

B.Sc. Forensic Science: Semester-III	
FST305: Zoology-III	
Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test - 12 Marks
Tutorials: 1 hr/Week	Teachers Assessment - 6 Marks
Credits: 4	Attendance - 12 Marks
	End Semester Exam - 70 marks

Course outcomes:

At the completion of the course the student will be able to have:

- A detailed and conceptual understanding of molecular processes viz. DNA to trait.
- A clear understanding of the processes of central dogma viz. transcription, translation etc. underlying survival and propagation of life at molecular level.
- Understanding of how genes are ultimately expressed as proteins which are responsible for the structure and function of all organisms.
- Learn how four sequences (3 letter codons) generate the transcripts of life and determine the phenotypes of organisms.

Unit I – Process of Transcription and Translation

- Fine structure of gene
- RNA polymerases
- Transcription factors and machinery
- Formation of initiation complex
- Initiation, elongation and termination of transcription in prokaryotes and eukaryotes
- The Genetic code
- Ribosome
- Factors involved in translation
- Aminoacylation of tRNA, tRNA-identity, aminoacyl-tRNA synthetase
- Initiation, elongation and termination of translation in prokaryotes and eukaryotes.

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Unit II – Principle and Types of Microscopes

- Principle of Microscopy and Applications
- Types of Microscopes: light microscopy, dark field microscopy, phase-contrast microscopy, Fluorescence microscopy, confocal microscopy, electron microscopy

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Unit III – Centrifugation and Chromatography

- Principle of Centrifugation
- Types of Centrifuges: high speed and ultracentrifuge
- Types of rotors: Vertical, Swing-out, Fixed-angle etc.
- Principle and Types of Chromatography: paper, ion exchange, gel filtration, HPLC, affinity

Unit IV – Spectrophotometry and Biochemical Techniques

- Biochemical techniques: Measurement of pH, Preparation of buffers and solutions
- Principle of Colorimetry/Spectrophotometry: Beer-Lambert law
- Measurement, applications and safety measures of radio-tracer techniques

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Unit V Molecular Techniques

- Detection of nucleic acid by gel electrophoresis
- DNA sequencing DNA fingerprinting, RFLP
- Polymerase Chain Reaction (PCR)
- Detection of proteins, PAGE, ELISA, Western blotting

Suggested Readings:

1. Lodish et al. *Molecular Cell Biology*. Freeman & Co, USA (2004).
2. Alberts et al. *Molecular Biology of the Cell*. Garland (2002).
3. Cooper. *Cell: A Molecular Approach*. ASM Press (2000).
4. Karp. *Cell and Molecular Biology*. Wiley (2002).
5. Watson et al. *Molecular Biology of the Gene*. Pearson (2004).
6. Lewin. *Genes VIII*. Pearson (2004).
7. Pierce H. *Genetics*. Freeman (2004).
8. Sambrook et al. *Molecular Cloning Vols I, II, III*. CSHL (2001).
9. Primrose. *Molecular Biotechnology*. Panima (2001).
10. Clark & Switzer. *Experimental Biochemistry*. Freeman (2000).

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