VAAGDEVI DEGREE & PG COLLEGE

DIST:HANUMAKONDA,TELANGANASTATE–506001

(AffiliatedtoKakatiyaUniversity,Warangal)

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Criterion: I

Teaching Plans

Biotechnology

VAAGDEVI DEGREE &PG COLLEGE
DEPARTMENT OF BIOTECHNOLOGY
COURSE FILE- III SEM
MOLECULAR BIOLOGY AND r-DNA TECHNOLOGY
2022- 2023

Name of the faculty	K. Hima Bindu B. Kiranmayi
Designation	Lecturer
Email	Bindukurra21983@gmail.com
Course code	BTG-III
Course Title	Molecular biology and r-DNA technology
ACADEMIC YEAR / SEMESTER	2022-23 / III-Sem
NUMBER OF INSTRUCTIONAL HOURS	4hours/week

1. INTRODUCTION TO THE COURSE:

Molecular biology and r-DNA technology are the branches of biotechnology concerned with the study of cell at molecular level that is central dogma of molecular biology and also study of recombinant DNA technology and its applications in different fields.

Vision

To be a center of excellence in value based holistic quality education carving research, innovation and entrepreneurial attitude that transforms students into globally competent society sensitized graduates.

Mission

- To create a student centric institute support with innovative student pedagogy
- To maximize the utilization of the state-of-the-art infrastructure for the overall development of individuals.
- To encourage independent thinking and application-oriented collaborative research in the areas of contemporary interest to contribute to the development of the region and the nation.
- To provide effective teaching& learning environment for training graduates with values, entrepreneurial attitude and globally employable skills.
- To encourage participation in games & sports, co-curricular and extra-curricular activities resulting in overall personality development.

PROGRAM OUTCOMES

1. PO1.Critical Thinking: Take informed actions after identifying the assumptions that frame our thinking and actions, checking out the degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from different perspectives.
2. PO2.Effective Communication: Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
3. PO3. Social Interaction: Elicit views of others, mediate disagreements and help reach conclusions in group settings.
4. PO4. Effective Citizenship: Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering
5. PO5. Ethics: Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them. Manual for Affiliated/Constituent UG & PG Colleges NAAC for Quality and Excellence in Higher Education 175
6. PO6. Environment and Sustainability: Understand the issues of environmental contexts and sustainable development.
7. PO7. Self-directed and Life-long Learning: Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes

PROGRAM SPECIFIC OUTCOME

Program Specific Outcomes – B.Sc (Biotechnology)	Students majoring in Biotechnology will develop a comprehensive understanding and appreciation in: ● Aim to provide a firm foundation in every aspect of Biotechnology. ● To explain broad spectrum of modern trends in Biotechnology. ● To develop curiosity, creativity and understanding links of Biotechnology to other disciplines. ● To develop the ability to applied the theoretical knowledge through experiments in Biotechnology.

Program objectives and Course out comes mapping

ASSESSMENT LEVELS: 0 – NOT MAPPED; 1 –MAPPED AT WEAK LEVEL; 2 – MAPPED AT MODERATE LEVEL; 3 – MAPPED AT SATISFACTORY LEVEL

COURSE TITLE	COURSE CODE
MOLECULAR BIOLOGY & r-DNA TECHNOLOGY	Elective Course DSE-3

	PO -1	PO -2	PO -3	PO -4	PO -5	PO -6	PO -7
CO -1	2	1	1	1	2	2	2
CO -2	2	1	1	1	2	1	2
CO -3	2	1	2	1	2	2	2
CO -4	2	1	2	2	2	2	2
TOTAL ATTIAINMENT	2	1	1.5	1.25	2	1.75	2

$WPi = \Sigma j\ (CO\ j\ ) / 4$ (i=1 to 10 and j=1 to 4) (WPi is the Weight factor for Programme Outcome PO1)

Subject Code	Subject	Name of the Faculty	Signature
DSE-3	Molecular Biology & r-DNA technology	K. Hima Bindu	

Biotechnology
B.Sc - II Year, Semester – III
Core Course BSC-3

MOLECULAR BIOLOGY AND r-DNA TECHNOLOGY

UNIT-I

1.1 Transcription in prokaryotes: Enzymatic Synthesis of RNA, Basic features of RNA synthesis, E.coli RNA polymerase, Classes of RNA molecules.
1.2 Transcription mechanism in prokaryotes – Promoter, initiation, elongation, proof reading and Rho dependent and Rho independent termination.
1.3 Transcription in Eukaryotes: Polymerases of eukaryotes, Promoters of eukaryotes.
1.4 Synthesis of the RNA and post transcriptional modifications.
1.5 The Genetic Code, properties of genetic code, Wobble hypothesis.
1.6 Translation mechanism in prokaryotes and eukaryotes.

