

**Syllabus for Bachelor of Science**
**Microbiology**
**Subject Code: 02MB0152**
**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:** 6 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.

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)	Mid Sem (M)	Internal (I)	Viva (V)	Practicals	
4	0	2	5	50	30	20	25	25	150

**Contents:**

Unit	Topics	Contact Hours
1	<b>Basics of Chemistry</b> Atoms, Ions, Molecules, Chemical Bonds, Properties of Water, Solvent & Solute, Types or Chemical Reactions, Acid-Base, Buffers.	15
2	<b>Carbohydrates &amp; Nucleic Acids:</b> a. Mono, Oligo & Polysaccharides; Structure, Physical, Chemical & Biological properties, Biological Functions & Applications. b. Nucleosides & Nucleotides, Structure & Functions of DNA (A, B and Z forms), Structure & Functions of t-RNA, r-RNA, and m-RNA; estimation of nucleic acids.	15
3	<b>Amino Acids &amp; Proteins:</b> Structure, Classifications and Properties of Amino acids, Peptide bonds, Chemical interactions, Primary, Secondary, Tertiary, Quaternary Structures of Proteins, Structural Classification of Proteins, Protein Detection, Estimation, Functions & Applications.	15
4	<b>Lipids &amp; Vitamins:</b> Structure, classification, properties, reactions and functions of lipids and fatty acids (saturated, unsaturated, branched, triglycerides, phospholipids, sphingolipids, terpenes, waxes and steroids), detection and estimation of lipids. <b>Vitamins:</b> Structure and function of fat soluble vitamins as vitamins A, D, E and K.	15
	<b>Total Hours</b>	<b>60</b>

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