

**MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR**

**B. Sc. BIOTECHNOLOGY I YEAR TDC (2016-17)**

**Paper VI : *Metabolic Pathways***

**Unit-I**

Transportation across biomembrane, passive transport, active transport, facilitated transport, sodium, potassium and ATPase pump, role of calmodulin. Bioenergetics-general concepts of thermodynamics, energy, enthalpy, free energy, catalysis, activation energy. Metabolism- catabolism and anabolism. General concepts in metabolic pathways and their regulation.

**15 Credit hours**

**Unit-II**

Photosynthesis : significance, historical aspects, photosynthetic pigments, action spectra and enhancement effects, concept of two photosystems, Z-scheme, photophosphorylation, Calvin cycle, C<sub>4</sub> pathway, CAM plants, photorespiration. Transport of organic substances : mechanism of phloem transport, source-sink relationship, factors affecting translocation.

**15 Credit hours**

**Unit-III**

Respiration : ATP-the biological energy currency, aerobic and anaerobic respiration, Krebs' cycle, electron transport mechanism (chemi-osmotic theory), redox potentials, oxidative phosphorylation, pentose phosphate pathway, Gluconeogenesis.

**15 Credit hours**

**Unit –IV**

Nitrogen and lipid metabolism : biology of nitrogen fixation, importance of nitrate reductase and its regulation, ammonium assimilation, structure and function of lipids, fatty acid biosynthesis,  $\beta$ -oxidation saturated and unsaturated fatty acids, storage and mobilization of fatty acids.

**15 Credit hours**

**Unit – V**

Primary and secondary metabolism in plants. Structure, biosynthesis and functions of phenolics, lignins and lignans, alkaloids, terpenoids, flavonoids, suberins, coumarins and furanocoumarins, stilbins.

**15 Credit hours**

### **Recommended Books**

1. Horton and Moran. Principles & Biochemistry. Prentice Hall.
2. Buchanan, G. and Jones. Biochemistry and Molecular Biology of Plant. American Society of Plant Physiology.
3. David, L., Nelson and Cox. Lehninger : Principles of Biochemistry. McMillon Worth Pub.
4. Stryer. Biochemistry. John Wiley & Sons.