

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 Advanced Biochemistry I
Course No. (03.11.312)
2022/2023

Prepared by:	Reviewed by:	Head of the Department:	Vice Dean for Quality affairs	Dean of College:
Dr. Nabil Alowiri	Dr. Ebtessam Al-Zabedi	Dr. Nawal Al- Henhena	Dr\Gamil Taher Abdul Mughni	- Associate Prof. Dr. Ebtessam Al-Zabedi

I. Course Identification and General Information:					
1	Course Title:	Advanced Biochemistry I			
2	Course Code & Number:	03.11.312			
3	Credit Hours:	Theory Hours			
		Lecture	Exercise	Practical	Credit Hours
		2	0	0	2
4	Study Level/ Semester at which this Course is offered:	1 st Level / 1 st Semester			
5	Pre –Requisite (if any):	None			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Master Degree Biochemistry and Molecular biology			
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. Nabil Alowiri			
13	Date of Approval:	2023			

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II. Course Description:

The focus is on the regulation of sugar and fat metabolism in eukaryotes, with an emphasis on human. The course will begin with a review of carbohydrate and lipid metabolic pathways, particularly pathway integration and regulation. We will then progress to an in-depth analysis of current research in specific areas of nutritional sensing, signaling and metabolic regulation.

III. Alignment Course Intended Learning Outcomes with program outcomes

III. Course Intended Learning Outcomes (CILOs)		Referenced PILOs
A. Knowledge and Understanding: <i>Upon successful completion of the course, students will be able to:</i>		
a1	Demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their metabolic pathways	A1
B. Intellectual Skills: <i>Upon successful completion of the course, students will be able to:</i>		
b1	Explain the structure, functions, and metabolism of lipids in the living system	B2
C. Professional and Practical Skills: <i>Upon successful completion of the course, students will be able to:</i>		
c1	Apply theoretical and practical aspects of enzyme kinetics, inhibition, mechanisms, and regulation.	C1
D. Transferable Skills: <i>Upon successful completion of the course, students will be able to:</i>		

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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	Demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their metabolic pathways	Lectures	Exams
(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
B1	Explain the structure, functions, and metabolism of lipids in the living system	Lectures	Exams, Assignments.
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	Apply theoretical and practical aspects of enzyme kinetics, inhibition, mechanisms, and regulation.	Lectures Practical sessions	Lab reports, Exams
(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:			
	Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies

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NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CLOs)
1	Carbohydrate metabolism in muscle, adipose tissue and liver	<ul style="list-style-type: none"> - Glycolysis, various forms of fermentations in micro-organisms, citric acid cycle, its function in energy generation and biosynthesis of energy rich bond, pentose phosphate pathway and its regulation. - Gluconeogenesis, glycogenesis and glycogenolysis, glyoxylate and Gamma aminobutyrate shunt pathways, Cori cycle, anaplerotic reactions, Entner-Doudoroff pathway, glucuronate pathway. - Metabolism of disaccharides. - Hormonal regulation of carbohydrate metabolism. - Energetics of metabolic cycle. - Carbohydrates metabolic disorders 	5	10	a1,b1,c1
2	lipid metabolism in adipose tissue and	<ul style="list-style-type: none"> - Introduction, hydrolysis of tri-acylglycerols, α-, β-, ω- oxidation of fatty acids. - Oxidation of odd numbered fatty acids – fate of propionate, role of carnitine, degradation of complex lipids. - Fatty acid biosynthesis, Acetyl CoA carboxylase, fatty acid synthase, ACP structure and function, Lipid biosynthesis, biosynthetic pathway for tri-acylglycerols, phosphoglycerides, sphingomyelin and prostaglandins. - Metabolism of cholesterol and its regulation. - Energetics of fatty acid cycle 	5	10	a1,b1,c1
3	Protein metabolism and Nucleic acid metabolism	<ul style="list-style-type: none"> - General reactions of amino acid metabolism - Transamination, 	5	10	a1,b1,c1

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		<p>decarboxylation, oxidative & non-oxidative deamination of amino acids.</p> <ul style="list-style-type: none"> - Special metabolism of methionine, histidine, phenylalanine, tyrosine, tryptophan, lysine, valine, leucine, isoleucine and polyamines. Urea cycle and its regulation. - Biosynthesis and degradation of purine and pyrimidine ribonucleotides, formation of deoxy ribonucleotides and their regulation 			
4	Final Exam		1	2	
	Number of Weeks /and Units Per Semester		16	32	

V. Teaching Strategies of the Course:

1-	Lectures
2-	Practical session
3-	Self-learning
4-	Group research

VI. Assessment Methods of the Course:

No	Assignment
1	Written Exams (Short Essays) and Quizzes
2	Written Exams(MCQ)
3	Structured Oral Exams
4	Objective Structured Practical Exams (OSPE)
5	Student presentation

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VII. Assignments:					
No.	Assignments	Week Due	Mark	Proportion of Final Assessment	Aligned CILOs (symbols)
2	Activity	Throughout the semester	20	20%	a1,b1,c1
5	Final Exam		80	80%	a1,b1,c1
Total			100		

Learning Resources:	
<ul style="list-style-type: none"> Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher). 	
1- Required Textbook(s) (maximum two).	
Devlin, T.M., John Wiley & Sons, (2011) , Biochemistry with Clinical Correlations -7th ed., Inc. (New York), ISBN: 978-0-470-28173-4.	
2- Essential References.	
Lehninger: Principles of Biochemistry (2013) 6th ed., Nelson, D.L. and Cox, M.M., W.H. Freeman and Company (New York), ISBN:13: 978-1-4641-0962-1 / ISBN:10:1-4292-3414- 8.	
3- Electronic Materials and Web Sites etc.	
1- Metabolism – clinicaland Experimental: https://metabolismjournal.com 2- The World Health Organization (WHO): https://www.who.int/	

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.

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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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