Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIEED

SCIENCES

Faculty of Laboratory Medicine.

Department of Biochemistry and Molecular biology
Course Specification of Advanced Biochemistry II
Course No. (03.11.318)
2022 /2023

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

I. Course Identification and General Information:

1	**Course Title:**	Advanced Biochemistry II			
2	**Course Code & Number:**	**03.11.318**			
3	**Credit Hours:**	**Theory Hours**			
		Lecture	**Exercise**	Practical	**Credit Hours**
		2	0	0	2
4	**Study Level/ Semester at which this Course is offered:**	1st Level / 2nd 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			

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: ***Upon successful completion of the course, students will be able to:***		
a1	**Demonstrate** knowledge and understanding of the principles that govern the structures of macromolecules and their metabolic pathways	**A1**
B. Intellectual Skills: ***Upon successful completion of the course, students will be able to:***		
b1	**Explain** the structure, functions, and metabolism of lipids in the living system	**B2**
C. Professional and Practical Skills: ***Upon successful completion of the course, students will be able to:***		
c1	**Apply** theoretical and practical aspects of enzyme kinetics, inhibition, mechanisms, and regulation.	**C1**
D. Transferable Skills: ***Upon successful completion of the course, students will be able to:***		

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

NO.	Units/Topics List	Sub Topics List	Number of Weeks	contact hours	Learning Outcomes (CILOs)
1	**Inborn Errors of Metabolism**	Diseases enzymes and genes, defects in enzyme synthesis, genetic heterogeneity, pathogenic mechanism in inherited metabolic diseases, diagnosis of inherited metabolic diseases	**4**	**8**	**a1,,b1,c1**
3	**Molecular aspects of signal transduction**	Signaling mediated-processes; Intracellular receptors (steroid hormones), cell-surface receptors (cAMP and calcium).	**3**	**6**	**a1,,b1,c1**
4	**Regulation of cAMP concentration by hormones**	Adenylate cyclase, phosphodiesterase, G-protein, mechanism of action of cAMP, specificity of cAMP-dependent protein kinase, structure and mechanism of action of the protein kinase	**2**	**4**	**a1,,b1,c1**
5	**Modulation of cytoplasmic Ca2+ by hormones**	Catecholamine's receptors, calcium as second messenger, effect of calcium on liver metabolism, nature of intracellular calcium pool, mechanism of action of Ca2+ as a regulator (Calmodulin its structure and physical properties, effect of calmodulin binding to target enzymes).	**2**	**4**	**a1,,b1,c1**
6	**Ca2+ and cellular regulation**	Control of calcium levels, its transport across plasma membrane and endoplasmic reticulum, uptake by sarcoplasmic reticulum and its release, mitochondrial calcium uptake and its efflux, sodium-independent efflux, calcium cycling or buffering.	**1**	**2**	**a1,,b1,c1**
7	**Interactions between cAMP and Ca2+ as messengers**	Levels of interaction, effects of calcium on cAMP metabolism, effect of cAMP on calcium metabolism, interactions at the level of intermediary metabolism.	**1**	**2**	**a1,,b1,c1**
8	**Hormone action and phosphatidylinositol turnover**	Reactions of phosphatidylinositol metabolism, enzymes of inositol lipid metabolism, possible messenger molecules	**2**	**4**	**a1,,b1,c1**
10	**Final Exam**		**1**	**2**	
Number of Weeks /and Units Per Semester			**16**	**32**	

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V. Teaching Strategies of the Course:	
1-	Lectures
2-	Practical session
3-	Self-leaning
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	

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**		

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Learning Resources:
• *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.
1- 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. 2- Nelson, D.L. and Cox, M.M. Lehninger Principles of Biochemistry (8th Edition, 2021).
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.
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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