

Ph.D. Course Work Syllabus

Paper-II Zoology

Paper Code-(Ph.D.-102)

Contact Hours: 4 Hrs/ week

Continuous Assessment: 40 Marks

Credit: 4

End Term Exam: 60 Marks

Unit – I

Scope in genetic engineering techniques, Basic cloning method: Cloning vectors, steps involved in gene cloning, Different enzymes and their application: DNA and RNA polymerase, reverse transcriptase, alkaline phosphatase, kinase, ligase, RNase, DNase topoisomerase, Restriction endonucleases: R-M system, nomenclature of RE, types and recognition, cleavage sites and application of endonucleases.

Unit – II

Nucleic acid Purification, cDNA Synthesis, Yield Analysis, agarose gel electrophoresis, PCR (DNA Amplification, Prime designing and its application). Gene Cloning Vectors: Plasmids, Lambda bacteriophage, yeast cloning vector, Artificial chromosome (YAC, BAC), Shuttle vector, expression vector. Cloning and expression of DNA in plant, Yeast, insect cells, mammalian cells.

Unit – III

Nucleic Acid Sequencing (Chain termination, chemical degradation, automated pyrosequencing), Nucleic acid blotting and hybridization (Southern, Northern and dot blot hybridizations), Introduction to Microarray, molecular: RFLP, RAPD, AFLP, SNP.

Unit – IV

Recombinant proteins: Purification of proteins and folding, characterization and stabilization, Protein analysis: SDS page and Western blotting, T-DNA and Transposon Tagging, Gene therapy, Gene knockout and gene silencing.

Text Books: -

1. Genetic Engineering: Rastogi and Pathak, Oxford University Press.
2. Metzenberg, Stan. Working with DNA. Oxford:Taylor and Francis.
3. Brown, T.A. Gene Cloning and DNA Analysis: An Introduction. United Kingdom: Wiley -Blackwell.

4. Sambrook J., MacCallum P. and David Russell. Molecular Cloning: A Laboratory manual (3rd edition, three- books set) New York, USA: CSHL Press.
5. Primrose S.B., Twyman R. M., Old R.W. Principles of Gene Manipulation. Wiley-Blackwell, 2001.