



Jordan University of Science and Technology
Faculty of Medicine
Doctor Of Medicine (Md) Department

MED122 Biochemistry - JNQF Level: 7

Second Semester 2022-2023

Course Catalog

3 Credit Hours. This general biochemistry course tailored for first-year medical students delves into the intricate molecular foundations governing life processes. From elucidating the building blocks of life, such as carbohydrates, lipids, and proteins, to exploring the dynamic metabolic pathways essential for cellular function, the course navigates through the complexities of biochemical reactions. Emphasizing the integration of molecular principles with clinical contexts, it highlights the role of biochemistry in understanding disease mechanisms and therapeutic interventions. Through theoretical learning and practical applications, students acquire the knowledge necessary to comprehend the biochemical foundations that govern health and disease in clinical practice.

Text Book

Title	Lippincott Illustrated Reviews: Biochemistry
Author(s)	Denise Ferrier
Edition	7th Edition
Short Name	Lippincott
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Lehninger	Lehninger Principles of Biochemistry	David L. Nelson and Michael M. Cox	8th Edition	
Harper's	Harper's Illustrated Biochemistry, 31st Edition	Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly, P. Anthony Weil	30th Edition	31st

Instructor

Name	Dr. Heba Ghozlan
Office Location	-
Office Hours	

Email	hhgozlan@just.edu.jo
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Class Schedule & Room
<p>Section 1: Lecture Time: Mon, Wed : 13:00 - 14:30 Room: مدرج د. سعد حجازي</p> <p>Section 2: Lecture Time: Sun, Tue : 12:30 - 14:00 Room: مدرج الفاروق</p> <p>Section 3: Lecture Time: Sun, Tue : 10:00 - 11:30 Room: مدرج د. سعد حجازي</p> <p>Section 4: Lecture Time: Mon, Wed : 10:00 - 11:30 Room: MIDDLE HALL</p> <p>Section 5: Lecture Time: Mon : 14:30 - 16:00 Room: مدرج الفاروق</p>

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction to the course	
Week 1	Prelude to biochemistry. Acids and bases, buffers, Henderson-Hasselbalch equation (Dr. Al-Azzam)	
Week 2	Amino acids and proteins I: Structure and classification of amino acids. Properties of individual amino acids and their titration curves (Dr. Al-Azzam)	Chapter 1, From Lippincott
Week 2	Amino acids and proteins II: Peptide bond, proteins primary, secondary, super secondary, tertiary (domains) and quaternary (subunits) structure. Protein folding. Protein denaturation and refolding (Dr. Al-Azzam)	Chapter 2 From Lippincott
Week 3	Enzymes I: Enzymes as biological catalysts, classification of enzymes, properties, how they work. Enzyme active site. Chymotrypsin as example on how enzymes work (Dr. Al-Azzam)	Chapter 5 From Lippincott
Week 3	Enzymes II: Factors affecting their activity. Kinetics; Michaelis-Menten equation, Lineweaver-Burke plot. Coenzymes. Enzymes inhibition and regulation (Dr. Al-Azzam)	Chapter 5 From Lippincott
Week 4	Bioenergetics and Oxidative Phosphorylation. Thermodynamics of metabolic reactions and ATP molecule as a carrier of energy (Dr. Nusier)	Chapter 6 From Lippincott

