

**CH-116 Principles of Biochemistry**

**Credit Hours**        2-1

**Pre-requisite**        Nil

**Course Objectives**

The course aims to introduce students to the fundamental concepts of biochemistry, including the structure, classification, and biological functions of key biomolecules such as carbohydrates, lipids, proteins, and nucleic acids. Students will explore the chemical properties of amino acids, peptides, and enzymes, along with the role of vitamins and metabolic pathways. Additionally, the course will highlight the pharmaceutical and industrial applications of biochemistry and biotechnology.

**Detailed Contents**

Introduction to the scope of Biochemistry, cell structures and their functions, origin and nature of biomolecules. Carbohydrates structure, classification, Physical and chemical properties of various classes of carbohydrates, biological functions of glucose, starch, glycogen, cellulose, and cell wall polysaccharides. Lipid's structure and classification, chemistry and biological importance of fatty acids, waxes, glycerides, phospholipids, sphingo lipids, glycolipids, sterols and prostaglandins. Function of lipids in biological membranes and transport mechanisms. Protein structure and classification, physical and chemical properties of amino acids, biological significance of amino acids, peptides, proteins. Nucleic Acids Chemical composition of nucleic acids, structure and biological function of nucleic acids. Vitamin types and their functions. Enzymes properties, nomenclature, classification, Metabolic pathways. Pharmaceutical and industrial implications of Biochemistry and Biotechnology.

**Course Outcome**

By the end of this course, the students will be able to;

Explain biochemical principles underlying the structure and function of biomolecules.

Analyze metabolic pathways and their relevance to cellular function and human health.

Evaluate the applications of biochemistry in fields such as medicine, agriculture, and biotechnology etc.

Relevant Experiments:

Qualitative and quantitative tests for Carbohydrates, Proteins and Lipids.

Preparations of Buffers and laboratory solutions and PH determination.

Enzyme and DNA isolation, extraction, analysis and study of various parameters.

Estimation of metal ions and glucose in biological fluids.

**Recommended Books:**

Nelson, D. L. (2012). Lehninger's principles of biochemistry (6th ed.). Macmillan Higher Education; W. H. Freeman. ISBN: 9781429222631

Voet, D., & Voet, J. G. (2011). Biochemistry (4th ed., illustrated). John Wiley & Sons Canada. ISBN: 9780470917459

Murray, R. K., & Harper, H. A. (2021). Harper's biochemistry (29th ed.). Appleton & Lange. ISBN: 9780838536841

Zubay, G. L. (2008). Biochemistry (4th ed., illustrated). [Publisher not listed]. ISBN: 9780697219008

Harvey, R. A., Ferrier, D. R., & Karandish, S. (2010). Lippincott's illustrated reviews: Biochemistry (5th ed.) and Biochemistry map (MedMaps) bundle. Lippincott Williams & Wilkins. ISBN: 9781451116311

Current Literature and Review