

ELECTIVE I - RECOMBINANT DNA TECHNOLOGY

Semester	Subject code	Category	Lecture		Theory		Practical		Credit
			Total hrs	Hrs/week	Total hrs	Hrs / week	Total hrs	Hrs/week	
V		Elective	45	3	45	3	-	-	3

COURSE OBJECTIVES

To enable the students to understand the basics of Recombinant DNA Technology

COURSE OUTCOMES

On the successful completion of the course, students will be able to know the basics of Recombinant DNA Technology

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To understand tools of r-DNA technology	K2
CO2	To understand and get familiarized about Cloning vectors	K2
CO3	To understand about Cloning Strategies	K2
CO4	To understand about Molecular Techniques in R-DNA Technology	K2
CO5	To understand about the Applications of genetic engineering	K2

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	M	M	M	M	M	M
CO2	M	M	M	S	M	M
CO3	M	M	M	M	M	M
CO4	M	M	M	M	M	M
CO5	M	M	M	S	S	S

S- Strong;**M- Medium;****L- Low****UNIT-I: Tools for r-DNA technology****8 hrs**

DNA modifying enzymes and their uses in recombinant DNA technology: Restriction endonucleases, DNA ligases, Reverse Transcriptase, Alkaline Phosphatase, Taq polymerase.

UNIT-II: Cloning Vectors**9 hrs**

Bacterial vectors for Prokaryotes – pBR322, pUC, Bacteriophage Vectors - Lambda (insertion & replacement vectors) and M13, Cosmids, Artificial chromosomes (YAC), Vectors for plant and animal cells (Ti plasmids and Viral vector - SV 40). Specialized vectors – Shuttle vectors.

UNIT-III: Cloning Strategies**10 hrs**

Steps involved in Gene cloning, Construction of genomic DNA libraries (shotgun cloning) and cDNA libraries. Screening of recombinants - Antibiotic resistance, lac Z, α complementation (Blue-white selection). Colony Hybridization and Immunological screening for expressed genes.

UNIT-IV: Molecular Techniques**8 hrs**

Techniques: PCR - Principle, types and applications. Nucleic acid and protein hybridization techniques - Southern blotting, Western blotting and Northern blotting.

UNIT-V: Applications of genetic engineering

10 hrs

Biotechnological applications of r DNA technology: Therapeutic products for use in human health care- insulin, Hepatitis B vaccine using rDNA technology- Gene therapy for ADA and cystic fibrosis. Forensic applications - DNA Profiling.

DISTRIBUTION OF MARKS: Theory - 100% and Problems – Nil

TEACHING METHODOLOGY:

- ❖ **Lectures**
- ❖ **Power point presentation**
- ❖ **Charts**
- ❖ **Models**
- ❖ **Group discussion**
- ❖ **Group assignments**

TEXT BOOKS:

Sl no:	Book Name	Author	Publisher	Year of Publication
01	Molecular Biology	Freifedler	Narosa Publishing House New Delhi	2004
02	Gene cloning	Brown T.A.	Wiley & Sons	2010
03	Introduction to Genetic Engineering	Old, R.S and Primrose	Blackwell Scientific Publications,	2001

REFERENCE BOOKS:

Sl no :	Book Name	Author	Publisher	Year of Publication
01	Gene targeting protocols	Eric B Kmiee	Human Press Inc	2013
02	Recombinant DNA Technology	Watson JD, Gilman M, Witkoski J, Zoller. M	2 nd Ed. Scientific American Books.	1992
03	Recombinant DNA Technology	Keya Chaudhuri	The Energy and Resources Institute, TERI	2015
04	Principles of Gene Manipulation	Old, R.S and Primrose	Blackwell Scientific Publications,	2006

WEB SOURCES:

www.nature.com

www.sciencedirect.com

www.springer.com

www.nptel.com

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