



SHREE H. N. SHUKLACOLLEGE OF SCIENCE

(AFFILIATED TO SAURASHTRA UNIVERSITY)

Shree H.N. Shukla College Campus Nr. Lalpari lake, Behind old Marketing Yard,
Amargadh, Bhichari, Rajkot-360001, Ph. No-9727753360

Saurashtra University

Semester 2nd Syllabus of Biochemistry(CBCS) New Proposed Syllabus – December 2019
Biochemistry – 201

CELL BIOLOGY

Credit: 4

Theory: 6 lectures/ week Total Lectures: 60

Unit I: Introduction to Cell, Cell morphology and Cell theories

[12 hours]

1. Definition of Cell, History of cell biology and levels of organizations in biology
2. Structural organization of prokaryotic and eukaryotic cells.
3. Structural and functional diversities in eukaryotic cells, plant Vs animal cell. Overview on viruses, viroids and prions.
4. Structure and functions of cytoskeleton elements.

Unit II: Structure, chemical composition, enzymes and functions of different cell organelles:

[12 hours]

1. Cell wall, Plasma membrane and cytoplasm.
2. Mitochondria. Endosymbiosis hypothesis regarding origin of mitochondria and chloroplasts. Maternal origin of mitochondria.
3. Endoplasmic reticulum, Golgi complex, Lysozomes and Microbodies (Glyoxyzomes and peroxyzomes).
4. Homogenization methods and isolation of cell organelles by differential centrifugation and marker enzymes.

Unit III: Cell cycle , Cell renewal and Cell Death:

[12 hours]

1. Overview of Eukaryotic cell cycle and Checkpoints
2. Process of mitotic cell division and its physiological significance.
3. Events in meiotic cell division and its significance.
4. Apoptosis and necrosis - brief outline.

UNIT IV: Cell-Cell Interaction [12 hours]

1. Cell-Cell Interactions and Cell-Matrix Interactions
2. Components of Extracellular Matrix
3. Collagen and Non-Collagen Components
4. Tight Junctions; Gap Junctions; Desmosomes; Hemidesmosomes; Focal Adhesions AndPlasmodesmata
5. Cell Wall; Role of Cell Interaction in Development.

Unit V: Biological membranes and Membrane Transport: [12 hours]

1. Chemical composition of biological membranes. Singer and Nicholson model of plasma membrane structure
2. Concept of membrane asymmetry, Lateral movement and flip-flop movement of phospholipids and proteins in biological membranes. FRAP experiment.
3. Transport of ions and molecules across the biological membranes: Simple diffusion, Facilitated diffusion and Active transport.
4. Sodium potassium ATPase structure and mechanism and its significance. General introduction to ionophores and their applications.



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Practicals for Paper No 201- (Cell Biology):

Credit: 3

6 Hours / Week

1. Staining and Visualization of plant cell.
2. Staining and Visualization of animal cell.
3. Identification of different stages of mitosis in onion root tip.
4. Identification of different stages of meiosis in grasshopper testis.
5. Micrographs of different cell components (dry lab).
6. Preparation of liver homogenate using Glass-Teflon homogenizer and Isolation of sub cellular organelles from liver homogenate by differential centrifugation
7. Preparation and Observation of Bacterial Protoplast.
8. Power point presentation/ Scientific Essay / poster making (Card Sheet).

Reference Books for Paper No 201(Cell Biology):

1. Molecular biology of the Cell by Albert's et al., Garland publication Inc NY and London.
2. Molecular biology by Lodish, scientific American books.
3. Cell and Molecular biology (8th Ed) by De Robertis&Robertis. Lippincot Williams & Wilkins, Philadelphia.
4. Biochemistry by Donald Voet&JudithVoet, John Wiley & sons.inc, NY.
5. Biochemistry by Geoffrey Zubay, McGraw Hill.

