

he Hashemite University



الجامعة الهاشمية



Deanship of Academic Development
and International Outreach

عمادة التطوير
الأكاديمي والتواصل الدولي

Syllabus: General Biochemistry (111501107) Summer Semester 2023/2024

COURSE INFORMATION	
Course Name: General Biochemistry Semester: Summer semester Department: Department of Anatomy, Physiology and Biochemistry Faculty: Faculty of Medicine	Course Code: 111501107 Section: All Core Curriculum: MD program
Day(s) and Time(s): Sunday 9 – 12 Tuesday 9 -12 Thursday 9-12 Classroom: Al Hareth Auditorium	Credit Hours: 3 Prerequisites: None
COURSE DESCRIPTION	
<ul style="list-style-type: none">After presenting some preliminary principles of biochemistry in previous course of molecular biology, this course will introduce medical students to more advance knowledge on biochemistry. At the beginning there is more emphasis on understanding enzymes as efficient biological protein catalyst, in addition to the factors which affect their activation and inhibition. Then students will learn about coenzymes as well as some bioenergetics before they are introduced to the metabolism of human body. This part will cover the anaerobic and aerobic metabolism of carbohydrates, amino acids and protein metabolism, lipid metabolism and finally their integration which involves the coordination between these metabolic pathways under different nutritional states.	
DELIVERY METHODS	
The course will be delivered through a combination of active learning strategies. These will include: <ul style="list-style-type: none">PowerPoint lectures and active classroom based discussionRelevant papers and reading materialsE-learning resources: e-reading assignments and practice quizzes through Microsoft Team	

FACULTY INFORMATION	
Name	Dr. Ahmed Salem
Academic Title:	Assistant Professor
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Office Hours:	Sunday 1.00-2.00 Thursday 1.00-2.00
Name	Dr. Nebras Melhem
Academic Title:	Lecturer
Email Address:	nebras@hu.edu.jo
Office Location:	Faculty of Medicine, ground floor, Room 1039
Office Hours:	Sunday 9.00-10.30 Tuesday 9.00-10.30 Thursday 11.30-12.30

REFERENCES AND LEARNING RESOURCES

Required Textbook

D. M. Vasudevan, S. Sreekumari, Kannan Vaidyanathan. Textbook of biochemistry for medical students. (Jaypee Brothers Medical publishers. 2019). ISBN-10: 9350905302, ISBN-13: 978-9350905302

Suggested Additional Resources:

Additional textbook

Victor W. Rodwell, David A. Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil. Harper's Illustrated Biochemistry (McGraw-Hill Education / Medical. 31st edition: 2018). ISBN-13: 978-1259837937, ISBN-10: 1259837939

STUDENT LEARNING OUTCOMES MATRIX*

Core Curriculum Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
	Develop an understanding of: Introduction to biochemistry	By the end of the course, the student should be able to understand: 1. What is biochemistry? 2. Outlines of biochemistry application in medicine	MCQ Exams
	Enzymes	Basic principles of: 1. Understanding enzymes a catalyst 2. The catalytic cycle 3. How enzymes accelerate cellular reactions? 4. The basis of enzyme classifications 5. Exploring the factors affecting the rate of enzymic reaction Competency in: 1. Effect of substrate concentration on rate of enzymatic reaction 2. Understanding enzyme kinetics 3. Michaelis-Menten equation 4. What are Km and V max values? 5. Enzyme activation and inhibition	

		6.Irreversible and reversible inhibitors 7.Kinetics of reversible inhibitors Understanding of: 1. What are isozymes? 2. Application of isozymes in diagnosis 3.Control of enzyme activity a. Allosteric regulation b. Covalent modification	
	Enzyme cofactors	1.Inorganic cofactors 2.Coenzymes and relevant examples (e.g.: a. Thymine pyrophosphate b. Flavin c. Nicotinamide d. Pyridoxalphosphate e. Cobalamin f. Tetrahydrofolate g. Biotin h. Ascorbic acid	
	Bioenergetics	1.Potential and kinetic energy 2.Laws of thermodynamics 3. Gibbs free energy 4. Exergonic and endergonic reactions 5.High energy compounds 6. Energy coupling	
	Introduction to metabolism	1.Definition of metabolism 2.Anabolism and catabolism 3. Autotrophic versus heterotrophic nutrition 4. Human as heterotrophic nutritional organism	
	Carbohydrate metabolism I	1. Glycolysis a. First phase b. Second phase 2.Pentosephosphate pathway 3.Metabolism of non-glucose sugars a.metabolism of fructose. b.metabolism of galactose c.metabolism of glucuronic acid 3. Glycogen metabolism a. Glycogen synthesis b. Glycogen breakdown	
	Carbohydrates metabolism II Aerobic metabolism	1.Gluconeogenesis Synthesis of glucose from lactate, amino acids and glycerol 2. Krebs cycle 3. Electron transport and oxidative phosphorylation 4.Inhibitors of electron transport and oxidative phosphorylation	
	Lipid metabolism	1. Fatty acids metabolism a. Fatty acid synthesis b. Fatty acid catabolism 2. Cholesterol synthesis	

		3. Eicosanoids synthesis from fatty acids	
	Amino acids metabolism	1.Synthesis of non-essential amino acids 2.Catabolism of amino acids 3. Nitrogen metabolism and urea cycle 4. Heme synthesis from glycine and succinyl-CoA	
	Integration of metabolism	1.Coordination between metabolic pathways under different nutritional states. 2.Central junction points in metabolism 3. Amphipathic pathways	

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section: student service and care unit

Tel: 053903333 ext. 4132/4583/ 5023

Location: Deanship of Students Affairs

Email: stydent@hu.edu.jo

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance.* It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or

being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment as listed below with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus

Assessment	Grade Weighting	Deadline Assessment
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Mid Exam	50%	TBC
Final Exam	50%	TBC

Description of Exams

Test questions will predominately come from material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. **Exam will consist of multiple choice for the regular exam and short essay questions for make-up exams.**

Grades are not negotiable and are awarded according to the following criteria*:

L etter Grade	Descrip tion	G rade Points
A +	Excellent	4. 00
A		3. 75
A -		3. 50
B +	Very Good	3. 25
B		3. 00
B-		2. 75
C +	Good	2. 50
C		2. 25
C-		2. 00
D +	Pass	1. 75
D	Pass	1. 50
F	Fail	0. 00
I	Incompl ete	-

Week	Topics
Week 1	<ul style="list-style-type: none">● Introduction● Enzymes 1-2
Week 2	<ul style="list-style-type: none">● Enzymes 3● Enzyme cofactors● Bioenergetics
Week 3	<ul style="list-style-type: none">● Amino acid metabolism
Week 4	<ul style="list-style-type: none">● Carbohydrate metabolism 1
Week 5	<ul style="list-style-type: none">● Midterm exam
Week 6	<ul style="list-style-type: none">● Carbohydrate metabolism 2
Week 7	<ul style="list-style-type: none">● Lipid metabolism
Week 8	<ul style="list-style-type: none">● Integration of metabolism