

## BIOTECHNOLOGY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
V	21CZO5A	CORE V	5	75	5	75	Nil	5

### COURSE OBJECTIVES

- The objective of this course is to give a firm foundation in the fundamentals of modern Molecular techniques.
- The course will give a nut shell idea of various protocols followed in Biotechnology in relation to animal science.

### COURSE OUTCOMES (CO)

On the successful completion of the course, students will be able to:

CO Number	CO Statement	ledge Level (K1-K4)
CO1	Students will understand the artificial synthesis of insulin using rDNA Technology	K2
CO2	Students will get an idea about the various techniques used in modern biotechnology	K2, K3
CO3	Students will understand the cloning techniques and organ culture.	K2, K3
CO4	students will be able to understand the general principles of generating genetically modified organisms and modern artificial methods in biotechnology	K3, K4
CO5	Students will understand the modern techniques of cryopreservation	K2,K3

**Knowledge Level:** K1- Remember; K2 – Understand K3 – Apply; K4 – Analyze.

### MAPPING WITH PROGRAMME OUTCOMES

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

S- Strong; M – Medium; L- Low

Distribution of Marks: Theory 100% and Problems Nil %

## **UNIT I**

### **RECOMBINANT DNA TECHNOLOGY**

**(15 Hours)**

Scopes of Biotechnology. Steps involved in gene cloning- Enzymes :Exonucleases, Endonucleases, Restriction enzymes, DNA Ligase - Linkers and Adaptors, DNA Polymerase ,Vectors- Plasmid vectors, Vectors based on the lambda Bacteriophage, Cosmids, M13 vectors, Expression vectors, Vectors for cloning and expression in Eukaryotic cells, Insertion vector, Replacement vector. Introduction of rDNA into host cells - Microinjection, Electroporation, Microprojectile, Shot Gun method, Ultrasonication, Liposome fusion, Microlaser.

## **UNIT II**

### **MOLECULAR TECHNIQUES**

**(15 Hours)**

Methods to isolation of DNA – PCR, Electrophoresis, Molecular markers - RAPD, SNPS, RFLP and DNA finger printing. Nucleic acid hybridization- Blotting types and applications, FISH. DNA Sequencing- Maxam and Gilbert, Sanger and Coulson method and automated DNA sequencing, DNA probes and diagnosis.

## **UNIT III**

### **ANIMAL TISSUE CULTURE**

**(15 Hours)**

Primary cell culture, Secondary cell culture- Cell lines- *He la* and *WI38*, Steps involved in mammalian cell culture, Maintenance of cell lines, Applications, Organ culture- Techniques and Applications, Animal cloning – Dolly.

## **UNIT IV**

### **APPLICATIONS**

**(15 Hours)**

Constuction of Super bugs (Oil pollution), Single cell Protein from microbes – Biopesticides (*bacillus thuringiensis*) – Biofertilizers- Rhizobium and Azotobacter, Genetically modified Animals - Transgenic Animals and its significance. Commercial production of Insulin -Human Genome Project- Artificial Intelligency- Gene therapy. Biofuels.

## **UNIT V**

### **ENZYME BIOTECHNOLOGY**

**(15 Hours)**

Microbial production- Isolation of Microorganisms. Preparation of inoculum, Medium formulation and preparation, Purification of Enzymes. and application of enzymes – Ribozymes- Artificial enzyme (Synzymes) - Immobilization of enzymes methods and its application Biosensors.

## TEXT BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Ignachimuthu, S.	Basic Biotechnology	Tata McGraw Hill Publishing Company Ltd., New Delhi	1998
2	Dubey R.C.	A text book of Biotechnology	S. Chand and Co., Ltd., New Delhi	2006
3	Kumaresan, V.	Biotechnology	Saras Publications, Nagercoil	2004
4	Bhatia, S.C.	Textbook of Biotechnology	Atlantic	2006
5	Verma PS and Agarwal VK	Genetic Engineering	S. Chand Publishers, New Delhi	2006

## REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Alexander, N. Glazer and Hiroshi Nikado	Microbial Biotechnology: Fundamentals of Applied Microbiology	Cambridge University Press	1995
2	Glick, B.R., Pasternak, J.J.	Molecular Biotechnology	ASM Publisher	2003
3	Jogdand, S.N.	Environmental Biotechnology	Himalaya Publishing House, Bombay	1995
4	Old, R.W. and Primrose, S.B.	Principles of Gene manipulation	Black well Scientific Publications	1994
5	Das, H.K.	Textbook of Biotechnology, Second Edition	Wiley-India Publications	2010
6	Sangita Malvee	Biotechnology-An Introduction	SBS Publishers and Distributors	2007
7	Prakash, M.	Textbook of Biotechnology	Sonali Publication	2009

**WEB SOURCES:**

[www.sciencedirect.co](http://www.sciencedirect.co).

[www.pebmed.com](http://www.pebmed.com)

[www.khansacademy.com](http://www.khansacademy.com)

[www.epatsala.com](http://www.epatsala.com)

[www.swayam.com](http://www.swayam.com)

**TEACHING METHODOLOGY**

- Class room teaching
- Charts/ Models
- Power point Presentations
- Discussions
- Assignments
- Home test

**SYLLABUS DESIGNERS**

- Dr. D. Sasikala, Assistant Professor and HOD
- Dr. V. Kiruthiga, Assistant Professor
- Dr. V. Rekha, Assistant Professor
- Dr. A. Vinodhini, Assistant Professor
- Dr. G. Vidhya, Assistant Professor