CONCEPTS IN BIOTECHNOLOGY

Semester	Subject Code	Category	Lecture		Theory		P	C
I	21CBT1A	Core - I	5 hrs per week	75	5 hrs per week	75	0	5

COURSE OBJECTIVE:

- To provide students with an introduction to concepts applied in the field of biotechnology from other interdisciplinary subjects such as genetics, molecular biology, biochemistry, applied microbiology and to equip learners with a strong foundation essential for subjects in the later years of the Biotechnology Science Major.

COURSE OUTCOMES: Upon successful completion of the course, students will be able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1 – K4)
CO 1	Recall the basics of biotechnology and categorize different fields	K1 & K2
CO 2	Demonstrate the use of microbes in biotechnological products	K2
CO 3	Illustrate the cloning procedures and methods in rDNA technology	K3
CO 4	Correlate and differentiate plant and animal cell lines and its usage in agriculture and medicine	K4
CO 5	Interpret the sequence analysis through bioinformatics tools.	K2

Knowledge level: K1- Remember; K2- Understand; K3- Apply; K4- analyze

MAPPING WITH PROGRAMME OUTCOMES

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

S-strong; M- medium; L-low

UNIT 1 Introduction to Biotechnology 15 Hours

Definition of biotechnology, History and contributions of scientists, scope in multidisciplinary fields of biotechnology, whole organisms to nano level, stem cells, genetic engineering.

UNIT II Microbial Culture and Applications 15 Hours

Introduction, Microbial Culture Techniques, Measurement and Kinetics of Microbial Growth, Isolation of Microbial Products, Applications of Microbial Culture Technology, Bioethics in Microbial Technology.

UNIT III Cloning and Genetic Engineering 15 Hours

Introduction, Tools of rDNA Technology, Making Recombinant DNA, Introduction of Recombinant DNA into host cells, Identification of Recombinants, Polymerase Chain Reaction (PCR), DNA Probes, Hybridization Techniques, DNA Sequencing, Site-directed mutagenesis.

UNIT IV Biotechnology in Medicine and Agriculture 15 Hours

Introduction, Cell and Tissue Culture Techniques, Applications of Cell and Tissue Culture, Gene Transfer Methods in Plants, Transgenic Plants with Beneficial Traits, Animal Cell Culture Techniques, Characterization of Cell Lines, Applications of Animal Cell Culture.

UNIT V Genomics and Proteomics 15 Hours

Introduction to the world of genomes, bioinformatics, DNA sequence and structural databases, Proteins databases, 3-D Shape of Proteins, Protein based products, Designing Proteins, Proteomics, Microarrays.

Distribution of Marks: Theory 80% and Problems 20%

TEACHING METHODOLOGY:

- Class room teaching
- Assignments
- Discussions
- Homework
- PPT presentations
- Seminars
- Models and charts

TEXT BOOKS:

S.No	Authors	Title	Publishers	Year of Publication
1.	D Balasubramaniam	Concepts in Biotechnology	Universities Press	2016

REFERENCE BOOKS:

S.No	Authors	Title	Publishers	Year of Publication
1.	Raies A. Qadri, JavidParray	Concepts of Biotechnology	LAP LAMBERT Academic Publishing	2011

WEB RESOURCES:

1. https://opentextbc.ca/biology/

2. http://ocw.osaka-u.ac.jp/engineering/biotechnology-fundamentals

Syllabus Designer:

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