Programme	Biochemistry	Course Code	BC. 301	Credit Hours	3(2+1)
Course Title	**Clinical Biochemistry**				

Course Introduction

This course focuses on the critical role of plasma enzymes and proteins in diagnostics, exploring their identification, the implications of enzyme deficiencies, and the assessment of cell damage. Students will examine abnormal plasma enzyme activities, including isoenzymes like lactate dehydrogenase and creatine kinase, and delve into the clinical correlations of disorders such as diabetes mellitus, lipid metabolism disorders, and metabolic bone diseases. The course also covers liver diseases, hemoglobinopathies, and disorders related to iron and porphyrin metabolism. Additionally, cancer diagnosis is discussed, including the use of tumor markers, the impact of ectopic hormone production, and the consequences of cancer treatment.

Learning Outcomes

On the completion of the course, the students will:

- Identify, interpret and perform the role of plasma enzymes in the diagnosis of various clinical disorders
- Assess the severity of disorder/cell damage
- Correlate the enzymes deficiencies with inborn errors of metabolism
- Determine the role of enzymes as prognostic indicator

Course Content

Theory Unit-

- Diagnostically important Plasma Enzymes & Proteins
- Identification and treatment of enzyme deficiencies
- Assessment of cell damage
- Factors affecting results of plasma enzyme assays
- Abnormal plasma enzymes activities: isoenzymes in plasma (Lactate dehydrogenase, Creatine kinase, Amylase)
- Immunoglobin deficiencies, Disorders of carbohydrate metabolisms and Clinical correlations
- Diabetes mellitus, Fructose intolerance, Lactic acidosis, Hypoglycemia, Galactosaemia
- Glycogen storage Diseases, Disorders of Lipid Metabolism (hyperlipidemia, cholesterol and cardiovascular diseases)
- Disorders of purine and pyrimidine metabolism (Gout, Arthritis), Metabolic Bone Diseases (Calcium balance, biological functions of calcium, phosphate and magnesium metabolism)
- Liver Diseases (cirrhosis', specific liver diseases, hepatitis, obstructive jaundice)
- Hemoglobinopathies, Disorders of iron and porphyrin metabolism
- Cancer diagnosis, tumor markers, consequences of cancer treatment
- Ectopic hormone production

Practical Unit-

- Blood sampling technique
- Serum/plasma isolation procedure
- Determination of total plasma proteins
- Determination of serum Albumin
- Blood glucose estimation (Fasting and Random)
- Estimation of glycosylated Hemoglobin (HbA1c)
- Glucose tolerance test for borderline diabetics
- Liver function tests
- Renal Function tests

- Estimation of cardiac enzymes (CPK, MB, LDH)
- Determination of lipid profile
- Serum and urine electrolytes
- CSF analysis in cases of meningitis

Textbooks and Reading Material

- Michael L.Bishop, Edward P. Fody, Larry E. Schoeff Publisher: Lippincott Williams &Wilkins (July 6, 2004) *Clinical Chemistry: Principles, Procedures, Correlations* 6th Edition
- Carl Burtis Edward Ashwood David Bruns (2011). "*Tietz Textbook of Clinical Chemistry and Molecular Diagnostics",* ELESVIER
- Alistaire F Smith, Geoffrey Beckett, Simon Walker, Peter Rae (1998) *Lecture Notes on Clinical Biochemistry,* 6 th Edition, John Wiley & Sons.
- Alan H Gowenlock; Janet R Mc Murray. Varley Clinical Biochemistry 6th edition 2006. Heinemann medical books, New Dehli
- Donald Voet; Judith G Voet. Biochemistry 3rdedition,2004. John Wiley & Sons
- Allan (2014) Gaw Clinical Biochemistry E-Book: An Illustrated Colour Text,by 3rd edit Churchill livin stone.

Teaching Learning Strategies

- Lectures
- Assignments and Presentations
- Group discussions
- Interactive sessions

Assignments: Types and Number with Calendar

- Quiz in 4th week of 5 marks
- Assignments on Clinical Biochemistry in 8th week of 10 marks
- Presentations of given assignment topics in 12th week of 10 marks

Assessment

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.