



University of Management & Technology
School of Science
Department of Life Science

BT-303 Biochemistry-I

Lecture Schedule	Tuesday and Friday 11:00 AM – 12:15 PM	Semester	Spring 2021
Pre-requisite	---	Credit Hours	4
Instructor	Ms. Zaineb Sohail	Contact	Zaineb.sohail@umt.edu.pk
Office	3S-42	Office Hours	Available during office timings
Course Description	Biochemistry is at the core of many areas of biology and is responsible for a large number of scientific breakthroughs in medicine and biotechnology. Biochemistry-I is an introductory course which includes water, pH, buffers, carbohydrates, proteins, lipids and nucleic acids with emphasis on their composition, structure, classification and functions. Moreover, the enzymes their properties, nomenclature, classification, and factors affecting enzyme activities are also the part of this course.		
Expected Outcomes	<p>After successful completion of this course, a student will be able to:</p> <ol style="list-style-type: none"> 1. Describe what biochemistry is, properties of water, pH and buffer system. 2. Learns the chemistry of carbohydrate, lipid and proteins and its importance in the molecular level, structure, classification, function for living organisms, as it provides the body with energy. Identify the metabolic fate of carbohydrate (glycolysis) and lipids (β- oxidation). 3. To imagine the structure of DNA and RNA. 4. Recognize the enzymes and coenzymes and their role in the biological processes in the body. 5. Learn how amino acids are synthesized, and act as precursor of other molecules 6. Know the hormones, structure, function and its role in regulating the metabolism. 7. Recognize the vitamins how important it is to the human health 8. Learn metabolism of amino acids and how ammonia is removed from the body 		
Textbook(s)	Mary K. Campbell, Shawn O. Farrell, "Biochemistry" 5 th ed David L. Nelson, Michael M. Cox, "Lehninger Principles of Biochemistry" 5 th ed		
Grading Policy	<ul style="list-style-type: none"> • Quizzes 20% • Assignment 15% • Project 05% • Take Home Exam 25% 		

	<ul style="list-style-type: none">• Presentations• Viva Voce	<p>15%</p> <p>10%</p>
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Course Schedule

Week	Lecture #	TOPICS	Chapter Name
1	1 2	Introduction to Biochemistry Biochemical composition of cells Fundamentals basis of Biochemistry	Leininger Principles of Biochemistry Ch.1. The foundations of Biochemistry
2	1 2	Introduction to water as a solvent and its effect on the cellular environments Handerson Hesselbalch equation, concepts of pH, pOH, acids bases and buffers	Ch:2. Water
3	1 2	pH, acids bases and buffers, body buffers (Cont....) Introduction to amino acids, chirality and optical rotations	Ch. 2 Water Ch. 3. Amino Acids, Peptides and Proteins
4	1 2	Properties of amino acids, classification of amino acids based on different conditions, Peptide bond, nature and properties of peptide bonds, Peptides and proteins	Ch. 3. Amino Acids, Peptides and Proteins
5	1 2	Protein structures (four levels of organizations) and functions. A brief overview of different intra and intermolecular interactions required for protein 3D structure maintenance. Introduction and classification of enzymes	Ch. 4. Three-dimensional structure of the proteins. Ch. 6 Enzymes
6	1 2	Properties and classification of Enzymes Mechanism of action of enzymes, enzymes and inhibitors, classification of inhibitors.	Ch. 6. Enzymes
7	1 2	Factors affecting enzyme activity, Lock and key models for enzymes, Parameters for the ideal enzyme-substrate interactions Introduction to carbohydrates	Ch. 6. Enzymes Ch. 7. Carbohydrates and Glycobiology
8	1 2	Different properties of carbohydrates including chirality, enantiomers, diastereomers, epimers, anomers and reducing properties of carbohydrates.	Ch. 7. Carbohydrates and Glycobiology

		An introduction to sugar modification and effect of these modifications on the properties of the sugars. Classification of the carbohydrates	
9	1 2	Structural comparisons of homopolysaccharides and heteropolysaccharides (GAGs) Significances of complex sugars.	Ch. 7. Carbohydrates and Glycobiology
10	1 2	Digestion of carbohydrates and digestive enzymes. Introduction to lipids, structural composition of TAGs, Classifications of TAGs	Ch. 7. Carbohydrates and Glycobiology Ch. 10. Lipids
11	1 2	Comparison of storage and structural lipids, Different types of the structural lipids (Membrane lipids) Sugar codes and biological recognition (RBCs) General reactions of the lipids	Ch. 10. Lipids
12	1 2	Cholesterol, effect of cholesterol on the fluidity of the plasma membrane and other biological significances	Ch. 10. Lipids
13	1 2	Introduction to Nucleic acids and nucleotides. The brief introduction to the three components of the nucleotides Nitrogenous bases and their types (Purines and Pyrimidines)	Ch. 8. Nucleotides and Nucleic Acids
14	1 2	Nucleosides and Nucleotides Additional functions of nucleotides Modified nucleotides	Ch. 8. Nucleotides and Nucleic Acids
15	1 2	Comparison of RNA and DNA with similarities and differences Types of RNA Significance of nucleic acids	Ch. 8. Nucleotides and Nucleic Acids