

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	MBSC-06 T	
2	Course Title	Molecular Biology and Microbial Genetics	
3	Course Type	DSC	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course the student will able to – <ul style="list-style-type: none"> ➤ recall the structures and functions of biomolecules ➤ relate the DNA replication, recombination and repair mechanism ➤ interpret protein synthesis and protein regulations ➤ explain Mutations and Mutagens ➤ identify and distinguish genetic regulatory mechanisms 	
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	Fundamentals of molecular biology: History and scope of molecular biology, Contributions of scientists, contributions of Dr. Har Govind Khurana, DNA as genetic material – experimental evidences. Components of DNA and RNA, Nucleosides & Nucleotides Double helical structure of DNA (Watson-Crick model), various forms of DNA-A, B and Z.		12
II	Central Dogma of Protein synthesis: DNA replication- Experiments performed, Mechanism, process and enzymes / proteins involved. Transcription in Prokaryotes - initiation, elongation and termination, RNA polymerases and general Transcription factors. Translation in Prokaryotes - initiation, elongation and termination. Factors involved in translation. Genetic code; properties.		11
III	Mutation and DNA repair system: Introduction and type of gene mutation; Base substitution, frame shift (insertion, deletion, miss-sense, nonsense mutation). Mutagens; physical and chemical. DNA repair system (mismatch repair, photo-reactivation, excision and SOS repair).		11
IV	Gene regulation: Concept of gene- Cistron, Recon, Mutton. Principles of gene regulation and Operon concept- <i>lac</i> Operon and <i>trp</i> Operon. Activator, Coactivator and Repressor.		11
Key Words	Replication, transcription, Translation, Repair system, Mutation, Operon		

Name and Signature of Convener and Members of CBoS

Plal
10/6/24

Shm
10.6.24

Rashmi
10.6.24

DD
10.6.24

DWCA

Dr. Nelson Xc

Plal
10/6/24

Daul
10.6.24

Sadlane
10-6-24

Prasanna
10/6/24

Dr. Nelson Xc

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. A Text book of Microbiology; Dubey & Maheshwari; S. Chand & Sons.
2. General Microbiology; Powar & Dagainwala Vol. I, Himalaya Publication
3. Cell biology & Genetics; P.K. Gupta

Reference Books:

1. Principles of Genetics; Gardner, Simmons and Snustad.
2. Concepts of Genetics; Klug and Cummings.
3. Microbial Genetics; Freifelder.
4. Genetics; Arora and Sandhu.
5. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology; P.S Verma & V. K. Agarwal
6. Genes XI; B. Lewin.

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

- <https://ncert.nic.in/textbook/pdf/lebo105.pdf>
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SBB2101.pdf
- [https://bio.libretexts.org/Bookshelves/Microbiology/Microbiology_\(Boundless\)/07%3A_Microbial_Genetics](https://bio.libretexts.org/Bookshelves/Microbiology/Microbiology_(Boundless)/07%3A_Microbial_Genetics)
- <https://microbenotes.com/category/molecular-biology/>
- https://asutoshcollege.in/new-web/Study_Material/microbial_genetics_07042020.pdf

Part – D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

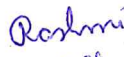
Continuous Internal Assessment (CIA): 30 Marks


End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz – (2): 20+20	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment/ Seminar – 10	
	Total Marks – 30	
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


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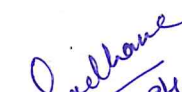

10.6.24


Dr. Anil Kumar


Dr. Nelson Ke


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DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART – A: Introduction		
Program: Bachelor in Life Science (Degree/Honors)		Semester VI
		Session: 2024-25
1	Course Code	MBSC-06 P
2	Course Title	Lab. Course - MBSC-06
3	Course Type	Laboratory Course
4	Prerequisite (If Any)	As per Program
5	Course Learning Outcomes (CLO)	At the end of this course the student will able to – <ul style="list-style-type: none"> ➤ experiment with isolation of DNA ➤ demonstrate electrophoretic separation of DNA ➤ develop the concept of mutagenic agents ➤ perform quantitative estimation of DNA & RNA
6	Credit Value	1 Credit <i>Credit = 30 Hours. Laboratory or Field learning/ Training</i>
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. Study UV light as a mutagenic agent. 2. To perform Replica plating technique. 3. Isolation of genomic DNA. 4. Resolution and visualization of DNA by Agarose Gel Electrophoresis. 5. Isolation of antibiotic resistant mutants by gradient plate technique. 6. Quantitative estimation of DNA by DPA method. 7. Quantitative estimation of RNA by oricinol method.	30
Key Words	DNA, Electrophoresis, Mutagenic, Genomic, Antibiotic resistant	

PART – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. Microbiology – A Practical Approach - Bhavesh Patel and Nandini Phanse
2. Solutions to Practical Microbiology - Bhavesh Patel and Nandini Phanse
3. Experiments in Biotechnology - Nighojkar and Nighojkar
4. Practical Microbiology- Dr. R.C Dubay, Dr. D.K. Maheshwari

Online Resources:

- https://faculty.ksu.edu.sa/sites/default/files/bch361_handnote_1.pdf
- https://www.brainkart.com/article/Isolation-of-DNA-from-plant-materials_38351/
- <https://cales.arizona.edu/spls/sites/cals.arizona.edu.spls/files/PLP%20428528%20Lab%20Manual%202019.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):	A. Laboratory/ Field Skill Performance: On spot Assessment B. Performed the Task based on lab. work – 20 Marks 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

Signatures: [Handwritten signatures]

 Dates: 10-6-24, 10-6-24, 10-6-24, 10-6-24, 10-6-24, 10-6-24, 10-6-24, 10-6-24