The Hashemite University

الجامعـــــــــة الهاشميـــــــــة

Deanship of Academic Development and International Outreach

كلية الطب البشري

عمادة التطوير أألكاديمي والتواصل الدولي

Syllabus: General Biochemistry (111501107)
Summer Semester 2025/2026

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): TBD **Classroom:** TBC	**Credit Hours:** 3 **Prerequisites**: None

COURSE DESCRIPTION

- 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:

- PowerPoint lectures and active classroom based discussion
- Relevant papers and reading materials
- E-learning resources: e-reading assignments and practice quizzes through Microsoft Team

FACULTY INFORMATION

Name	**Dr. Ahmed Salem (course coordinator)**
Academic Title:	**Assistant Professor**
Office Location:	**Faculty of Medicine, GF, Room 1019**
Telephone Number:	**5416**

Email Address:	**asalem@hu.edu.jo**
Office Hours:	**To be determined**
Name	**Dr. Nebras Melhem (teaching faculty)**
Academic Title:	**Lecturer**
Email Address:	**nebras@hu.edu.jo**
Office Location:	**Faculty of Medicine, ground floor, Room 1039**
Office Hours:	**To be determined**

REFERENCES AND LEARNINGRESOURCES

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

Additional textbooks

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

Lippincott Illustrated Reviews, Biochemistry, 7th Edition Denise R. Ferrier

Lehninger Principles of Biochemistry, David L. Nelson, Michael M. Cox, 8th Edition

STUDENT LEARNING OUTCOMES MATRIX*

Program Learning Outcomes	Course Objectives	Course Student Learning Outcomes	Assessment Method
A1, A2	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
A3, B1, C1	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.Irriversible 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	
A4	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	
B2	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	
A5	Introduction to metabolism	1.Definition of metabolism 2.Anabolism and catabolism 3. Autotrophic versus heterotrophic nutrition 4. Human as heterotrophic nutritional organism	
A7, A8	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	
A7, A8	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	
A9	Lipid metabolism	1. Fatty acids metabolism a. Fatty acid synthesis b. Fatty acid catabolism 2. Cholesterol synthesis 3. Eicosanoids synthesis from fatty acids	

A5	Amino acids metabolism	1.Synthesis of non-essential amino acids 2.Catabolism of amino acids 3.Nitrogen metabolism (Purine & Pyrimidine metabolism) and urea cycle 4. Heme synthesis from glycine and succinyl-CoA	
A6	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 par6ticipate 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
Mid Exam	50%	TBC
Final Exam	50%	TBC

Description of Exams
Test questions will predominately come from material presented in the lectures. The exam will consist of multiple-choice questions for the regular exams and short essay questions for makeup exams (for students with accepted excuses, only documented absences will be considered as per the Hashemite University guidelines).

Mid exam:
Material included: 12 lectures
Marks: 50
Number of questions: 60 MCQS
Duration: 75 minutes

Final exam
Material included: 20 lectures
Marks: 50
Number of questions: 60 MCQS
Duration: 75 minutes

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

Letter Grade	Description	Grade 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	**Incomplete**	**-**

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

Week	Topics	Faculty
Week 1	● **Introduction** ● **Enzymes 1-2**	**Dr Nibras Melhem**
Week 2	● **Enzymes 3** ● **Enzyme cofactors**	**Dr Nibras Melhem**
Week 3	● **Carbohydrate metabolism**	**Dr Ahmed Salem**
Week 4	● **Lipid metabolism**	**Dr Ahmed Salem**
Week 5	● **Midterm exam**	-
Week 6	● **Integration of metabolism/ Bioenergetics**	**Dr Ahmed Salem**
Week 7	● **Protein Metabolism**	**Dr Nibras Melhem**
Week 8	● **Final exam**	-