INSTITUTE	**FACULTY OF SCIENCE**
PROGRAM	**POSTGRADUATE DIPLOMA IN MEDICAL LABORATORY TECHNOLOGY**
SEMESTER	**1**
COURSE TITLE	**CLINICAL BIOCHEMISTRY**
COURSE CODE	**02ML0103**
COURSE CREDITS	**4**

Objective:

1 To equip students with concepts and applications of fundamental and applied biochemical concepts used in medical laboratories.

2 To equip students with concepts and applications of fundamental and applied biochemical concepts used in medical laboratories.

Course Outcomes: After completion of this course, student will be able to:

1 Students will become aware of standard laboratory practices and laboratory management.

2 Students will become well versed with the different types of solutions and relevant calculations in their preparations.

3 Students will be able to appreciate and distinguish the applications of various biochemical techniques used in a medical lab.

4 Students will gain deep insights regarding various metabolic disorders and their metabolic significance.

Pre-requisite of course: To equip students with concepts and applications of fundamental and applied biochemical concepts used in medical laboratories.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Introduction to Biochemistry Laboratory** Introduction to Clinical Biochemistry and role of Medical Lab Technologist, ethics, responsibility, safety measure and hazards in a clinical biochemistry lab and first aid in laboratory accidents. Glassware's & plastic wares used in the lab, calibration of volumetric apparatus in Medical Laboratory Technology. Cleaning, care and maintenance of laboratory equipment.	

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Contents : Unit	Topics	Contact Hours
2	**Solution Preparation** Preparation of solution and reagents, normal solution, molar solutions, percent solution, buffer solution, dilutions, w/v, v/v, standard solution, aqueous solutions, concepts of acid and base Units of measurement: SI unit, reference range, conversion factor, units for measurement of bio metabolite, enzymes, protein, drugs, hormones, vitamins.	
3	**Analytical Techniques in Biochemistry** Introduction and General principle of Electrophoresis: Forces acting on the component in an electrophoresis system - Factors affecting the electrophoresis - Types of Electrophoresis - Applications - Separation of Serum Proteins by Agar Gel Electrophoresis. Chromatography Technique: General principle - Classification of chromatography - Principle of partition chromatography - Procedure - Other Chromatographic Techniques - Adsorption chromatography - Thin layer chromatography - Gas-liquid chromatography – Ion exchange chromatography - Gel filtration chromatography - Affinity chromatography - HPLC (High Performance Liquid Chromatography).	
4	**Metabolic Disorders** Enzymes as clinical diagnostic tools. Endocrinal disturbance: protein hormones and hormones of hypothalamus, pituitary, thyroid and steroid hormones- Inborn errors in metabolism: Introduction, Metabolic disorders of carbohydrates- galactosemia, glycogen storage disease, deficiency of glucose6-phosphate dehydrogenase, Hypoglycemia, Diabetes mellitus. Metabolic disorder of lipid: Tay-Sachs disease, Nieman Pick disease. Metabolic disorder of amino acid: phenylketonuria, alkaptonuria, Maple syrup urine disease. Metabolic disorder of nucleotides: gout, Lesch-Nyhan Syndrome. Diagnostic Tests: Renal Function Test, Liver Function Test Lipid profiling, Nitrogenous compounds: Proteins & Amino acids, Plasma proteins, Non-protein Nitrogenous compounds, Cardiac profile & Heart enzymes, Hormone analysis.	
Total Hours		

Textbook :

1 Textbook of Medical Biochemistry, M N Chatterjea & Rana Shinde, Jaypee Publications, 2012

2 Introductory Practical Biochemistry, 2nd edition, , Singh & Sahni, Alpha science, 2008

References:

1 Principles of Biochemistry,6th edition, Principles of Biochemistry,6th edition, Lehninger, W H Freeman, 2013

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
30.00	25.00	25.00	15.00	5.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to the conventional teaching method by blackboard may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.

2 The internal evaluation will be done based on continuous evaluation of students in the classroom in the form of attendance, assignments, verbal interactions etc.

3 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

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