FOUR YEAR UNDERGRADUATE PROGRAM (2924 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Degree/Honors)		**Semester - VI**	**Session: 2024-25**
1	**Course Code**	**MBSE-04 T**	
2	**Course Title**	**Microbial Biotechnology**	
3	**Course Type**	**Discipline Specific Elective (DSE)**	
4	**Prerequisite (If Any)**	**As per Program**	
5	**Course Learning Outcomes (CLO)**	**At the end of this course, the students will be able to –** ➢ relate the concepts of genetic engineering ➢ classify different types of vectors ➢ explain the techniques in Molecular Biology ➢ identify cDNA libraries and their applications ➢ examine the products of rDNA technology	
6	**Credit Value**	**03 Credits**	**Credit = 15 Hours - Learning & Observation**
7	**Total Marks**	**Max. Marks: 100**	**Minimum Passing marks: 40**

PART – B: Content of the Course

Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	**Genetic Engineering:** Tools and techniques in genetic engineering, Restriction endonucleases- Types and uses, DNA modifying enzymes and their applications: DNA polymerases and DNA ligases. **Cloning Vectors:** Definition and Properties Plasmid vectors: pBR and pUC series. Bacteriophage lambda and M13 based vectors. Cosmids, BACs, YACs.	12
II	**Techniques in Molecular Biology:** DNA electrophoresis, Introduction to PCR, RAPD, RFLP. Nucleic acid hybridization techniques- Southern, Northern, Western and Dot blots. DNA microarray analysis.	11
III	**cDNA libraries and Applications of rDNA Technology:** Genomic and cDNA libraries; Preparation and uses, Screening of libraries: Colony hybridization and colony PCR.	11
IV	**Products of recombinant DNA technology:** Products of human therapeutic interest - insulin, hCGH, antisense molecules. Bt transgenic - cotton, brinjal, Gene therapy, recombinant vaccines, protein engineering and site directed mutagenesis.	11
Key Words	**Vectors, Plasmid, PCR, Colony hybridization, cDNA libraries, Bt transgenic, Gene therapy**	

Name and Signature of Convener and Members of CBoS

10/6/24 10.6.24 Rashmi 10.6.24 10.6.24 DR. K.K. Patel

10.6.24 10/6/24 10.6.24 Dr. Nelson Kerketta

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. A Text Book of Microbiology: R. C. Dubey & D. K. Maheshwari
2. Biotechnology; V. Kumaresan
3. Genetics - Arora and Sandhu

Reference Books:

1. Genes XI - Lewin, B.
2. Principles of Genetics - Gardner, Simmons and Snustad
3. Concepts of Genetics - Klug and Cummings
4. Microbial Genetics - Freifelder
5. Molecular cloning Vol. 1-III. Sambrook & Russel.

Online Resources – e-Resources/ e-Books and e- learning portals

- https://www.egyankosh.ac.in/bitstream/123456789/86112/1/Unit-14.pdf
- https://file.hukum.uns.ac.id/data/PDIH%20File/e-book/Wilson%20Wall%2C%20Genetic%20DNA%20Technology%20Legal_Aspects.pdf
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SBB2102.pdf
- https://asutoshcollege.in/new-web/Study_Material/microbial_genetics_07042020.pdf
- https://faculty.ksu.edu.sa/sites/default/files/5_68.pdf

Part – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: **100 Marks**

Continuous Internal Assessment (CIA): **30 Marks**

End Semester Exam (ESE): **70 Marks**

Continuous Internal Assessment (CIA): **(By Course Teacher)**	Internal Test / Quiz – **(2): 20+20** Assignment/ Seminar – **10** Total Marks – **30**	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against **30** Marks
End Semester Exam (ESE):	**Two Section – A & B** Section A: **Q1.** Objective **10 X 1 = 10 Mark**; **Q2.** Short answer type – **5X4= 20 Marks** Section B: Descriptive answer type qts., **1 out of 2** from each unit – **4X10 = 40 Marks**	

Name and Signature of Convener and Members of CBoS

10.6.24 Roshmi 10.6.24 10.6.24 Dr. K.K. Rahul Dr. Nelson Xess

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FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction

Program: Bachelor in Life Science (Degree/Honors)		Semester -VI	Session: 2024-25
1	Course Code	MBSE-04 P	
2	Course Title	Lab. Course	
3	Course Type	Laboratory Course	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – ➢ identify the competent cells and demonstrate transformation ➢ make use of electrophoresis and examine restriction digestion and ligation ➢ perform Southern blotting ➢ examine PCR results	
6	Credit Value	1 Credit	*Credit = 30 Hours. Laboratory or Field learning/ Training*
7	Total Marks	Max. Marks: 50	Min. Passing marks: 20

PART – B: Content of the Course

Total No. of learning-Training/ Performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab./ Field Training/ Experiment contents of Course	1. Demonstration of Bacterial Transformation and calculation of transformation efficiency. 2. Interpretation of gel electropherograms. 3. Digestion of DNA using restriction enzymes and analysis by agarose gel electrophoresis. 4. Demonstration of Ligation of DNA fragments. 5. Demonstration of Amplification of DNA by PCR. 6. Demonstration of Southern blotting. 7. Observation of Bt crops.	30
Key Words	Electrophoresis, Restriction enzymes, Ligation, PCR Amplification, Southern blotting	

PART – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Microbiology – A Practical Approach - Bhavesh Patel and Nandini Phanse
2. Experiments in Biotechnology - Nighojkar and Nighojkar
3. Current protocols in molecular biology- Ausbel

Online Resources:

- https://home.sandiego.edu/~josephprovost/Bacterial%20Transformation%20Protocol.pdf
- https://vyngocnguyen.files.wordpress.com/2016/04/e8-packet11-2.pdf
- https://faculty.ksu.edu.sa/sites/default/files/polymerase_chain_reaction_pcr.pdf
- https://www.deshbandhucollege.ac.in/pdf/e-resources/botany/LS-VI-Blotting-Techniques.pdf

PART – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	**Internal Test/ Quiz – (2): 10 & 10** **Assignment/ Seminar + Attendance: 05** **Total Marks: 15**	Better Marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against **15** Marks
End Semester Exam (ESE):	**Laboratory/ Field Skill Performance: On spot Assessment** **A. Performed the Task based on lab. work – 20 Marks** **B. Spotting based on tools & technology (written) - 10 Marks** **C. Viva-voce (based on principle/ technology) – 05 Marks**	**Managed by course teacher as per lab. status**

Name and Signature of Convener and Members of CBoS