UNIT-II

2.1. Regulation in Prokaryotes: General aspects of Regulation.
2.2. Transcription level regulation – positive, negative regulation.
2.3. Attenuation regulation.
2.4. Operon concept – lac, trp, operons.
2.5 Translation regulation in Eukaryotic and prokaryotic organisms.
2.6. Inhibitors of Protein synthesis – antibiotics and other inhibitors.

UNIT-III

3.1. Enzymes used in gene cloning: Restriction Endonucleases, Ligases, Phosphatases, Methylases, Kinases.
3.2. Cloning vehicles, plasmids, cosmids, phage vectors.
3.3. Construction of genomic and cDNA libraries.
3.4. Identification of cloned genes – Colony hybridization.
3.5. Expression vectors, Plasmid vectors.
3.6. Yeast vectors.

UNIT-IV

4.1. Principle, Methodology and application of PCR technology.
4.2. Variations of PCR.
4.3. DNA fingerprinting technique and its application in forensic medicine.
4.4. Principles involved in blotting techniques – Southern, Northern and Western.
4.5. Genome sequencing: Sanger mode of sequencing.
4.6. Applications of r-DNA technology in medicine.

Chair Person
Board of Studies in Biotechnology
Kakatiya University
Warangal - 506 009 (A.P.) INDIA

Practical Paper – III

1. Isolation of DNA from plant, animal/bacteria cells
2. Isolation of plasmid DNA
3. Analysis of DNA by agarose gel electrophoresis
4. Restriction digestion of DNA
5. PCR
6. Competent cell preparation, transformation and selection.

Spotters

1. Spliceosome
2. RNAi
3. t-RNA
4. Lac Operon
5. S-Loop
6. PBR 322
7. Reverse transcriptase
8. Shine- Dalgarno sequence
9. Taq DNA polymerase
10. YAC

Reference Books

1. Molecular Biology of the Gene – By Watson, Hopkins, Roberts, Steitz and Weiner (Pearson Eduction)
2. Cell and Molecular Biology - By Roberts & Roberts , Publ Waverly
3. Text Book of Biotechnology - By J.D. Hawkins, Publ: Cambridge
4. Genetic Engineering – By R. Williamson, Publ Academic Press
5. Principles of Gene Manipulation By R.W. Old & S.B. Primrose, Publ Blackwell
6. Genes – By B. Lewin oxford Univ. press
7. Molecular biology and biotechnology by H.D Kumar, Publ Vikas
8. Gene and Genomes By Maxine Singer and Paul Berg
9. Principles of Gene manipulation by R.W old and S.B Primrose, Publ Blackwell
10. Molecular biology by D. Freifelder, Publ: Norosa

TEACHING PLAN

Sl No	Unit / Topic	Teaching Planned on Date	No of Periods Planned	Course Outcomes	Teaching aids used	Books Referred
1	Transcription and translation: Mechanisms of transcription and translation in prokaryotes and eukaryotes, enzymatic synthesis of RNA, post transcriptional and translational modifications.	18/08/22 TO 06/09/2022	21	CO1	Online Classes Platform: MicroSoft Teams	• Gene biotechnology by- Jogdand. • P.K.Gupta.
2	Regulation mechanisms: Transcriptional and translational level regulations. Inhibitors of protein synthesis- antibiotics.	07/09/22 To 26/09/22	22	CO2	Online Classes Platform: MicroSoft Teams	• P.K.Gupta • Molecular biology genetic engineering and immunology By- B.D.Singh
3	r-DNA Technology: enzymes used in gene cloning, vectors(expression and cloning vectors), plasmids, genomic libraries and c-DNA libraries	5/10/22 TO 1/11/2022	18	CO3	Online Classes Platform: MicroSoft Teams	• Gene biotechnology
4	PCR technology, DNA finger printing, blotting techniques(southern, western, northern), sanger sequencing, applications of r-DNA technology in medicine.	4/11/22 TO 21/11/2022	23	CO4	Online Classes Platform: MicroSoft Teams	• Gene biotechnology

List of Recommended Text Books

SNO	Name of the Book	Author
1	Molecular biology	Watson , Hopkins
2	Molecular biology	D.Freifelder
3	Cell and molecular biology	Robertis

List of Reference Text Books

SNO	Name of the Book	Author
1	Molecular biology	P.K.Gupta
2	r-DNA Technology	Gene biotechnology
3	Microbial physiology and genetics	B.D.Singh R.P.Singh

List of URL's to be Referred

SNO	Name of the URL
01	https://www.elsevier.com/books/molecular-biology/clark/978-0-12-813288-3
02	https://www.springer.com/series/7651

METHODOLOGY FOR CONTINUOUS INTERNAL EVALUATION & EXTERNAL ASSESSMENT:

SNO	NAME OF THE EXAM	MAX MARKS
01	Unit test	20
02	Internal examinations	20
03	Pre final examinations	80