GUJARAT UNIVERSITY
B.Sc. (Honors) Microbiology Syllabus
Second Year B. Sc. Semester III, Microbiology
Multidisciplinary Course
Effective from June-2024

Learning outcomes

- This syllabus aim to provide students with a comprehensive understanding of the structure, function, and significance of carbohydrates, nucleic acids, proteins, lipids for biology.
- Awareness of the diverse functions of proteins in cells and organisms, including enzymatic catalysis, will improve the understanding of signal transduction, structural support, and immune defense further.
- Ability to explain the roles of lipids in membrane structure, energy storage, and signaling molecules.

Paper Code: MDC-MIC-234T
Paper Name: Introduction to Biomolecules
Credits: 02 (02 hrs/ week, Total: 30 hrs)

Unit 1 Carbohydrates and lipids **(Hr)**

A. Carbohydrates **(08)**

I. Sugars: Structures of monosaccharides and their stereochemistry
II Reactions of monosaccharides
III Structure and Functions of disaccharides: Sucrose, Maltose and Lactose
IV Structure and Functions of Polysaccharides: Starch, Cellulose and Peptidoglycan **(07)**

B. Lipids

I. Types of Fatty Acids
II. Classification of Lipids.
III. Essential Fatty acids
IV. Lipids and Biological membrane

Unit 2 Nucleic acid and Protein

A. Nucleic acid **(08)**

I. Chemical Composition and structure of Nucleic acid: Sugar, Phosphoric acid, Nitrogenous base: Purines and Pyrimidines
II. Nucleosides and Nucleotides
III. [a] Formation of Phosphodiester bond and polynucleotide chain of DNA.

[b] Structure of ds DNA

[c] Functions of DNA

IV. Types of RNA: Structure and Functions of rRNA mRNA and tRNA.

B. Protein **(07)**

I. Structure and properties of amino acids

II. Formation of peptide Bond and polypeptide chain

III. Structure of proteins: Primary, Secondary, Tertiary and Quaternary

IV. Classification of proteins

V. Functions of Proteins

Text Books:

1. Rastogi S. C., Biochemistry (2003) 2nd Edition, ISBN: 978-0070527959,Tata McGraw - Hill Education
2. Atlas R M, (1977), Principles of Microbiology, 2nd Edition, Wm. C. Brown Publ. Iowa USA
3. Fundamentals Of Biochemistry (2000) by J L Jain, Sunjay Jain and Nitin Jain, ISBN-10 : 9352838300 S. Chand Publication, New Delhi

URLs/Weblinks for E-content

1.	Carbohydrates	https://www.youtube.com/watch?v=Q8kPQQfdtgY&list=PL0o42GecDaMe4h7oZ22kHC45Cpga9BH8c
2.	Protein	https://www.youtube.com/watch?v=YWEiQlEUFak&list=PLRdQ4XybtNjRjlIIVcoCMcwN36BIgPDqw&index=3 https://www.youtube.com/watch?v=kDmOM_sggtc&list=PLRdQ4XybtNjRjlIIVcoCMcwN36BIgPDqw&index=6 https://www.youtube.com/watch?v=Fp1wKo72b2A&list=PLRdQ4XybtNjRjlIIVcoCMcwN36BIgPDqw&index=4
3.	Nucleic acid	https://www.youtube.com/watch?v=s1MoBTEcVYY
4.	Lipids	https://www.youtube.com/watch?v=ZqoX2W1N6l0

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Paper Code: MDC-MIC-234P
Paper Name: Microbiology Practical
Credits: 02 (04 hrs/ week, Total: 30 hrs)

1. Qualitative analysis of biomolecules

   A. Carbohydrates: Iodine test, Molisch's test, Benedict's test, Barfoed's test, Bial's test and Seliwanoff's test
   B. Protein: Biuret test, Ehrlich's test, Glyoxilic acid test and Xanthoproteic test
   C. Lipids: Sudan IV test, Solubility test, Saponification test, Potassium permanganate test for unsaturated fatty acids

2. Study of biomolecules as ingredients of microbiological media

   A. General cultivation medium: Nutrient agar
   B. Selective medium: Rose Bengal agar
   C. Differential medium: MacConkey's agar
   D. Enriched medium: Blood Agar medium