

**OBJECTIVES:** To enable the students to –

- learn recombinant DNA technology , and
- acquire techniques involved in gene transfer and r-DNA technology blotting techniques, DNA fingerprinting, sequencing , etc.,

**COURSE:**

**UNIT – I: RECOMBINANT DNA TECHNOLOGY – 1**

1. r-DNA technology – Isolation and cutting of DNA molecule
2. Steps in r-DNA technology.
3. Classification of Restriction endonucleases. Enzymes used in molecular cloning: Polymerases, ligases, phosphatases, methylases, Kinases and nucleases.

**UNIT – II: RECOMBINANT DNA TECHNOLOGY – 2**

1. Cloning vehicles – plasmids, PBR-322, phages, cosmids, shuttle vectors
2. Genomic libraries – Genomic and c-DNA libraries
3. Expression of cloned genes
4. Factors influencing the expression of foreign genes.

**UNIT – III: GENE TRANSFER TECHNIQUES**

1. Cutting and joining DNA - Methods of blunt end ligation and Cohesive end ligation (Linkers, adaptors and homo polymer tailing )
2. Transfection – Electrophoration, Microinjection, Gene gun method, Liposome mediated Transfection, Calcium chloride precipitation.
3. Transformation. selection of transformed cells and screening methods (genetic markers and blue white screening)

**UNIT – IV: TECHNIQUES IN GENETIC ENGINEERING**

1. Blotting techniques – Southern, Northern & Western blotting
2. Polymerase chain Reaction (PCR)
3. Restriction fragment length polymorphisms (RFLP's)
4. Random amplification polymorphic DNA's (RAPD's)
5. DNA sequencing
6. DNA fingerprinting

**UNIT-V: BIOINFORMATICS**

1. Introduction of Bioinformatics.
2. Sequence information sources- EMBL, GENBANK, Entrez, Unigene.
3. Protein information sources – PDB, SWISSPROT, TREMBL.
4. Sequence similarity searches – BLAST, FASTA.

**REFERENCES:**

1. Principles of gene manipulations-by R.W.Old and S.B.Primrose, Blackwell publications
2. Genetic Engineering by Boylan, Pearson education
3. Genetic Engineering and Biotechnology by V.Kumar Gera
4. Genetic Engineering by R.Williamson, public:Academic press.

**OBJJECTIVE:** To enable the students to learn the techniques of Genetic engineering

**COURSE:** Experiments on

1. Bacterial Transformation
2. Isolation of Plasmid DNA
3. Restriction Digestion of DNA
4. Ligation of DNA
5. Polymerase Chain Reaction (PCR)
6. DNA finger printing

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