

MIC 403: Microbial Genetics and Biostatistics

COURSE CODE: MIC 403

NO. OF CREDITS: 04

COURSE OUTCOMES (COs)

- **CO1** Classical concepts of molecular biology and microbial genetics are imparted alongwith the emphasis on modern advancements.
- **CO2** Promulgating the information on fungi and bacteriophage genetics.
- **CO3** Implementing the learning on in-age concepts of molecular biology and geneticengineering.
- **CO4** Familiarizing the concept of biological data management and its analysis usingstatistics.

Unit 1: Bacterial genetics and plasmid

- Methods of gene exchange in bacteria: Transformation, Conjugation and Transduction
- Application and use of gene exchange processes
- Plasmid biology: Types, Replication, Compatibility, Control of copy number and segregation
- Plasmid designing and application

Unit 2: Genetics of microorganisms

- Ordered tetrad analysis and mitotic recombination of *Neurospora*.
- Unordered tetrad analysis in yeast.
- Bacteriophage genetics of T-even phages with detailed emphasis on T4.
- Bacteriophage genetics of T-odd phages with detailed emphasis on T7.
- M13 phage genetic assembly and function with emphasis on its role in genetic engineering.

Unit 3: Concepts of molecular biology

- Organization of eukaryotic chromosome
- Enzymes involved in prokaryotic DNA replication
- Molecular mechanism of prokaryotic DNA replication
- Introduction to eukaryotic DNA replication.
- Structure of RNA Polymerase and molecular mechanism of transcription
- Molecular mechanism of translation
- Mutation and DNA damage
- Repair mechanisms

Unit 4: Biostatistics

- Meaning of data and their representation in biostatistics
- Measures of central tendency with computation and their application in biostatistics
- Measures of dispersion with computation: Standard deviation and Variance
- Correlation: meaning, types, and methods of correlation
- Chi-squared tests and their role in biostatistics
- F test and Student's t-test in hypothesis testing
- Normal distribution curve, characteristics, and uses with computation

REFERENCE

No.	Name	Author
1.	Biotechnology and genomics	P. K. Gupta, Rastogi Publication
2.	Cell and molecular microbiology	Garald Karp
3.	Gene function	Robert Glass
4.	Gene V- VII	Benjamin Lewin
5.	General genetics	L. Snyder et. al
6.	Genetics 3 rd edition	Peter J. Russel
7.	Genetics as a tool in microbiology	Gloover & Hopwood
8.	Genetics of bacteria	Scaife et.al
9.	Growth of bacterial cell	Ingraham et. al
10.	Molecular biology and biotechnology	Robert A., Meyers Eds.
11.	Molecular biology of gene	J.D.Watson
12.	Molecular biomethods handbook	Rapley & Walker
13.	Molecular biotechnology	Primrose
14.	Molecular cell biology	Lodish et.al
15.	Molecular genetics of bacteria	Snyder & champnes
16.	Biostatistics	Lewis A.E.
17.	Statistical Methods in Biology	N. T. J. Bailey
18.	Elements of biostatistics	S. Prasad
19.	Introduction to biostatistics	R. N. Forthofer & Lee

WEBLINKS

e-PGPathshala:

1. Genetics and Molecular Biology

<https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=t5vt4STquHRj94mcOBMr5g==>

- Paper-04 Module-08 DNA Replication in Prokaryotes
- Paper-04 Module-09 DNA Replication in Eukaryotes
- Paper-04 Module-05 DNA Topoisomerase
- Paper-04 Module-06 DNA Methyltransferase
- Paper-04 Module-07 DNA Polymerases

2. Biostatistics

<https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=31BI+Y/JyQo+vltwaZoj+g==>

- Paper-02 Module- Introduction to statistics and biostatistics

lyoyal