20CY211 BIOLOGICAL CHEMISTRY

Hours Per Week :

L	T	P	C
4	-	-	4

Course Description and Objectives:

The major objectives of this course are to bring holistic information about various bio molecules, their significance in proper maintenance & growth of living cell via different metabolic path ways. As it is compiled with the details of sources, classification, physical & chemical characteristics of bio molecules, students are able to understand their requirement for the body based on the Recommended Dietary Allowances. It enlightens the students on energy component associated with all kinds of bio molecules and also the deficiency/ metabolic syndromes associated with them. Upon completion of this course students are able to understand the metabolic path ways and the interconnection among them. Students should understand the chemistry behind the life molecules and can apply in identifying the symptoms/disorders due to mal nutrition.

Course Outcomes:

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

COs	Course Outcomes
1.	Understand the role of cell organelles & attributes the biological buffers adequacy for normal metabolic processes.
2.	Determine the energetics of carbohydrates in metabolism & the various routes of energy generation, can assign RDA value based on BMI.
3.	Analyze the structural organization of proteins and metabolic disorders associated with it and can diagnose the malnutrition disorders to suggest balanced diet.
4.	Evaluate the disorders of lipid metabolism & pathways of energy release from lipids via beta oxidation and ketogenesis, able to estimate the TG, Cholesterol and attribute to functioning of heart.
5.	Analyze energy rich bonds in biomolecules & energy rich compounds & the factors effecting enzyme activity, can identify the important co factors, micro & macronutrients necessity.

UNIT - I :

Introduction to Biochemistry: Outlines of the biochemistry, organization of cell organelle, cell membrane, active and passive transport processes across the cell membranes, Biological importance of water, types of biological buffers & their significance.

UNIT - II :

Chemistry of Carbohydrates and their Metabolism: Definitions, classification with examples and structures, Sources, Properties, Reactions and Biological significance of carbohydrates.

Glycolysis, Citric acid cycle (TCA cycle), Electron transport, HMP shunt, Glycogenolysis, Gluconeogenesis, Glycogenesis. Recommended dietary allowances (RDA) & Metabolic disorders of carbohydrates.

UNIT - III :

Chemistry of Proteins and their Metabolism: Definitions, classification with examples and structures, properties, reactions and biological significance of proteins.

Protein turnover. Ketabolism of Amino acids (Trans-amination,deamination, de-carboxylation). Urea cycle and it's metabolic disorders. Outlines of their metabolism, Protein malnutrition & its consequences

UNIT - IV :

Chemistry of Lipid and their Metabolism: Definitions, classification with examples and structures, properties, reactions and biological significance of lipids.

Oxidation of saturated (- Oxidation), Ketogenesis and Ketolysis; Biosynthesis of Fatty acids, Lipids; Metabolism of cholesterol; Hormonal regulation of Lipid Metabolism. Defective metabolism of Lipids.

UNIT - V :

Enzymes: Classification, mode of action**,** factors affecting enzymes action, Coenzymes, enzyme kinetics.

Biomolecules: Brief outline of Energy rich compounds, nucleic acids, vitamins and minerals, Detoxification mechanisms and their biological significance.

Sources, Absorption, Biochemical functions, Deficiency states of Na, K, Mg, Ca, P, S, Cl, F, I, B, Se, Fe, Zn, Cu, V, Cr, Mn, Co, Mo

Text Books :

1. Harper, Biochemistry
2. A.L.Lehninger, Principles of Biochemistry.
3. J.L.Jain, Fundamentals of Biochemistry.
4. Satyanarayana, Text Book of Biochemistry
5. Rama Rao, Text Book of Bio Chemistry.
6. Conn, Outlines of biochemistry

Reference Books :

1. L.Stryer, Text Book of Bio Chemistry.
2. E.E Conn & P.K. Stumpf, Outlines of Biochemistry by, John Wiley & sons, New York.
3. B.Harrow and A. Mazur, Text Book of Biochemistry, WB Saunders Co., Philadelphia.
4. Boyer Rodney, Modern experimental Bio Chemistry.
5. West, Edward Text Book of Biochemistry.
6. Conn, Outlines of Biochemistry.
7. Plummer, Practical Bio Chemistry.
8. Denniston, Topping & Caret; General, Organic, and Biochemistry, McGraw-Hill.