

Course Code: MLC 402

Course Title: Clinical Biochemistry I

Number of Credits: 3T + 2P = 5 Credits

Effective from AY: 2022 -2023

Prerequisite for the Course:	Basic knowledge of cell biology and biochemistry	
Objectives:	<ul style="list-style-type: none">• Understanding concepts of human cell organization for further study of its role in metabolic functions• Study of chemistry of various body enzymes, vitamins, minerals, carbohydrates, proteins and lipid for further estimation of the same from blood and body fluid samples such as urine etc.	
Content:	Module 1: Cell and Physical Chemistry Cell : Cell definition, Eukaryotic cell, cell organelles and its functions, Subcellular fractionation, cell markers, cell membrane Physical Chemistry: Define:- pH, Hydrogen ion concentration and buffers, blood buffers, Regulation of blood pH, Acid Base metabolism	4hrs 4hrs
	Module 2: Carbohydrate, Lipid, Proteins (Chemistry) Carbohydrate chemistry: Definition, Classification, (Mono / Di / Polysaccharides / MPS) sources, functions & its Biomedical importance Lipid chemistry with Prostaglandins: Lipids:-Definition, Classification, Functions of Phospholipids, lipoproteins, cholesterol, Prostaglandins, Essential fatty acids Protein chemistry: Definition, Classification of proteins & aminoacids, essential amino acids, biologically important amino acids and peptides, Structure of proteins, Functions and importance of plasma proteins Haemoglobin & Hb Metabolism: Structure & Functions of Hb,Heme synthesis, Hb breakdown, Abnormal Hb	3hrs 4hrs 3hrs 3hrs
	Module 3: Enzymes, Vitamins and Minerals Enzymes: Definition, Classification, factors affecting enzyme action, Coenzymes, enzyme inhibition, Isoenzymes, Diagnostic enzymes Vitamins: Definition, Classification, Vitamins, RDA, dietary sources, functions, deficiency manifestations of Vitamin A, D,E,K,C, B1,B6,B12 & Folic Acid Mineral Metabolism: Digestion, Absorption, Transport, Excretion, Functions, Disorders; Dietary sources of Ca, P, Mg, Cu, Fe, I, Zinc	7hrs 8hrs 6hrs 3hrs

	Viva/Tutorial/ Small Group Discussion: Above all topics	
	Practical Module: <ul style="list-style-type: none"> • Demonstration: Estimation of pH. Use of pH meter • Qualitative Carbohydrate chemistry –Monosaccharides • Qualitative Carbohydrate chemistry- Disaccharides & Polysaccharides • Qualitative Protein chemistry -Colour Reactions & Precipitation • Qualitative Protein chemistry -Albumin/ Globulin, Casein & Gelatin • Qualitative Lipid chemistry & Estimation of Cholesterol • Estimation of Serum Proteins, A/G ratio • Estimation of chloride in serum • Estimation of serum Calcium • Estimation of serum Inorganic Phosphorus • Demonstration: Chromatography • Demonstration: Electrophoresis • Demonstration: Colorimeter • Demonstration: Autoanalyser • Revision 	4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs 4hrs
Pedagogy:	Lectures/tutorials/assignments/ Presentations/Practicals/ demonstrations.	
Learning Outcome:	By the end of this course, students will be able to <ol style="list-style-type: none"> 1. Explain the chemical organization of cells. 2. Compare and contrast the chemistry of biomolecules. 3. Perform quantitative and qualitative tests for biomolecules. 4. Estimate enzymes and minerals from serum. 	
References	<ol style="list-style-type: none"> 1. Lieberman MA and Ricer R(2019). BRS Biochemistry, Molecular Biology, and Genetics.Wolter Kulver Publication. 2. Nelson DL and Cox MM(2019). LehningerPrinciples of Biochemistry, Seventh edition. Wiki publications. 3. Panini RS(2013).Medical biochemistry – an illustrated review. ThiemeMedical Publishers, New York. 4. Vasudevan DM(1995): Textbook of Biochemistry for medical student’s first edition: Jaypee Brothers Medical Publishers Pvt Ltd, New Delhi. 5. Pankaja Naik. (Latest edition). Medical Biochemistry. 6. Sood R (1999) fifth edition: Medical Laboratory Technology, Jaypee Brothers Medical Publishers Pvt Ltd, New Delhi. 7. Sood R(1985) first edition: Medical Laboratory Technology, JaypeeBrothers Medical Publishers Pvt Ltd, New Delhi. 	

	<p>REFERENCE BOOKS FOR PRACTICALS:</p> <ol style="list-style-type: none"> 1. Mukherjee KL (2017) Volume II: Medical Laboratory Technology, Tata McGraw-Hill Publishing Company Ltd. New Delhi. 2. Kamat G(2011). Practical manual of Hematology. Jaypee Brothers Medical Publishers Pvt Ltd, New Delhi. 	
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