4th Semester	**RBM4C003**	**Biochemistry and Biophysics**	**L-T-P 3-0-0**	**3 CREDITS**

Module- I (7 Hours)

The cell: Cellular organization, cell membrane structure, cell control mechanism, membrane signaling
Biomolecules: Carbohydrates, amino acids, lipids, nucleic acid, vitamins, minerals

Module- II (11 Hours)

Bioenergetics: Adenosie triphosphate (ATP), structure of ATP, Methods of ATP production, self-regulation system of ATP, Overview of energy transfer

Enzymes: Chemical nature, Nomenclature, classification, hydrolysis, mechanism of enzyme action, mechanisms of enzyme inhibition, M-M-Kinetics, Isozymes and Allosteric enzymes, Isolation techniques &Spectrophtometric assay of enzyme activitymedical and diagnostic applications of enzymes

Cellular respiration: Aerobic and anaerobic respiration

Module- III (09 Hours)

Metabolism: Carbohydrate metabolism, Amino acid metabolism, triacylglycerol metabolism, lipid catabolism, ketogenesis, fatty acid biosynthesis, cholesterol biosynthesis

Protein synthesis: Initiation, elongation, termination, control of gene expression, regulation of Lac operon, RNA processing, Recombinant DNA, Transcription & Translation, Reverse Transcription, Replication.

Module-IV: (10 Hrs.)

Bioelectrical Phenomena: Membrane Potential, Local and propagator types, Diffusion potential, phase boundary potentials, Generator Potentials, Monophonic as Biphasic Action Potentials (AP). Properties & Propagation of AP, factors influencing propagation of AP. Electrical properties of excitable membranes, Membrane Capacitance, Resistance, conductance, equivalent electrical circuit diagram for excitable membranes & pacemaker potentials.Electrical activity of brain (EEG) different wave forms, & their characteristics, Electrical Activity of Heart (ECG),Eelctro-RetinoGram(ERG), Electro-Occologram (EOG), Receptor potentials, Stimuli, Electrical stimulus, strength-duration relationship, Dielectric properties of Bio-membrane, Space Constant & Time Constant for excitable membrane.

Module-V: (08 Hrs.)

Ionizing radiations, U-V & I-R radiations, radioisotopes & their use in biomedical research, Radioactive decays, Half-life period, Half Value Layer, Linear Energy Transfers (LET), Relative Biological Efficiency (RBE) and Interaction of radiation with-matter.

Books:

- Radiation Biophysics, Second Edition - by Edward L. Alpen - Academic Press; 2 edition (January 15, 1998)
- Biochemistry- The Molecular Basis of Life, Trudy McKee & James R. McKee, Oxford University Press
- Bio-Physics – Roland Glaser- Springer; 2nd printing edition (November 23, 2004)
- The Biomedical Engineering Hand Book- 3rd Ed- (Biomedical Engineering Fundamentals) - Joseph D. Bronzino – CRC –Tylor-Francis – 2006 (Section- III – Bio-Electrical Phenomena)
- Biochemistry: Lehninger Principles of Biochemistry, Fourth Edition - by David L. Nelson & Michael M.Cox , - W. H. Freeman; 4 edition (April 23, 2004)
- Fundamentals of Biochemistry: Life at the Molecular Level - by Donald J. Voet , Judith G. Voet& Charlotte W.Pratt.-Wiley;2edition(March31,2005)