

COURSE DESCRIPTION

Course Information

Course Name	Introduction to Biochemistry
Course Number	MBC 228
Credit Hours	2 (2+0)
Department/Level	Department of Clinical Laboratory Science/Level 3
College	College of Applied Medical Sciences
Pre-requisite	CHEM 2 (110)
Name of Coordinator	Dr. Gaffar Sarwar Zaman, Assistant Professor

Methods of the Course Instructions

1. Theoretical Classes (lectures)
2. Blackboard Assignments/Discussions

Course Objectives

(A) General Objectives

The course aims to provide students with a basic understanding of the molecular architecture of eukaryotic cells and organelles, including membrane structure and transport, biomolecules and metabolism of carbohydrates, lipids and proteins, chemistry of nucleic acids, principle and major mechanisms of metabolic control, enzyme catalysis and molecular signaling by hormones, nutrition, biochemistry of connective tissue, muscle contraction and a part of the clinical biochemistry.

(B) Specific Objectives;

1. Explain the structure of and function of cell and organelles, osmotic properties of cell, cell molecule transportation, and cell locomotion
2. Discuss the importance of carbohydrates, classification and metabolism of carbohydrates, diseases associated with abnormality in metabolism of carbohydrates.
3. Show the basic structure of amino acids. Discuss biosynthesis of non-essential amino acids and metabolism of amino acids. Explain different levels of proteins and digestion of proteins.
4. Explain the structure of lipids. Classify lipids and discuss the biomedical importance of lipids.
5. What are Nucleic acids. Discuss the chemistry of Nucleic acids- DNA and RNA.
6. Define enzymes. Explain enzyme structure and different reactions catalyzed by enzymes.
7. Define acid, base, pH and discuss about the regulatory mechanisms that maintain pH and acid base disorders.

8. What is Nutrition? Discuss the various nutrients, energy content of food and utilization of energy, energy balance, malnutrition and deficiency diseases.
9. Discuss the main constituents of Extracellular matrix (ECM), types and characteristic of ECM. Study the diseases associated with it.
10. What are the major functions of muscles, types of muscles and the constituent of muscles mainly skeletal muscles. Discuss the mechanism of muscle contraction.
11. Define hormones and receptors. Discuss the signal transduction pathway mode of hormone action, types of endocrine control.
12. Learn the important aspects of clinical biochemistry, with reference to Liver Function and Renal function.

Course Learning Outcomes:

After successfully completing this course, the student should be able to:

1. Summarize the structure and functions of cells and organelles, Illustrate the difference between Prokaryotic and Eukaryotic cell. Outline the major classes of biomolecules.
2. Classify and compare different types carbohydrates. Explain the metabolism and diseases associated with their abnormal metabolism.
3. Classify different levels of protein structure and explain the digestion of proteins and metabolism of amino acids.
4. Outline the different types of lipids, their functions and biomedical importance.
5. Explain nucleic acid structure and components of DNA and RNA.
6. Show the importance of enzymes in biochemical reactions, enzyme action and factors affecting the enzyme activity.
7. Explain the process of acid base balance and the regulatory mechanism to maintain the body pH normal. Discuss the acid base disorder and compensatory response.
8. Identify the role of macro and micronutrients in nutrition. Outline the deficiency diseases associated with malnutrition.
9. Explain the biochemistry of connective and the diseases associated with it.
10. List the major types of muscle cells, explain the structure of muscle and mechanism of muscle contraction.
11. Explain the importance of hormones in regulation of metabolism and signal transduction pathway with examples.
12. Identify different components clinical biochemistry with reference to Liver function and Kidney function.

Distribution of Course Lectures

(i) Theory Lectures:

S. No.	Topics	No. of week
1	Cell biology; Carbohydrate chemistry and metabolism.	1,2
2	Protein chemistry and metabolism.	3,4
3	Lipid Chemistry and Function	5
4	Nucleic acid chemistry; enzymes	6
5	Acid-Base and Water Balance	7,8
6	Nutrition.	9
7	Muscle Contraction.	10,11
8	Biochemistry of connective Tissue.	12
9	Hormone Action.	13
10	Clinical Biochemistry	14,15

Grading Policy & Components

Function	Marks Theory	
Continuous assessment	Quiz 1	20
	Quiz 2	20
	Blackboard assignments/discussions	10
	Total	50
Final	70% MCQs	35
	30% Essay type questions	15
	Total	50

Text Books

1. Harpers Illustrated Biochemistry; by Victor W. Rodwell, David Bender, Kathleen M. Botham, Peter J. Kennelly & P. Anthony Weil; 30th Edition (1 January 2015); Publisher: McGraw-Hill Education / Medical; ISBN-10: 0071825347; ISBN-13: 978-0071825344

Signature of Course Coordinator	Signature of Head of Department
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