



MANGALORE UNIVERSITY
DEPARTMENT OF BIOSCIENCES

M.Sc. ENVIRONMENTAL SCIENCE

ESH403 BIOLOGICAL CHEMISTRY

Course Outcomes:

- CO1 Understand the fundamentals of biological chemistry.
- CO2 Discuss on biomembranes.
- CO3 Describe the processes of metabolism.
- CO4 Study in detail biomolecules namely proteins, nucleic acids and lipids.

UNIT I (13 hours)

Basic concepts: Introduction to biomolecules, classification, type; bonding in biomolecules. Structure of water - hydrophobic, hydrophilic interactions in biological systems.

UNIT II (13 hours)

Proteins; Amino acids and peptides – classification and structure and functions; synthetic polypeptides. Enzymes and coenzymes – classification structure and functions. Nucleic acids: Elementary concepts of nucleosides, nucleotides and polynucleotides. Structure and functions of DNA and RNA.

UNIT III (13 hours)

Lipids: common classes of lipids – glycerolipids, phospholipids and sphingolipids structure and properties. Carbohydrates: Monosaccharides, oligosaccharides and polysaccharides. Structure and functions of some important polysaccharides (starch, cellulose, glycogen, heparin, chitin, pectins, hemicellulose and chondroitin).

UNIT IV (13 hours)

Membranes : Biomembrane organisation – membrane lipids, membrane bound proteins. Properties of membranes and transport mechanism. Metabolism and bioenergetics. Overview of metabolism - catabolic and anabolic process, glycolysis, citric acid cycle and oxidative phosphorylation.

References

1. Vogel, A.L., 1971. Elementary practical organic chemistry. Vol. 3 Quantitative organic analysis. Langman ELBS.
2. Frieser, L.F. 1968. Organic chemistry experiments. (D.C. Health & Co.).
3. Elmore, D.T., 1968, Peptides and proteins. Cambridge University Press.
4. Finer, L.L. 1980. Organic chemistry. Vol. I & II. Lynem (ELBS).
5. Morison, R.T., and Boyd, R.N., 1983. Organic Chemistry. McGraw Hill. Kogakusha.
6. Pigman & Horton, D., 1970. The carbohydrates. Chemistry and biochemistry, 2nd ed. Vol. IA & IB. Plenum Press, New York & London.
7. Branden, C. and Tooze, J. 1991. Introduction to Protein Structure. Garland Publishing Inc.
8. Cantor and Schimmel, 1980. Biophysical Chemistry Part I & III, WH Freeman and Co.

9. Dickerson and Geis, 1969. The structure and action of proteins. Benjamin/ Cummings Publishing.
10. Jayaraman, J., 1948. Laboratory Manual of Biochemistry.

