IV Sem. Soft Core Paper: – 3.

GENETIC ENGENEERING AND BIOTECHNOLOGY.

48 Hrs.

Genetic Engineering: **24 Hrs.**

Unit I:
Historical account
DNA cloning: Generation of recombinant DNA molecules, enzymes used in recombinant DNA technology – Nucleases, Ligase, Polymerases, DNA modifying enzymes.
Types of donor DNA: Genomic and cDNA; Construction of genomic and cDNA libraries

Unit II
Vectors and their characteristics: Plasmid vectors (pBR322, pUC18/pUC19), Bacteriophage vectors (λ, M13), Hybrid vectors (COSMID vector), Eukaryotic vectors (YAC), Ti plasmid, Shuttle vectors

Unit III
Hosts: Bacteria, Yeast; Ligation, transformation, methods of gene transfer, screening procedures for recombinant clones. Applications of genetic engineering

Unit IV
Basic techniques in genetic engineering: Agarose gel electrophoresis, Polyacrylamide gel electrophoresis, isolation and purification of nucleic acids, blotting techniques (Southern, Northern and Western), PCR and its applications, DNA sequencing.

Biotechnology: **24 Hrs.**

Unit V
Animal biotechnology:
Animal cell culture: facilities required, culture conditions, advantages and limitations, applications, culture media, characterization and biology of cultured cells – primary culture and cell lines, scale up.

Unit VI
Transgenic animals: Methods for introducing foreign gene, gene knockout, transgenic mice and their applications, transgenesis in large animals.

Unit VII
Agricultural biotechnology:
Plant tissue culture: plant cell culture, culture media, protoplast culture, micropropagation, GM plants, transgenic plants as bioreactors

Unit VIII
Medical/Pharmaceutical biotechnology:
Vaccines: Recombinant vaccines, DNA vaccines, Edible vaccines
Hybridomas, monoclonal antibodies and their applications, Gene therapy.

Tutorials. ---------- 16X2 = 32 Hrs.

REFERENCES

1. Brown, T. A. 1995. Gene Cloning: An introduction. Chapman and Hall, London.
2. Brown T. A. 2007, Genomes 3. Garland Science Publishing, New York.
3. Dunham, I., 2003. Genome Mapping and sequencing. Horizon Scientific
4. Primrose, S. B., and R. M. Twyman . 2006. Principles of gene manipulation and Genomics, Blackwell Publishing MA. USA.
5. Kreuzer, H. and A. Massey. 2001. Recombinant DNA and Biotechnology. ASM Press, Washington D.C.