

ZOOLOGY COMPONENT

DISCIPLINE SPECIFIC CORE (DSC 03)

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Cell Biology and Biochemistry ALS ZOO DSC 03	4	2	0	2	XII pass with Science with Biology/ Biotechnology	NIL

Learning Objectives:

The learning objectives of this course are as follows:

- To understand structure and functions of various cellular compartments and cell organelles.
- To learn about cell-cycle and its regulation.
- To acquire the knowledge of biomolecules and metabolic pathways.
- To study about enzyme action.

Learning Outcomes:

By studying this course, students will be able to:

- correlate the structure of various cell components with their function.
- describe the metabolic fate of carbohydrates, proteins and fats and understand the mechanics of enzyme action.

Unit 1: Basic structure of cell and cell organelles

(12 Hours)

Prokaryotic and eukaryotic cells. Structure of cell membrane: various models, fluidity of membrane. Eukaryotic cell organelles: Mitochondria, Chloroplast, Endoplasmic reticulum, Golgi body and Lysosomes. Nucleus: Nuclear Envelope- structure of nuclear pore complex, chromatin- euchromatin and heterochromatin; DNA packaging in eukaryotes.

Unit 2: Cell Cycle**(3 Hours)**

Cell division: Mitosis and Meiosis. Regulation of cell cycle.

Unit 3: Biomolecules and Metabolic pathways**(11 Hours)**

Introduction to Biomolecules: Carbohydrates, Lipids, and Proteins. Glycolysis, Krebs's Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen Metabolism. β oxidation of palmitic acid. Transamination, Deamination and Urea Cycle.

Unit 4: Enzyme action and regulation**(4 Hours)**

Mechanism of action (induced fit theory), Enzyme Kinetics (Michaelis Menten equation for single enzyme single substrate reactions), Enzyme inhibition and regulation.

PRACTICAL**(Credit: 02)****(Laboratory practical- 15 classes of 4 hours each)**

1. Preparation of a temporary stained squash of onion root tip and to study various stages of mitosis.
2. Study of various stages of meiosis through permanent slides.
3. Cytochemical demonstration of DNA by Feulgen reaction.
4. Perform qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose)
5. Study of activity of salivary amylase under optimum conditions.
6. Separation and identification of amino acids by paper chromatography

Essential/Recommended readings

1. Becker, Kleinsmith, and Hardin (2018) *The World of the Cell*, IX Edition, Benjamin Cummings Publishing, San Francisco.
2. Karp, G. (2015). *Cell and Molecular Biology: Concepts and Experiments*, VIII Edition, John Wiley & Sons Inc.
3. Berg, J. M., Tymoczko, J. L. and Stryer, L. (2015) *Biochemistry*. VII Edition. W.H Freeman and Co.
4. Nelson, D. L., Cox, M. M. and Lehninger, A.L. (2009). *Principles of Biochemistry*. IV Edition. W.H. Freeman and Co.

Suggestive readings

1. Cooper, G.M., Hausman, R.E. (2019) *The Cell: A Molecular Approach*. VIII Edition, ASM Press and Sinauer Associates.
2. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009). *Harper's Illustrated Biochemistry*. XXVIII Edition. Lange Medical Books/Mc Graw3Hill.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.