Syllabus for Bachelor of Science

B.Sc. Chemistry

Subject Code: 02MB0253
Subject Name: BASIC BIOCHEMISTRY
B.Sc. Semester – IV

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

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)	IA(M)	CSE (I)	Viva (V)	Term work (TW)	
5	0	2	6	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Basics of Chemistry** Atoms, Ions, Molecules, Chemical Bonds, Properties of Water, Solvent & Solute, Types ofBiochemical Reactions, Acid-Base, Buffer, Basic of Thermodynamics.	10
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 (Circular & Linear), Structure & Functions of RNA (t-RNA, r-RNA, and m-RNA); central dogma of life.	15
3	**Amino Acids & Proteins:** Basic Structure, Classifications and Properties of Amino acids; Peptide bonds; Structural organization of Proteins; Functions & Applications.	15
4	**Lipids & Vitamins:** Introduction of Lipids; Structure, classification (saturated, unsaturated, branched) & properties of fatty acids; Classification of Lipid (Simple, Complex & Derived), Functions and Applications of Lipids **Vitamins:** Sources, Structure and biological function of vitamins.	20
	Total Hours	**60**

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.

References:

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

Experiments:

1. Preparation of Solutions
2. Preparation of Buffers
3. Qualitative Determination of Carbohydrates
4. Quantitative Estimation of Carbohydrates
5. Qualitative Determination of Amino Acids
6. Quantitative Estimation of Proteins
7. Quantitative Estimation of Nucleic Acids