Saurashtra University

Course Structure
&
Syllabus
For
Undergraduate Programme
In
Biochemistry 3rd and 4th Semester
Core Courses
Under
Choice Based Credit Semester System
W.e.f. June 2011.
Saurashtra University
PAPER NO 301
BIOCHEMISTRY – CBCS
BIOPHYSICAL AND BIOCHEMICAL TECHNIQUES

Credit: 4
Theory: 6 lectures/ week Total Lectures: 60

Unit I Spectroscopic techniques: [12 hours]
2. Instrumentation, principles, components and working of single and double beam colorimeter and spectrophotometer.

UNIT 2 Hydrodynamic techniques: [12 hours]
1. Sedimentation- the concepts of Centrifugal force (F) and Relative centrifugal force (RCF).
2. Preparative and analytical centrifugation- instrumentation, techniques, and their applications.

UNIT 3 Radio isotopic techniques: [12 hours]
1. Types of radioisotopes used in biochemistry, units of radioactivity.
2. Techniques for measurement of radioactivity (gas ionization and liquid scintillation counting).

UNIT 4: Chromatography: [12 hours]
General principles, methods and applications of the following techniques:
1) Paper and thin-layer chromatography techniques.
2) Ion exchange chromatography.
3) Molecular sieve chromatography.
4) Affinity chromatography
5) Gas-Liquid chromatography (GLC)
6) High performance liquid chromatography (HPLC)

UNIT 5: Electrophoresis. [12 hours]
1. Basic principles of electrophoresis and factors affecting electrophoretic mobility.
2. Principle, materials used and applications of Agarose and Polyacrylamide gel electrophoresis (PAGE).
3. Techniques of Isoelectric focusing, SDS-PAGE, 2-D Gel electrophoresis and their importance
Practicals 302:
1) Introduction to principle and working of Colorimeter and spectrophotometer.
2) Determination of absorption spectrum and absorption maxima of given compound.
4) Introduction to principle and working of centrifuge.
5) Separation of amino acids using paper chromatography. Determination of Rf values and identification of amino acids from mixtures.
6) Separation of lipids by thin layer chromatography.
7) Separation of compounds using column chromatography.
8) Agarose Gel electrophoresis of DNA.

References:
1) Physical biochemistry by D.Frifelder, W.H.Freeman and Co.
2) Physical biochemistry by Vanholde K.E., Practice Hall Inc. New Jersey.
4) Biophysical biochemistry by Upadhyay and Nath.
5) Tools of biochemistry by cooper.
Saurashtra University  
PAPER NO 401  
BIOCHEMISTRY – CBCS  
CELL BIOLOGY AND PLANT BIOCHEMISTRY  

Credit: 4  
Theory: 6 lectures/ week  
Total Lectures: 60

Unit I: Cell morphology, structure and function of cell organelles:  [12 hours]  
2. Structural organization of prokaryotic and eukaryotic cells.  

Unit II: Cell cycle and cell division:  [12 hours]  
2. Basic concepts of cell division and cell differentiation.  
3. Process of mitotic and meiotic type cell division and it’s physiological importance.

Unit III: Biological membranes and Membrane Transport:  [12 hours]  
1. Chemical composition of biological membranes.  
2. Fluid-mosaic model for structure of biological membranes.  
3. Active and Passive transport.

UNIT IV: Plant Biochemistry – I  [12 hours]  
1. Photosynthesis- Light and Dark reactions, Hill reaction.  
2. C₃, C₄ Plants and CAM metabolism. Photorespiration.  

UNIT V: Plant Biochemistry – II  [12 hours]  
1. Biological Nitrogen Fixation and Ammonia Assimilation.  
2. Overview of Plant Tissue Culture.  
3. Overview of Transgenic Plants.

Practicals 402

1. Slide observation of Mitosis cell division.  
2. Slide observation of Meiosis cell division.  
3. Isolation of sub cellular organelles.  
4. Isolation of symbiotic nitrogen fixing microorganism from root nodules.  
5. Preparation of glassware for plant tissue culture.  
7. Callus formation from different parts of plant.  
8. Report of “Visit to Plant tissue culture laboratory”.

Reference Books for 401:
3. Cell and Molecular biology (8th Ed) by De Robertis & Robertis. Lippincot Williams & Wilkins, Philadelphia.
6. Plant Physiology by Devlin.