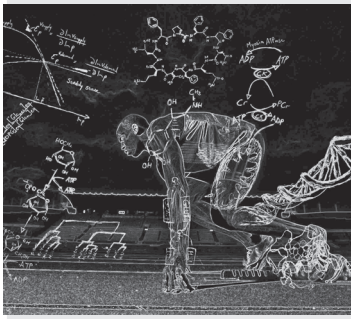
19BM202 CLINICAL BIOCHEMISTRY



SOURCE:
https://notesgate.com/wp-content/uploads/2017/11/Signals-and-Systems.jpg

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P
45	-	30

WA/RA	SSH/HSH	CS	SA	S	BS
4	10	-	2	-	2

COURSE DESCRIPTION AND OBJECTIVES:

This course surveys the structure and function of biological molecule including carbohydrates, lipids, and proteins. Topics of this course include enzyme activity, special properties of biological membranes, hormones, vitamins, metabolic pathways, biotransformation and molecular biology, introduction to biochemistry. Familiarized with the classification, structure and properties of carbohydrates, lipids, protein and enzyme.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes.

COs	Course Outcomes	POs
1	To emphasize the role of biomolecules by providing basic information on specific metabolic diseases and disorders.	1
2	Critically evaluate the role of carbohydrates, proteins, fats in the processes of metabolism.	2
3	Apply Handerson-Hasselbalch and Michaelis-Menten equations for solving problems.	2
4	Estimate the quantities of glucose, urea creatinine in laboratory experiments using analytical instruments.	5, 6,12

SKILLS:

- ✓ *Functioning and understanding of various body fluids.*
- ✓ *Interpretation of harnessing of energy in organ system.*
- ✓ *Analyze the basis of enzyme kinetics.*

UNIT - I **L-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. Biochemistry of living cell and transport of substances across biological membrane to be included in the beginning of the unit.

UNIT - II **L-9**

CARBOHYDRATES: Classification of carbohydrates - Mono, Di, Oligo and polysaccharides; Isomerism, racemization and mutarotation, Structure, Physical and chemical properties of carbohydrates; Metabolic pathways and bioenergetics – glycolsis, glycogensis, glycogenolysis and its hormonal regulation; TCA cycle and electron transport chain; Oxidative phosphorylation.

UNIT - III **L-9**

LIPIDS: 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, significance of biological membrane.

UNIT - IV **L-9**

NUCLEIC ACID AND PROTEIN: Structure of purines and pyrimidines, Nucleoside, Nucleotide, DNA act as a genetic material, Chargaff's 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 amino acids, Separation of protein, Gel filtration, Electrophoresis and Ultracentrifugation.

UNIT - V **L-9**

ENZYME AND ITS KINETICS: Classification of enzymes, Apoenzyme, Coenzyme, Holoenzyme and cofactors; Kinetics of enzymes - Michaelis-Menten equation; Factors affecting enzymatic activity - temperature, pH, substrate concentration and enzyme concentration, inhibitors of enzyme action, competitive, non-competitive, irreversible; Enzyme - mode of action, allosteric and covalent regulation, clinical significance of enzymes, measurement of enzyme activity and interpretation of units.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS **TOTAL HOURS: 30**

1. Study of Plasma protein electrophoresis.
2. Study of Chromatography of amino acids.
3. Study of Colorimetry.
4. Study of Spectrophotometry.
5. Study of pH meter.
6. Study of Flame photometry-Analysis of Na and K in an unknown sample.

7. Quantitative estimation of glucose.
8. Quantitative estimation of urea.
9. Quantitative estimation of creatinine.
10. Quantitative estimation of serum proteins, A/G Ratio.
11. CSF analysis.
12. Clearance tests-demonstration.

TEXT BOOKS:

1. David.W.Martin, Peter.A.Mayes and Victor. W.Rodwell, "Harper's Review of biochemistry", 19th edition, LANGE Medical Publications, 1981.
2. Keith Wilson and John Walker, "Practical Biochemistry - Principles and Techniques", Oxford University Press, 2009.

REFERENCE BOOKS:

1. Trevor palmer, "Understanding Enzymes", 1st edition, Ellis Horwood Ltd. 1991.
2. Pamela.C.Champe and Richard.A.Harvey, "Lippincott Biochemistry Lippincott's Illustrated Reviews", 1st edition, Raven Publishers, 1994.