



Jordan University of Science and Technology
 Faculty of Science and Arts
 Department of Chemistry
 Biochemistry CHEM 262 Syllabus
 First Semester 2020/2021

Textbook:

1. BIOCHEMISTRY, M.K. Campbell, S. O. Farrell, and O. M. McDougal (2017), 9th Edition. Publisher: Thomson Learning, Inc., USA.

Reference Book:

2. ESSENTIAL BIOCHEMISTRY, C. W. Paratt and K. Cornely (2014), 3rd Edition. Publisher: John Wiley and Sons, Inc., USA.

Course Description and Objectives

This course deals with identifying the structure and properties of biomolecules, such as amino acids, proteins, carbohydrates, lipids, and nucleic acids. The focus of this course will be on the relationship between protein structures and its biological function, generation and storage of metabolic energy, main metabolic pathways and their key steps. In addition, the role of phospholipids in determining the properties of biological membranes and their function will be discussed. The principal objective of the course is for students to acquire knowledge and understanding of new concepts in the subject of the course and to develop critical thinking skills.

Week	Topic	Titles	Chapter
1 11/10	Water: The solvent for Biochemical Reactions	2.1 Water and Polarity 2.2 Hydrogen Bonds 2.3 Acids, Bases, and pH 2.4 Titration Curves 2.5 Buffers	2
2 18/10	Amino Acids and Peptides	3.1 Amino acids Are Three-Dimensional 3.2 Structures and Properties of Amino Acids 3.3 Amino Acids Can Act as Both Acids and Bases 3.4 The Peptide Bond 3.5 Small Peptides with Physiological Activity	3
3 25/10	The Three-Dimensional Structure of Proteins	4.1 Protein Structure and Function 4.2 Primary Structure of Proteins 4.3 Secondary Structure of Proteins 4.4. Tertiary Structure of Proteins 4.5 Quaternary Structure of Proteins	4
4 1/11	The Behavior of Proteins: Enzymes	6.1 Enzymes Kinetics versus Thermodynamics 6.2 Rate of Enzyme-Catalyzed Reactions 6.3 Enzyme-Substrates Binding 6.4 The Michaelis-Menten Approach to Enzyme Kinetics 6.5 Examples of Enzyme Catalyzed Reactions 6.7 Enzyme Inhibition	6
5 8/11	The Behavior of Proteins: Enzymes, Mechanisms, and Control	7.1 Behavior of Allosteric Enzymes 7.2 The Concerted and Sequential Models for Allosteric Enzymes 7.3 Control of Enzyme Activity by Phosphorylation 7.4 Zymogens 7.5 The Nature of The Active-Site 7.8 Coenzymes	7

6 15/11	Lipids and Proteins are Associated in Biological Membranes	8.1 The Definition of a Lipid 8.2 The Chemical Natures of The Lipid Types 8.3 Biological Membranes 8.4 Membrane Proteins 8.5 The Function of Membranes 8.7 Lipid-Soluble Vitamins and Their Functions 8.8 Prostaglandins and Leukotriene's	8
7 22/11	Carbohydrates	16.1 Sugars: Their Structures and Stereochemistry 16.2 Reactions of Monosaccharide's 16.3 Some Important Oligosaccharides 16.4 Structures and Functions of Polysaccharides 16.5 Glycoproteins	16
8 29/11	Glycolysis	17.1 The overall Pathway of Glycolysis 17.2 Conversion of Six-Carbon Glucose to Three-Carbon Glyceraldehyde-3-Phosphate 17.3 Glyceraldehyde-3-Phosphate Is Converted to Pyruvate 17.4 Anaerobic Metabolism of Pyruvate 17.5 Energy Production in Glycolysis 17.6 Control of Glycolysis	17
9 6/12	Storage Mechanisms and Control in Carbohydrate Metabolism	18.1 How Glycogen is Degraded and Produced 18.2 Gluconeogenesis Produces Glucose from Pyruvate 18.3 Control of Carbohydrate Metabolism 18.4 Glucose is Sometimes Diverted through the Pentose Phosphate Pathway	18
10 13/12	The Citric Acid Cycle	19.1 The Central Role of The Citric Acid Cycle in Metabolism 19.2 The Overall Pathway of The Citric Acid Cycle 19.3 How Pyruvate is Converted to Acetyl-CoA? 19.4 The Individual Reactions of the Citric Acid Cycle 19.5 Energetics and Control of the Citric Acid Cycle 19.6 The Glyoxylate Cycle: A Related Pathway 19.9 The Link to oxygen	19
11 20/12	Electron Transport and Oxidative Phosphorylation	20.1 The Role of Electron Transport in Metabolism 20.2 Reduction Potentials in The Electron Transport Chain 20.3 Organization of Electron Transport Complexes 20.4 The Connection between Electron Transport and Phosphorylation 20.5 The Mechanism of Coupling in Oxidative Phosphorylation 20.7 The ATP Yield from Complete Oxidation of Glucose	20
12 27/12	Lipid Metabolism	21.1 Lipids are Involved in The Generation and Storage of Energy 21.2 Catabolism of Lipids 21.3 The Energy Yield from The Oxidation of Fatty Acids 21.4 Catabolism of Unsaturated Fatty Acids and Odd-Carbon Fatty Acids 21.5 Ketone Bodies 21.6 Fatty-Acid Biosynthesis 21.8 Cholesterol Biosynthesis	21

13	The Metabolism of Nitrogen	23.1 Nitrogen Metabolism: An Overview 23.2 Nitrogen Fixation 23.3 Feedback Inhibition in Nitrogen Metabolism 23.4 Amino Acid Biosynthesis 23.5 Essential Amino Acids 23.6 Amino Acid Catabolism 23.7 Purine Biosynthesis 23.8 Purine Catabolism 23.9 Pyrimidine Biosynthesis and Catabolism	23
3/1/ 2021			

جميع الامتحانات تحدد من قبل دائرة القبول والتسجيل All Exams: will be declared by the Registration Office

- تعليمات الامتحانات: 1- على كل طالب أن يلتزم بأداء الامتحان على رقم جهاز الحاسوب في الجلسة والقاعة المخصصة له مسبقاً، وعليه مسؤولية الاطلاع على جميع الإعلانات المتعلقة بتوزيع الطلاب على قاعات الامتحان وكذلك كل ما يتعلق بالمساق.
- 2- يدخل الطالب إلى قاعة الامتحان بدون أية أوراق أو كتب أو يضعها بعيدة عنه عند دخوله إلى القاعة، ويُخلق هاتفه الخلوي قبل الدخول إلى القاعة ولا يستعمله إلا بعد خروجه النهائي من القاعة.
- 3- يضع كل طالب بطاقته الجامعية على طاولة الامتحان من البداية
- 4- على الطالب أن يتجنب كل ما يثير شبهة الغش (راجع دليل الطالب- نظام تأديب الطلبة المادة 6)

Instructions for exams:

- 1- Each student must perform the exam at the specified computer number in the hall and time assigned for him previously.
- 2- No papers or books are allowed in the exam halls, and the cellular phone should be closed before entering the exam hall.
- 3- Each student must display his University ID card on his table from the beginning.
- 4- Students should be aware not to behave in a suspicious manner regarding cheating