

B.Tech. Biotechnology: Semester-V BBT 502: GENETIC ENGINEERING	
Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

Course Objective

The course will provide basic concepts of genetic engineering. The objective of this course is to familiarize students with recombinant DNA technology and basic methods used in gene transfer and genetic engineering.

Course Learning Outcomes

After completing the course, the student shall be able to:

CO1: Understand the use of Genetic engineering as a tool in biotechnology.

CO2: Analyze the functions of DNA ligase, restriction enzymes, plasmid in genetic engineering.

CO3: Identify different carriers used in gene transfer to host cell.

CO4: Understand different methods used for gene transfer.

CO5: Evaluate the principle of PCR and gene libraries.

Unit 1: Introduction and Tools for Genetic Engineering:

Introduction of RDT, Restriction enzymes, Modifying enzymes, DNA ligase, Polymerase. Cloning Vectors: Plasmids, Lambda phage, Phagemids, Cosmids, Artificial chromosomes (BACs, YACs), Shuttle vectors, virus based vectors.

Unit 2: Gene Transfer Technology

Isolation of gene, DNA sequencing techniques, Artificial DNA synthesis. Methods of gene transfer: Transformation, transduction, Particle gun, Electroporation, liposome mediated, microinjection, Agro-bacterium mediated gene transfer.

Polymerase Chain reaction (PCR) and applications: Basic principles, modifications, applications. Gene libraries: cDNA synthesis, Genomic DNA libraries, Amplification of gene libraries, Identifying the products of cDNA clones.

Unit 3: Analysis and expression of cloned gene in host cells:

Expression vectors, Restriction enzyme analysis, Southern blotting, Northern blotting, Western blotting, In-situ hybridization. Colony and plaque hybridization, Factors affecting expression of cloned genes, Reporter genes, Fusion proteins.

Application of recombinant DNA in biotechnology: Antisense and ribozyme technology, Gene

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Therapy prospect and future, DNA vaccine, Transgenic plants.

Suggested Readings


- Recombinant DNA 2nd Edition. Watson, James D. and Gilman, M. (2001) W.H Freeman and Company, New York.
- Molecular Biotechnology: Principles Application of Recombinant DNA 2nd Edition. Glick, B. R. and
- Pasternak, J. J. (1998) ASM press Washington DC.
- Genetic Engineering. Ahluwalia, K. B. (2002) New Age International (P) Ltd.
- An Introduction to Genetic Engineering 2nd edition Desmond Nicholl S.T. (2002) Cambridge University Press.


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