

Course Code	Course Name	Credits
26BT007	RECOMBINANT DNA TECHNOLOGY	04

Course Objectives

- To make the students to understand the concepts of rDNA Technology.
- To gain knowledge about the importance of restriction enzymes.
- To gain knowledge about the importance of gene transfer technologies.
- To learn the concept of vectors and expression systems and methods of selection.
- To understand and describe the concept of Hybridization technique.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Apprehend with the tools and techniques in rDNA technology and types of Vectors.
- Relate the role of restriction and modifying enzymes in recombinant DNA technology.
- Explore the techniques involved in construction of genomic DNA library and cDNA library.
- Design the protocols for analyzing gene transfer methods and to explore knowledge on hybridization-based markers.
- Explain the role of rDNA technology in production of recombinant protein and vaccines

Unit 1 - Restriction enzymes (12 Hrs.)

DNA ligase, DNA polymerases, Reverse transcriptase, terminal transferases, T4 polynucleotide kinases, methylases, DNases, Ribonucleases, alkaline phosphatases, S1 nuclease and other enzymes.

Unit 2 – Gene cloning vectors (13 Hrs.)

Plasmids- Isolation, purification, structure and types. Bacteriophage and other phage vectors. Types of vectors: Animal viruses as vectors – Tobacco Mosaic Virus, BAC, YAC, M13 vector, shuttle vectors, Phagemids, Cosmids, Insertion vector, Fusion vector.

Unit 3 - Gene transfer techniques (13 Hrs.)

Chemical mediated gene transfer, Microinjection, Electroporation, Particle gun/Particle bombardment, Transformation, Conjugation and Liposome mediated gene transfer or Lipofection. DNA Library: c-DNA and genomic DNA libraries.

Unit 4 – DNA markers (12 Hrs.)

RACE PCR, RAPD, SSCP, RFLP, AFLP, DNA fingerprinting, DNA foot printing and applications.

Unit 5 - Applications of rDNA technology (10 Hrs.)

Production of recombinant proteins (Insulin, Somatostatin and Somatotropin), vaccines.

Reference Books:

1. Bernard R. Glick, Jack J. Pasternak. Molecular Biotechnology. ASM Press. 2010.
2. Terry Brown. Gene Cloning and DNA Analysis: An Introduction. John Wiley & Sons. 2010.
3. Sandy B. Primrose and Richard Twyman.. Principles of Gene Manipulation and Genomics. John Wiley & Sons. 2009.
4. James D. Watson, Amy A. Caudy, Richard M. Myers and Jan A. Witkowski. Recombinant DNA: Genes and Genomics: A short course. W.H. Freeman and Co Ltd. 3rd Edition. 2007.
5. Primrose, S.B and Twyman, R.W. Principles of Gene Manipulation and Genomics, VII edition, Wiley Blackwell. 2006.