ST. JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS) VISAKHAPATNAM

II SEMESTER **ZOOLOGY**  TIME:3Hrs/Week

Z-Ma2-2501(3) **CELL & MOLECULAR BIOLOGY** Marks:100

w.e.f. 2023-24 admitted batch (23AK)

# LEARNING OBJECTIVES

* To understand the cell and distinguish between prokaryotic and eukaryotic cell
* To understand the role of different cell organelles in maintenance of life activities
* To acquaint the students with the concept s of cell division and cell cycle
* To acquaint student with basic concepts of molecular biology as to how characters are expressed with a coordinated functioning of replication, transcription and translation in all living beings
* To acquaint the students on the biological importance of biomolecules.

# LEARNING OUTCOMES:

The overall course outcome is that the student shall develop deeper understanding of what life is and how it functions at cellular level. This course will provide students with a deep knowledge in Cell and molecular biology. By the completion of the course the graduate shall able to –

* Understand the basic unit of the living organisms and to differentiate the organisms by their cell structure.
* Describe fine structure and function of plasma membrane and different cell organelles of eukaryotic cell.
* Explain the cell cycle and bioenergetics of the cell
* Understand the central dogma of molecular biology and flow of genetic information from DNA to proteins
* Understand the gene expression phenomenon and biological importance of biomolecules

# SYLLABUS:

**UNIT – I Cell Biology-I**

* 1. Definition, history, prokaryotic and eukaryotic cells, virus, viroids, mycoplasma
  2. Electron microscopic structure of animal cell.
  3. Plasma membrane –Models and Fluid mosaic model
  4. Transport functions of plasma membrane-Active – passive- facilitated.

# UNIT – II Cell Biology-II

* 1. Structure and functions of Golgi complex & Endoplasmic Reticulum
  2. Structure and functions of Lysosomes & Ribosomes
  3. Structure and functions of Mitochondria & Centriole
  4. Structure and functions of Nucleus & Chromosomes

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# UNIT – III Cell Biology-III

* 1. Cell Division- mitosis, meiosis
  2. Cell cycle – stages- check points- regulation
  3. Abnormal cell growth- cancer- apoptosis
  4. Bio energetics- Glycolysis-Krebs cycle-ETS

# UNIT IV: Molecular Biology-I

* 1. Central Dogma of Molecular Biology
  2. Basic concepts of - DNA replication – Overview (Semi-conservative mechanism, Semi- discontinuous mode, Origin & Propagation of replication fork)
  3. Transcription in prokaryotes – Initiation, Elongation and Termination, Post- transcriptional modifications (basics)
  4. Translation – Initiation, Elongation and Termination

# UNIT V: Molecular Biology-II

* 1. Gene Expression in prokaryotes (Lac Operon); Gene Expression in eukaryotes
  2. Biomolecules- Carbohydrates (Glucose- structure-properties- biological importance only)
  3. Biomolecules- Protein (Amino acid- structure- properties- biological importance only)
  4. Biomolecules- Lipids (Fatty acid- structure - properties- biological importance only)

***Co-curricular activities (Suggested)***

* Model of animal cell
* Working model of mitochondria to encourage creativity among students
* Photo album of scientists of cell biology
* Charts on plasma membrane models/cell organelles
* Charts on central dogma/lac operon/genetic code
* Model of semi-conservative model of DNA replication
* Power point presentation of any of the above topics by students

# REFERENCES:

* Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell „Molecular Cell Biology‟W.H. Freeman and company New York.
* Cell Biology by De Robertis
* Bruce Alberts, Molecular Biology of the Cell
* Rastogi, Cytology
* Varma & Aggarwal, Cell Biology
* C.B. Pawar, Cell Biology
* Molecular Biology by Frei fielder
* Instant Notes in Molecular Biology by Bios scientific publishers and Viva BooksPrivate Limited
* James D. Watson, Nancy H. Hopkins „Molecular Biology of the Gene‟

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