

BIOTECHNOLOGY

Sem	Subject Code	Category	Lecture		Theory		Practical		Credit
			Hrs/ week	Hrs/ sem.	Hrs/ week	Hrs/ sem.	Hrs/ week	Hrs/ sem.	
VI	21CBC6C	Core	4	60	4	60	-	-	4

COURSE OBJECTIVES

- The content of the syllabus provides an understanding of how biochemical processes find application and improves our life.
- The course introduces the basic biotechnology concept and its application such as plant tissue culture, transgenic technology in plants, genetic engineering tools, and the products developed by biotechnologists found useful in research, industry and clinic.

COURSE OUTCOMES

After the completion of this course, the student will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Students will understand the methods for production of enzymes using recombinant DNA technology and their application in industrial systems.	K3
CO2	Describes the steps involved in plant tissue culture and its applications. It design and deliver the useful production of transgenic plants to the society.	K4
CO3	Understand the role of vectors, plasmids in gene technology.	K2
CO4	Students will acquire basic knowledge of recombinant DNA technology, engineering of DNA molecules using restriction and modification enzymes. Creation of genomic and cDNA libraries and their applications.	K2
CO5	Application of recombinant technology in the production of Biopharmaceutical processes and bio-products.	K3

(*CO-Course Outcomes

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

MAPPING WITH PROGRAMME OUTCOMES:

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

(S- Strong; M-Medium; L-Low)

Total Hours:60

UNIT - I

Scope and applications of Biotechnology

10 Hours

Biotechnology: Definition and scope, types and branches of biotechnology. Enzyme biotechnology – enzyme production from microbes and its application. Enzyme immobilization - definition, methods involved in immobilization of enzyme, industrial and medical applications of immobilized enzymes.

UNIT – II

Plant biotechnology

10 Hours

Plant tissue culture – concept, methods involved in plant tissue culture and its applications. Genetic engineering of plants for pest resistance, herbicide tolerance, stress tolerance and delayed fruit ripening.

UNIT – III

Cloning vectors and techniques

10 Hours

Cloning vectors: Plasmids – definition, classification of plasmids isolation and characteristics of plasmids, cosmids, bacteriophages, PBR 322, plant vectors- Ti plasmid. PCR- principle, types, applications and RT- PCR.

UNIT – IV

Recombinant DNA technology

15 Hours

Recombinant DNA technology-Basic techniques-cutting and joining of DNA molecules – DNA ligases and its uses, Restriction endonucleases-types, target sites, nomenclature and classification, Reverse transcriptase, DNA polymerase, Taq polymerases - uses and application. Definition of gene structure. Cloning techniques- genomic library and cDNA.

UNIT – V

Genetic engineering

15 Hours

Production of medically important biomolecules – Insulin, Growth hormone, interferons, Cytokines. Monoclonal antibodies, mycelium cell fusion, selection of hybrids, hybridomas, protoplast fusion and HAT-medium, screening assays, purification and application of monoclonal antibodies.

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

TEACHING METHODOLOGY

- The students will be given home assignments
- Classical black board teaching, power point presentation.
- Learning through discussion and encouraging peer learning and vertical learning.

TEXT BOOKS

S.NO	AUTHOR NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
1.	Sathyanarayana	Biotechnology	Books and allied publishers, 3 rd edition	2006
2.	RC Dubey	Textbook of Biotechnology	S.Chand& Co	2009

REFERENCE BOOKS

S.NO	AUTHOR NAME	TITLE OF THE BOOK	PUBLISHER	YEAR
1.	Brown TA	“ Gene cloning: An introduction”	Nelson Thorne, 3 rd edition	1995
2.	William. J. Thieman , Michael A. Pallidino	Introduction to biotechnology	Pearson Publication, 2 nd edition	2013
3.	SS Purohit	Biotechnology fundamentals and Applications	Agrobios Publications, 4 th dition	2007
4.	SB Primose& R Twyman	Principles of gene manipulation and genomics	Blackwell publishing, 7 th edition	2006
5.	PK Gupta	Biotechnology and genomics	Rastogi Publication, 2 nd reprint	2006
6.	T.Strachan and A.P.Read	Human Molecular Genetics	BIOS Scientific Publications, 2 nd Edition	2003

WEB SOURCES:

- www.easybiologyclass.com/enzyme-cell-immobilization-techniques/
- www.slideshare.net/TapeshwarYadav1/recombinant-dna-technology-49722102

SYLLABUS DESIGNER:

- Dr.S. Asha, Assistant professor in Biochemistry.
- Mrs.G. Nithya, Assistant professor in Biochemistry