3
6	Final Theoretical Exam		1	2	a1 ,b1,a2
	Number of Weeks /and Units Per Semester		17	34	

B - Practical Aspect: (if any)				
Order	Tasks/ Experiments	Number of Weeks	contact hours	Learning Outcomes
1	1- concentrated and diluted glucose	1	2	c1 ,d1
2	2- glucose in urine	1	2	c1,d1
3	3-Lactose in milk	1	2	c1 ,d1
4	4-Gastric juice	1	2	c 1,d1
5	colorimetry theory:	1	2	c1 ,d1
6	1-Estimation of protein in serum	1	2	c 1,d1
7	2- Estimation of creatinine	1	2	c1 ,d1
8	3 - Estimation of uric acid	1	2	c 1,d1
9	4- Estimation of urea	1	2	c1 ,d1

10	5 - Estimation of hemoglobin	1	2	c1 ,d1
11	6- Estimation of glucose	1	2	c 1,d1
12	7- Bile detection.	1	2	c 1,d1
13	8-Lipid profile in serum or plasma (Cholesterol, triglycerides, Esterified cholesterol)	1	2	c 1,d1
14	Final practical exams	1	2	
Number of Weeks /and Units Per Semester		14	28	

V. Teaching Strategies of the Course:

1-	Lectures
2-	Practical session
3-	seminars

VI. Assessment Methods of the Course:

No	Assignment
1	Written Exams (Short Essays) and Quizzes
2	Written Exams(MCQ)
3	Practical Exams (PE)

VII. Assignments:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Midterm Exam	8	20	20%	a1, a2,b1, a3,c1
2	Practical exam	12	30	30%	a1, ,b1, a2,c1,d1
3	Final Exam	16	50	50%	a1,a2 ,b1,a3 ,c1
	Total	100		100%	

VIII. Learning Resources:

1- Required Textbook(s) .

- 1 - Ferrier Denise. Lippincott's illustrated reviews: Biochemistry, 7th edition, Wolters Kluwer. 2017.
- 2 - Rodwell Victor, et al. Harper's Illustrated Biochemistry, 31th edition McGraw-Hill. 2018.

2- Essential References.

- 1 - Biochemistry (<https://pubs.acs.org/journal/bichaw>)
- 2 - Biochemical Journal (<https://portlandpress.com/biochemj>)

3- Electronic Materials and Web Sites etc.

- 1 - <https://www.ncbi.nlm.nih.gov/pubmed/>
The medical biochemistry page (online textbook) : <https://themedicalbiochemistrypage.org/>
- 2- 1. MIT open courseware. Biological Chemistry I
(<https://ocw.mit.edu/courses/chemistry/5-07sc-biological-chemistry-ifall-2013/>)

3	2. MIT open courseware. Biological Chemistry II (https://ocw.mit.edu/courses/chemistry/5-08j-biological-chemistry-iispring-2016/)
4	3. MIT open courseware. Biochemistry laboratory (https://ocw.mit.edu/courses/chemistry/5-36-biochemistry-laboratoryspring-2009/)
5	4. The medical biochemistry page (online textbook) https://themedicalbiochemistrypage.org

XI. Course Policies:	
1	Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	Tardiness: -If the student dose not attend for more than 6 times, the student will be obligated to withdrew from the course
3	Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration

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