

Course Code	Course Title	L	T	P	C
1150BM102	BIOCHEMISTRY	3	0	0	3

a) Course Category

Program core

b) Preamble

The Purpose of the course is to understand the various biochemicals and their activities in the body.

c) Prerequisite

Biology for Engineers.

d) Related Courses

Pathology and Microbiology

e) Course Outcomes

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Explain the fundamentals of biochemistry	K2
CO2	Explain about carbohydrates and its importance.	K2
CO3	Explain about lipids and its importance.	K2
CO4	Describe the nucleic acids and proteins and various separation techniques.	K2
CO5	Describe the biochemistry of body fluids	K2

f) Course Content

UNIT I INTRODUCTION TO BIOCHEMISTRY 9

Introduction to Biochemistry, water as a biological solvent, weak acid and bases, pH, buffers, Handerson-Hasselbalch equation, physiological buffers, fitness of the aqueous environment for living organism . Principle of viscosity, surface tension, adsorption, diffusion, osmosis and their applications in biological systems.

UNIT II CARBOHYDRATES 9

Classification of carbohydrates - mono, di, oligo and polysaccharides. Isomerism, racemisation and mutarotation .Structure, physical and chemical properties of carbohydrates. Metabolic pathways and bioenergetics – Glycolysis, glycogenesis, glycogenolysis and its hormonal regulation. TCA cycle and electron transport chain.Oxidative phosphorylation

UNIT III LIPIDS 9

Classification of lipids- simple, compound and derived lipids. Nomenclature of fatty acid, physical and chemical properties of fat. Saponification number, Reichert- Meissl number and iodine number. Metabolic pathways: synthesis and degradation of fatty acid (beta oxidation), hormonal regulation of fatty acid metabolism, ketogenesis, structural architecture and significance of biological membrane.

UNIT IV NUCLEIC ACID & PROTEIN 9

Structure of purines and pyrimidines, nucleoside , nucleotide , DNA act as a genetic material, chargoffs rule. Watson and crick model of DNA. Structure of RNA and its type. Classification, structure and properties of proteins, structural organization of proteins, classification and properties of aminoacids.Separation of protein: gel filtration, electrophoresis and ultracentrifugation.

UNIT V BIOCHEMISTRY OF BLOOD AND BODY FLUIDS 9

Liver function test. Renal function test. Acid base balance and imbalance measurements of electrolytes, their abnormal and normal values and conditions. Biochemistry of urine testing, uses of isotopes in Biochemistry

g) Learning

Resources

- a. David.W.Martin, Peter.A.Mayes , Victor. W.Rodwell, “Harper’s Review of Biochemistry”, LANGE Medical Publications, 1981
- b. Keith Wilson & John Walker, “Practical Biochemistry - Principles & Techniques”, University Press, 2009.
- c. Text book of medical biochemistry – Rana shine, MN Chatterje 3rd edition (for unit 5).

Reference Books

1. Trevor palmer, “Understanding Enzymes”, Ellis Horwood Ltd. 1991.
2. Pamela.C.Champe & Richard.A.Harvey, “Lippincott Biochemistry Lippincott’s Illustrated Reviews”, Raven publishers,1994.

Sathyanarayana, Textbook of Biochemistry, 2003