M.Sc. III Semester Biotechnology.

OET 3.1: MOLECULAR BIOTECHNOLOGY

UNIT I. Introduction to Genetics: A brief history,-Mendel's law or inheritance. The discovery of DNA as genetic material, relation between genes and proteins. 6 hrs.

UNIT II. Molecular nature of genes: - Biological nature and properties of nucleic acids, forms of DNA and RNA, Replication of DNA - theories and models of replication. Fine structure of gene, concept of split genes - transposons, cistron, recon, muton 17 hrs.

UNIT III. Mutations, DNA damage and repair mechanisms. Gene Concept: - One gene one protein hypothesis. Beadle and Tatum's experiments with Neurospora. 12hrs.

UNIT IV. Genetic code: An overview of genetic code and its properties. 4 hrs

UNIT V. Regulation of gene expression, operon concept and types, catabolic repression, gene expression in eukaryotes.

7 hrs.

UNIT VI. Genetic recombination - transformation, transduction and conjugation. Transcription and translation in prokaryotic and eukaryotic organism. 18hrs.

GENETIC ENGINEERING:

Introduction Genetic engineering: History and scope of recombinant DNA technology. Gene cloning and need to clone a gene. Modifying enzymes: Restriction endonuclease, exonucleases, ligases, polymerases, kinase, alkaline phosphatase, topoisomerase etc. Purification of DNA from bacterial, plant and animal cells.Cloning and expression vectors: *E.coli,* yeast, plants (agrobacterium) and animal Viruses. **4 hrs**

DNA cloning strategies: preparation of genomic and cDNA libraries, bacteriophages and cosmids. Transformation and transfection. Non-vectorial transformation techniques: electroporation. Screening of gene library and selection of the clones. Expression of cloned genes. Production of proteins from cloned genes. **8hrs**

PCR and Its Applications **04hrs**

OEP 3.2 PRACTICALS

1.Single cell isolation.
2.Isolation of Auxotroph.
3.Isolation of-Antibiotic resistant organisms.
4.Study of growth curve.
5.Estimation of DNA.
6.Estimation of RNA.
7.Isolation of genomic DNA from bacteria.
8.Isolation of plasmid DNA from bacteria.
9.Restriction digestion analysis.
10.Transformation.
11.PCR amplification study using thermal cycl