

**OBJECTIVES :** The students will be able to :

- Describe the basic chemical structures carbohydrates and lipids and their general function and characteristics.
- Classify carbohydrates and lipids.
- Identify the reactions of various functional group of carbohydrates and lipids.
- Apply theory based tools to solve simple biochemical problems related to subject areas.

**COURSE :**

**UNIT – I : Introduction :** Introduction to Biochemistry, Water as a biological solvent, weak acids and bases,  $p^H$ , buffers, Henderson-Hasselbalch equation, physiological buffers, fitness of the aqueous environment for living organisms.

**UNIT – II : Carbohydrates :** Structure of monosaccharide. Stereo isomerism and optical isomerism of sugars, Reactions of aldehyde and ketone groups. Ring structure and anomeric forms, mutarotations. Reactions of sugars due to hydroxyl groups. Biological importance of monosaccharides Important derivatives of monosaccharides-structure, occurrence and functions of important ones).

**UNIT – III : Carbohydrates :** Structure occurrence and biological importance of monosaccharides, oligosaccharides and polysaccharides E.g.:Cellulose, chitin, agar, alginic acids, pectin, proteoglycans, sialic acids, blood group polysaccharides, glycogen and starch. Bacterial cell wall polysaccharides eg. Glycoproteins. Important derivatives of disaccharides & trisaccharides (structure, occurrence and functions of important ones).

**UNIT – IV : Lipids:** Definition and classification. Fatty acids: introduction, classification, nomenclature, structure and properties of saturated and unsaturated fatty acids. Essential fatty acids, prostaglandins. Bio – membranes structure and transport of ions & molecules.

**UNIT – V : Triacylglycerols :** nomenclature, physical properties, chemical properties and characterization of fats – hydrolysis, saponification value, rancidity of fats, Reichert-Meissel number and reaction of glycerol. Biological significance of fats. Glycerophospholipids (lecithins, lysolecithin, cephalin, phosphatidyl serine, phosphatidyl inositol, plasmalogens), sphingomyelins, glycolipids – cerebroside, gangliosides . Properties and functions of phospholipids, isoprenoids and sterols.

**REFERENCES :**

1. Rama Rao, A.V.S.S. (1989) Text Book of Biochemistry, L.K.& S Publishers, Visakhapatnam.
2. Comn, E.E. and Stump, P.K. (1989) Outline of Biochemistry. Wiley Eastern Ltd., New Delhi.
3. Keiner, I.S. and Orten, J.M. (1979) Biochemistry. C.V.Mosby &Co., St. Louis.
4. Sivaminathan, M(1981) Biochemistry For Medical Students, Geeta Book House Publishers, Mysore.
5. Kuchel.P.W. and Ralston, G.B. (19888) Theory and Problems Of Biochemistry, Mc Graw Hill Book Co., New York.
6. Berry A.K. (1989). Elementary Biochemistry, Emkay Publishers, New Delhi.

**OBJECTIVES :** The students will be able to :

- Interpret experimental/investigative data.
- Distinguish between normal and abnormal data derived as a result of tests which he/she has performed and observed in the laboratory.
- Apply theory based tools to solve simple biochemical problems related to subject areas.
- Work in a laboratory with selected experimental techniques and methods which are applied in biochemical experiments.
- Communicate knowledge about problem areas within biochemical subject areas in writing.

**COURSE :**

1. Preparation of standard buffers and determination of  $p^H$  of a solution.
2. Qualitative tests for :
  - a. Carbohydrates
  - b. Lipids
3. Determination of saponification value and iodine number of fats.
4. Extraction of total lipids by Folch method
5. Isolation of cholesterol from egg yolk .
6. Estimation of carbohydrates by anthrone method.
7. Isolation of glycogen from sheep liver.
8. Isolation of starch from potatoes.
9. Separation of sugars using paper chromatography.

**REFERENCES :**

1. Plummer, D.T.(1979) An Introduction to Practical Biochemistry, Tata MC Graw Hill Book Co., Bombay.
2. Oser, B.L. (1961) Hawk's Physiological Chemistry, Tata MC Graw Hill Book Co. Bombay.
3. Burtis, C.A & Ashwood, E.R (Eds) (V Edn) Tietz Fundamentals of Clinical Biochemistry. WBS aunders & Co. New York.