

Subject Code: 02MB0155
Subject Name: Biomolecules
B.Sc. Semester - II

Objective: To provide students with an organized approach of molecules of living systems and their functions and applications.

Credits Earned: 4 Credits

Course Outcomes: After completion of this course, student will be able to

- Understand the concepts & properties of molecules and their reactions.
- Better understanding about the structure, composition & properties of various biomolecules like carbohydrate, nucleic acids lipids, proteins and vitamins etc.
- Better understanding about the biological roles of biomolecules.
- Developing concepts about biological functions & applications of biomolecules in various fields.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA(M)	CSE (I)	Viva (V)	Term work (TW)	
4	0	0	4	50	30	20	0	0	100

Contents:

Unit	Topics	Contact Hours
1	Basics of Chemistry Atoms, Ions, Molecules, Chemical Bonds, Properties of Water, Solvent & Solute, Types of Chemical Reactions, Acid-Base, Buffers.	15
2	Carbohydrates & Nucleic Acids: a. Mono, Oligo & Polysaccharides; Structure, Physical, Chemical & Biological properties; Classification of carbohydrates; Biological Functions & Applications. b. Nucleosides & Nucleotides, Structure & Functions of DNA; Forms of DNA (A, B and Z); Structure & Functions of t-RNA, r-RNA, and m-RNA.	15
3	Amino Acids & Proteins: Basic Structure, Classifications and Properties of Amino acids; Peptide bonds. Proteins: Primary, Secondary, Tertiary & Quaternary Structures of Proteins; Protein: Functions & Applications.	15
4	Lipids & Vitamins: Introduction of Lipids; Structure, classification (saturated, unsaturated, branched) and properties of fatty acids; Lipid Classification-Simple, Complex and Derived lipids (triglycerides, waxes, phospholipids, sphingolipids, terpenes, and steroids), functions and applications. Vitamins: Sources, Structure and biological function of Vitamins	15
	Total Hours	60

References:

1. **Biochemistry** (2013), 4th Edition by U. Satyanarayana, Elsevier.
2. **Physical biochemistry: Principles and applications** (2009), 2nd Edition, by David Sheeham; John Wiley and Sons.
3. **Physical biochemistry: Applications to Biochemistry & Molecular Biology**, (1982), by David Freifelder; W. H. Freeman.
4. **Lehninger Principles of Biochemistry**, by David L. Nelson and Michael M. Cox; W. H. Freeman.
5. **Fundamentals of Biochemistry**, (2016) 5th Edition, Donald Voet, Judith G. Voet, W. Pratt; Wiley publishers.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation

Remember	Understand	Apply	Analyze	Evaluate	Create
25%	25%	25%	10%	10%	5%

Instructional Method:

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.
- b. The internal evaluation will be done on the basis of continuous evaluation of students in the class-room in the form of attendance, assignments, verbal interactions etc.

Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.