

COURSE TITLE: ADVANCE ZOOLOGY II (CELL & MOLECULAR BIOLOGY)

Credit Hours: 3

Aims and Objectives:

Objectives of the course are to impart knowledge about

- The animal cell and its complex organization of architecture
- The unified role it plays for the ultimate sustainability of the organisms
- The various ultra- structural
- Molecular and functional aspects of the cells

Course Contents

Introduction to prokaryotic and eukaryotic cells:

Plasma membrane, Chemical composition, structure and functions of plasma membranes cell permeability, active transport, endocytosis, phagocytosis.

Cytoskeleton:

Microfilaments, Microtubules, Intermediate filaments

Cytoplasmic Organelles:

Membrane system, Structural Commonalities, Functional Commonalities

Ultrastructure Chemical Composition And Functions Of Endoplasmic Reticulum (with special reference to their role in protein synthesis and drug metabolism)

Golgi Apparatus (with reference to its role in synthesis of glycoprotein)

Mitochondria (with reference to its role in cellular respiration, and its significance as semi-autonomous organelle)

Lysosome (with reference to its diverse roles due to hydrolytic activity of enzymes)

Peroxisome (with reference to metabolism of hydrogen peroxide)

Glyoxysome (with reference to glyoxylic acid cycle).

Nucleus chromatin, heterochromatin, euchromatin, chromosome structure with reference to coiling and nucleosome during different phases of cell cycle, Replication (mechanism, DNA replication in prokaryotes specially with reference to variety of DNA polymerases and other proteins involved, DNA replication in Eukaryotes with special reference to DNA polymerases, concept of Replicons etc.), Transcription (variety of RNA and their characteristics, synthesis of mRNA, rRNA and tRNA with special reference to enzymes, involved, RNA splicing, split genes, concept of Ribozymes and posttranscriptional processing), RNA transduction, Genetic code, point mutations, Translation (with reference to the specific role of Ribosomes, various factors, and posttranslational processing). Control of Gene expression in Prokaryotes.

Evaluation Criteria

Examination	Type	Marks
Internal Examination	Sessional Work	15%
	Mid-Semester	25%
External Examination	Final Semester	60%

Books Recommended

Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., & Watson, J. D. *Molecular Biology of the Cell*. New York: Garland Publishing Inc.

Damell, Jr. J., Lodisch, H., & Baltimore, D. (1990). *Molecular Cell Biology*. New York: Scientific American Inc.

DeRobertis, E. D. P., & DeRobertis, Jr. E. N. F. (1987). *Cell and Molecular Biology*. New York: Lea & Febiger.

Geoffrey, M. C., & Robert, E. H. (2007). *The Cell: A Molecular Approach*. Sunderland: Sinauer Associates, Inc.

Karp, J. (2005). *Cell and Molecular Biology: Concepts and Experiments*. United States of America: John Wiley and Sons, Inc.

ADVANCE ZOOLOGY Lab-II (CELL & MOLECULAR BIOLOGY)

Credit Hour-I

1. Detection and quantitative determination of chromosomal DNA and RNA.
2. Cultural and staining of bacteria and yeast.
3. Identification of different type of blood cells in human blood through smear technique.
4. Counting of prokaryotic cells (bacteria) and blood cells by using haemocytometer.
5. Isolation and characterization of proteins on polyacrylamide gel electrophoresis (native and sub-unit molecular weights).
6. Separation of different sized DNA fragments on agarose gel.

Evaluation Criteria

Examination	Type	Marks
Internal Examination	Sessional Work	15%
	Mid-Semester	25%
External Examination	Final Semester	60%

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