SARDAR PATEL UNIVERSITY
Programme: MSC (Microbiology)
Semester: IV
Syllabus with effect from: June 2011

Paper Code: PS04CMIC01	**Total Credits: 4**
Title Of Paper: r-DNA technology	

Unit	Description in detail	Weightage (%)
1	Scope of Genetic Engineering, Concept and importance of Genetic Engineering; General strategies and Steps involved in gene cloning; Extraction and purification of DNA from bacteria, plant and animal cells; Restriction enzymes, DNA ligase and other enzymes involved in gene cloning; mRNA and cDNA preparation.	**25 %**
2	Chemical synthesis of gene/DNA Cloning and expression vectors- Plasmids, -bacteriophages, M-13 based vectors, Phagemids, Cosmids, YAC, BAC, HAC/MAC, etc. Expression of cloned gene in heterologous host Introduction of DNA into different host systems.	**25 %**
3	Recombinant selection and screening Southern blotting & hybridization, Northern analysis,Western blot analysis, Agarose gel electrophoresis, Pulse Field Gel Electrophoresis, Rotating Gel. Electrophoresis (RGE), PAGE, SDS-PAGE, Isoelectric Focusing, Two Dimensional Electrophoresis, Capillary Electrophoresis, Capillary Gel Electrophoresis, Mapping Regulatory Sequences by in vivo expression assay Mapping of Protein Binding Site by DNAse I Protection, Mobility Gel Shift Assay Protein Activity Assay – Yeast-one hybrid, Yeast-two hybrid and Yeast-three hybrid system. Phage display, Substractive hybridization and cloning, HRT/HART, Chromosomal Walk. Characterization of Cloned genes. Restriction map, S1 mapping, Denaturation mapping, Heterologous mapping DNA sequencing, Nucleic Acid Microarray	**25 %**
4	Polymerase chain reaction Molecular markers Linkage mapping using meiotic recombination frequencies Genomic mapping using radiation induced Chromosome rearrangement Genomic mapping using DNA sequence polymorphism as genetic marker Invitro Mutagenesis Metagenomics Metabolic engineering Gene therapy Recombinant products- recombinant hormones, recombinant DNA vaccines, Transgenic plants, Transgenic animals, Genetic Engineering Guidelines, Levels of Physical containment, Levels of Biological containment, The Indian Guidelines.	**25 %**

Basic Text & Reference Books:

- Genome 3rd Edition -- Brown
- Molecular Biotechnology – Glick
- Principles of Genetic Manipulation – Old & Primrose
- Applied Molecular Genetics – RogerMiesfeld
- Biotechnology – H. K. Das