PARVATHANENI BRAHMAYYA
SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Autonomous
Siddhartha Nagar, Vijayawada–520010
Re-accredited at 'A+' by the NAAC

23ZOMAL122: CELL AND MOLECULAR BIOLOGY

Offered to: BSc. Honours (Zoology) **SEMESTER: II** Credits: 3

Course Type: Major 4 (TH) 60Hrs Year of Introduction: 2023 -2024

Course Prerequisites:
Knowledge of cell biology acquired in Intermediate

OBJECTIVES:

1. The objectives of cell and molecular biology involve unraveling the intricacies of cellular structures, functions.
2. The molecular processes to comprehend the fundamental mechanisms underlying life. Researchers aim to decode genetic information.
3. Understand cellular pathways, and uncover the molecular basis of diseases, fostering advancements in medicine and biotechnology.
4. Contribute to the development of cutting-edge technologies in microscopy, sequencing, and other experimental techniques.
5. Analysis and interpretation in cell and molecular biology research. Apply molecular biology techniques in biotechnological applications, such as genetic engineering and gene therapy.

CO1. Students will demonstrate a comprehensive understanding of prokaryotic and eukaryotic cell structures, functions, and processes and membrane-bound organelles.

CO2. Understanding of the structure and function of major cell organelles, including the endoplasmic reticulum, Golgi apparatus, mitochondria, and lysosomes.

CO3. Uunderstanding of the mechanisms and regulation of cell division, including mitosis and meiosis and bioenergetics, exploring the pathways involved in cellular energy production, such as glycolysis, Krebs cycle and ETS.

CO4. Understanding of molecular biology principles, including the structure and function of DNA, RNA, and proteins, translation of molecular mechanisms of protein synthesis from mRNA templates.

CO5. Understanding of the structure, function, and classifications of major biomolecules, including proteins, nucleic acids, lipids, and carbohydrates.

CO-PO MATRIX							
CO-PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
CO1						M	
CO2					L		
CO3					M		
CO4					M		
CO5					H		

SYLLABUS:

UNIT – I Cell Biology-I

1.1 Definition, history of prokaryotic and eukaryotic cells, virus, viroids and mycoplasma

1.2 Electron microscopic structure of an animal cell.

1.3 Plasma membrane –Models including Fluid mosaic model

1.4 Transport functions of plasma membrane-Active, passive and facilitated.

UNIT – II Cell Biology-II

2.1 Structure and functions of Golgi complex & Endoplasmic Reticulum

2.2 Structure and functions of Lysosomes & Ribosomes

2.3 Structure and functions of Mitochondria & Centriole

2.4 Structure and functions of Nucleus & Chromosomes

UNIT – III Cell Biology-III

3.1 Cell Division- mitosis and meiosis

3.2 Cell cycle – stages, check points and regulation

3.3 Abnormalities in cell division

UNIT IV: Molecular Biology-I

4.1 Central Dogma of Molecular Biology

4.2 Basic concepts of - DNA replication – Overview (Semi-conservative, Conservative and dispersive mechanisms), Origin & Propagation of replication fork.

4.3 Transcription in prokaryotes – Initiation, Elongation and Termination, Post- transcriptional modifications (basics)

4.4 Translation – Initiation, Elongation and Termination

4.5. Genetic code

4.6 Gene Expression in eukaryotes

UNIT V: Molecular Biology-II

5.1 Gene regulation in prokaryotes (Lac Operon) & Eukaryotes;

5.2 Biomolecules- Carbohydrates (Glucose- structure-properties- classification of carbohydrates)

5.3 Biomolecules- Protein (Amino acid- structure- properties- classification of amino acids)

5.4 Biomolecules- Lipids (Fatty acid- structure - properties- classification lipids)

5.5. Bio energetics- free energy, entropy, enthalpy, glycolysis, Krebs and Electron transportation.

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Model Paper

23ZOMAL122: CELL AND MOLECULAR BIOLOGY

Max Marks:70 Semester -II Max Time:3Hrs

SECTION-A

Answer the following Questions (5x4=20)

1. (a) . Write the general characters of Prokaryotes. CO1,L2.

OR

(b) Explain viroids. CO1,L2.

2. (a) Describe the structure of ribosomes . CO2, L2.

OR

(b) Explain the functions of mitochondria .CO2,L2.

3. (a) Write a short note on mitosis. CO3,L6

OR

(b) Write a shot note on abnormalities of cell division. CO3,L6.

4. (a)Explain the DNA Replication. CO4,L2.

OR

(b) Describe the post transcriptional modifications. CO4,L2.

5. (a)Explain the glycolysis . CO5,L2.

OR

(b) Describe the structure of glucose . CO5,L2.

SECTION-B

Answer the following Questions (5x10=50)

6. (a) Write an essay on electron microscopic structure of animal cell. CO1,L2.

OR

(b) Explain the model of plasma membrane. CO1,L2.

7. (a) Describe the process of protein synthesis in endoplasmic reticulum .CO2,L2.

OR

(b) Explain the structure chromosomes .CO2,L2.

8. (a) Write the essay on mitosis and miosis . CO3,L2.

OR

(b) . Explain the stages of cell cycle. CO3,L2

9. (a) Write in detail the process of origin and propagation of fork . CO4,L6.

OR

(b) Write an essay on transcription in prokaryotes. CO4,L6.

10. (a) Describe the classification of proteins . CO5,L2.

OR

(b) . Explain the classification of lipids. CO5,L2.

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