Week 4	Introduction to Carbohydrates (Dr. Nusier)	Chapter 7 From Lippincott
Week 5	REVIEW	
Week 5	FIRST EXAM	
Week 6	Glycolysis: Glucose transport into the cells. Aerobic and anaerobic glycolysis. Enzymes involve in glycolysis. Key steps in glycolysis and their regulation (Dr. Nusier)	Chapter 8 From Lippincott
Week 6	Tricarboxylic Acid Cycle and Pyruvate Dehydrogenase Complex. Metabolism of pyruvate and the tricarboxylic acid cycle (Dr. Nusier)	Chapter 9 From Lippincott
Week 7	Gluconeogenesis and the Cori cycle: Key steps, enzymes involve and their regulation (Dr. Nusier)	Chapter 10 From Lippincott
Week 7	Glycogen Metabolism (Dr. Ghozlan)	Chapter 11 From Lippincott
Week 8	Monosaccharide and Disaccharide Metabolism (Dr. Ghozlan)	Chapter 12 From Lippincott
Week 8	Pentose Phosphate Pathway and Nicotinamide Adenine Dinucleotide Phosphate (Dr. Ghozlan)	
Week 9	EID HOLIDAY	
Week 9	Dietary Lipid Metabolism: Lipids and Fatty acids: Structure, nomenclature, properties and sources of fatty acids. Essential fatty acids (Dr. Ghozlan)	Chapter 15 From Lippincott
Week 10	REVIEW	
Week 10	SECOND EXAM	
Week 11	Fatty acids digestion and absorption. Fatty acid synthesis and beta-oxidation (Dr. Ghozlan)	Chapter 16 From Lippincott
Week 11	Phospholipid, Glycosphingolipid, and Eicosanoid Metabolism (Dr. Ghozlan)	Chapter 17 From Lippincott
Week 12	Amino Acids I: Nitrogen Disposal (Dr. Smerat)	Chapter 19 From Lippincott

Week 12	Amino Acids II: Degradation and Synthesis (Dr. Smerat)	Chapter 20 From Lippincott
Week 13	Metabolic Effects of Insulin and Glucagon (Dr. Smerat)	Chapter 23 From Lippincott
Week 13	The Feed- Fast Cycle (Dr. Smerat)	Chapter 24 From Lippincott
Week 14	Micronutrients: Vitamins	Chapter 28 From Lippincott
Week 14	Basics of signal transduction	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Students will be able to analyze buffer systems to predict pH changes and interpret amino acid titration curves accurately [1PLO1] [1L7S1]	10%	
Students will be able to relate enzyme structure, function, and kinetics to predict enzymatic reactions and interpret regulatory mechanisms. [1PLO1] [1L7K1, 1L7S1, 1L7S2]	10%	
Students will be able to recall the fundamental structures of biomolecules such as proteins, lipids, and carbohydrates. [1PLO1] [1L7K1]	15%	
Students will be able to analyze the diverse metabolic pathways of biomolecules, demonstrating an understanding of their interconnections, regulation, and the role of enzymes in catalyzing these processes within biological systems. [1PLO1] [1L7K1, 1L7S2, 1L7S3]	45%	
Students will be able to interpret how insulin, glucagon, and metabolic pathways interact in the feed-fast cycle. [1PLO1] [1L7S2, 1L7S3]	10%	
Students will be able to describe the roles of vitamins in metabolic processes and their significance in maintaining cellular functions. [1PLO1] [1L7K1]	5%	
Students will be able to examine how signal transduction pathways integrate into cellular responses to external stimuli. [1PLO1] [1L7K1, 1L7S2, 1L7S3]	5%	

Relationship to Program Student Outcomes (Out of 100%)													
PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
100													

Relationship to NQF Outcomes (Out of 100%)			
L7K1	L7S1	L7S2	L7S3
40	13.33	25	21.67

Evaluation	
Assessment Tool	Weight
First Exam	30%
Second Exam	30%
Final Exam	40%

Policy	
Course Information	<p>Credits: 3</p> <p>Structure: The course will be taught face-to-face (F2F) i</p> <p>Office hours: When meeting with an instructor is needed, please make an appointment by email or plan according to office hours.</p>
Course Materials	<p>Lectures (PPT slides or PDFs) and other course materials including textbook chapters will be posted to JUST eLearning by each instructor.</p> <p>Textbooks</p>
Attendance	Attendance is MANDATORY. QR code will be used to record your attendance.
Assessments	<p>Final Grade Calculation:</p> <p>First Exam: 30%</p> <p>Second Exam: 30%</p> <p>Final Exam: 40%</p>

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