

LESSON PLAN

Discipline: B.Tech in Biotechnology

Semester: 5th

Subject: BTPC3002 – Genetic Engineering

No. of Days/Week: 3

Semester Duration: July – December

No. of Weeks: 16

Name of the Teaching Faculty: Dr. Gayatri Nahak

Week	Class Day	Theory Topics
1st	1st	Introduction to Genetic Engineering – Scope
	2nd	DNA Isolation & Purification – Principles
	3rd	Enzymes in Genetic Engineering (restriction enzymes, ligase)
2nd	1st	Cloning Vectors: Plasmids
	2nd	Cloning Vectors: Bacteriophages
	3rd	Cosmids
3rd	1st	YACs
	2nd	Vectors
	3rd	Gene Library – Construction and Screening
4th	1st	Selection and Identification of Recombinant Cells
	2nd	Principle & Methodology of PCR
	3rd	Applications of PCR in Genetic Engineering
5th	1st	DNA Fingerprinting – Techniques
	2nd	Applications of DNA Fingerprinting
	3rd	Site-directed Mutagenesis
	2nd	Antisense RNA and Applications
6th		siRNA Mechanism & Application
	1st	miRNA Mechanism & Application
	2nd	Ribozyme Technology – Principle and Use
	3rd	Ribozyme Technology – Principle and Use
7th	1st	RFLP – Principle, Procedure, Applications
	2nd	Gene Mapping & Targeting Techniques
	3rd	Gene Mapping & Targeting Techniques
8th	1st	Restriction Mapping – Process & Analysis
	2nd	Protein Engineering – Concepts & Examples
	3rd	Southern Blotting – Procedure
9th	1st	Northern Blotting – Procedure
	2nd	Molecular Markers – RAPD, AFLP etc.
	3rd	Applications of Molecular Markers
10th	1st	Revision of Modules I–III
	2nd	Physical Methods of DNA Transfection – Microinjection, Electroporation
	3rd	Physical Methods of DNA Transfection – Microinjection, Electroporation
11th	1st	Biolistic & Chemical-mediated DNA Transfer

	2nd	Viral Vector Mediated DNA Transfection
	3rd	Saccharomyces cerevisiae Expression System
	1st	Baculovirus-Insect Cell Expression System
12th	2nd	Gene Therapy – Principles
	3rd	Applications of Gene Therapy
	1st	Transgenic Mice – Production Methods
13th	2nd	Applications of Transgenic Animals
	3rd	rDNA Technology – Therapeutic Product (Insulin)
	1st	rDNA Technology – Therapeutic Product (Insulin)
14th	2nd	Production of Immune Modulators
	3rd	Safety Guidelines in Genetic Engineering
	1st	Genetic Engineering Regulations in India
	2nd	DNA Vaccine Technology – Concepts
15th	3rd	rDNA Technology – Therapeutic Product (Insulin)
	1st	Case Studies in DNA Vaccine Development
	2nd	Ethical, Legal & Social Issues in Genetic Engineering
	3rd	Doubt clearing class