

## BACHELORS WITH ZOOLOGY AS MAJOR (CT – II)

### 5<sup>th</sup> SEMESTER

#### ZOL522J2 ZOOLOGY \_ CELL & MOLECULAR BIOLOGY

**CREDITS: THEORY: 04; INTERNSHIP / PRACTICAL: 02**

#### **COURSE OBJECTIVE:**

*The learner will get the knowledge of cell structure and function, besides understanding the principles of molecular biology.*

#### **LEARNING OUTCOME:**

*The learner will develop a deeper understanding of cell structure and functions. Further, learner will get acquainted with how cells operate, communicate and die*

#### **THEORY (4 CREDITS)**

#### **UNIT I: CELL STRUCTURE & DIVISION**

- 1.1 Cell structure: structural features of prokaryotic & eukaryotic cells
- 1.2 Cell m
- 1.3 Membranes: structure (models) & functions- active & passive transport
- 1.4 Eukaryotic cell organization: brief idea of structure and function of main cell organelles
- 1.5 Cell division & Cell cycle: mitosis and meiosis, their regulation & control

#### **UNIT II: CELL SIGNALING AND TRANSDUCTION**

- 2.1 Cell-cell interactions and modes of cell signaling
- 2.2 Signaling receptors & Cellular response
- 2.3 Signal transduction pathways: MAP kinase and JAK/STAT pathways
- 2.4 Cancer biology: cancer and its classes, Apoptosis

#### **UNIT III: BIOMOLECULES OF LIFE**

- 3.1 Carbohydrates: structure, types & functions
- 3.2 Lipids: structure, types & functions
- 3.3 Proteins: basic structure and functions
- 3.4 Nucleic acids: composition, types & functions

#### **UNIT IV: MOLECULAR BIOLOGY**

- 4.1 Replication in prokaryotes and eukaryotes
- 4.2 DNA damage & repair
- 4.3 Transcription & its regulation in prokaryotes and eukaryotes
- 4.4 Translation and post translational modifications in eukaryotes.

#### **INTERNSHIP OR PRACTICALS (2 CREDITS)**

1. Study of cell & cell organelles through slides/charts/models
2. Preparation of temporary stained mount of the onion root for various mitotic stages
3. Preparation of temporary stained mount of the grasshopper testis for various meiotic stages
4. Slide study of various stages of mitotic and meiotic divisions
4. Qualitative tests for reducing sugar, non-reducing sugar, polysaccharide, lipid
5. Quantitative estimation of glucose
6. Estimation of amino acid by formol titration

#### **SUGGESTED BOOKS / READING MATERIAL**

1. Cell Biology by C. B. Powar
2. Molecular Cell Biology by Lodish
3. Biochemistry by Voet & Voet
4. Principles of Biochemistry by Lehninger
5. Biochemistry by U. Satyanarayana
6. Science of Genetics by Atherlay
7. Molecular Biology of Gene by Watson et al. Pearson Education, Delhi, India
8. Molecular Biology of the Cell by Alberts et al. Garland Science
9. The Cell: A Molecular Approach by Cooper & Hausman, Sunderland publishers, USA
10. Manual of Practical Zoology by P. S. Verma
11. Biotechniques : Theory and Practice by S. V. S. Rana, Rastogi publishers
12. Principles and techniques of Biochemistry and Molecular Biology by Wilson and Walker