



ST. ALOYSIUS COLLEGE (AUTONOMOUS), JABALPUR

Reaccredited 'A+' Grade by NAAC (CGPA:3.68/4.00)

College with Potential for Excellence by UGC

DST-FIST Supported & STAR College Scheme by DBT

Faculty of Science

Master of Science (M.Sc.)

SUBJECT: MICROBIOLOGY

M.Sc. II Semester

Paper-II

Core Paper

Paper II: Microbial Genetics

Course Outcomes

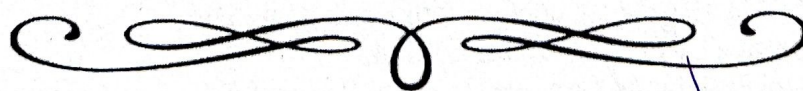
CO.No.	Course Outcomes	Cognitive Level
On completion of this course, the learners will		
CO 1	be able to identify the molecular basis and types of mutation, their cause and effect.	U, R
CO 2	be able to investigate different mechanisms of DNA repair, gene transfer and genetic recombination mechanisms.	A
CO 3	be able to define types and significance of plasmids in rDNA technology.	U
CO 4	be able to describe role of microbial genetics in industries, environment and health.	U

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	10	40 (Minimum Passing marks 13)	50
Practical	2	5	20	25
Total	6		75	

Evaluation Scheme

	Marks	
	Internal	External
Theory	1 Internal Exams of 10 Marks	1 External Exams (At the End of Semester)
Practical	Sessional (5 marks)	1 External Exams (At the End of Semester)





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Content of the Course

Theory

No. of Lectures (in hours per week): 5 Hrs. per week

Total No. of Lectures: 60 Hrs.

Maximum Marks: 40

Units	Topics	No. of Lectures
I	Gene as unit of mutation and recombination, molecular mechanism of mutation, mutagens, types of DNA damage (deamination, oxidative damage, alkylation, pyridine dimmers). spontaneous mutations-origin, suppression of mutation.	12
II	Gene transfer and genetic mapping, transformations, transfection, conjugation and transduction, genetic mapping of <i>E.coli</i> ; Molecular aspects of genetic recombination.	12
III	Complementation analysis, cis-trans test, deletion mapping; Benzer's concept of cistron, overlapping genes. DNA repair- photo repair, excision or dark repair, recombinational repair, SOS repair, methyl- directed mismatch repair, very short patch repair.	12
IV	Plasmids. F-factors description and their uses in genetic analysis; R factors, colicin and col factors; plasmids as vectors for gene cloning; replication of selected plasmids; compatibility. transposons and their uses in genetic analysis, plasmid vectors and bacteriophage vectors.	12
V	Important application of advances in microbial genetics, production of proteins, hormones and design of vaccines: conventional as well as new generation recombinant DNA vaccine, their design and advantages. <u>Innovative Topic: Superbug (<i>Pseudomonas putida</i>)</u>	12

List of recommended books

1. Microbial Genetics by Maloy ET. Al. 1994. Jones and Bartlett Publishers.
2. Molecular Genetics of Bacteria by J. W. Dale. 1994. John Wiley and Sons.
3. Modern Microbial Genetics. 1991 by Streips and Yasbin. Niley Ltd.
4. Gene VII by Lewin Oxford University Press. 2000.
5. Bacterial and Bacteriophage Genetics. 4 th Editions by Birge.
6. Microbial Genetics by Frefielder. 4th Edition.
7. Organization of Prokaryotic Genome. 1999 by Robert L.Charlebois, ASM Publications.



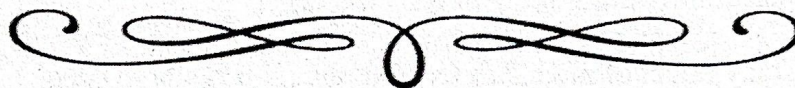
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8. DNA repair and mutagenesis. 1995 by Errol C. Friedberg, Graham C. Walker and Wolfram, Siede, ASM Publications. Molecular Genetics of Bacteria, 1997 by Larry, Snyder and Wendy, Champness, ASM Publications.
9. Methods of General and Molecular Bacteriology, 1993. Edited by Philip. Gerhardt, ASM Publications.
10. Recombinant DNA by Watson, J.D.
11. Essentials of Molecular Biology by Malacimski.
12. Mobile DNA II by Nancy Craig, Martin Gellet Allan Lambowitz.



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