



**2-Year Master of Science (M.Sc.) Curriculum and
Syllabus for Microbiology
Fourth Semester**

Course code	Course Name	L	P	T	Credits
TIU-PMB-T212	Prokaryotic Genetics	3	0	0	3
TIU-PMB-T214	Eukaryotic Genetics	3	0	0	3
TIU-PMB-P202	Project	13	0	0	3
TIU-PMB-S202	CASD-Research paper writing	0	3	0	2
TIU-PMB-G298	Seminar presentation Grand viva	0	2	0	2
TIU-PES-S298	ESD	0	2	0	2
	Total Credits	19	7	0	26



Semester IV

TIU-PMB-T212	Prokaryotic genetics
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1. Microbial genetics: Methods of genetic transfers – transformation, conjugation, transduction and sex-duction, mapping genes by interrupted mating, fine structure analysis of genes.
2. Mutation : Types, causes and detection, mutant types – lethal, conditional, biochemical, loss of function, gain of function, germinal verses somatic mutants, insertional mutagenesis.
3. Recombination : Homologous and non-homologous recombination including transposition.
4. Operon, unique and repetitive DNA, interrupted genes, gene families, structure of chromatin and chromosomes, heterochromatin, euchromatin, transposons

TIU-PMB-T214	Eukaryotic genetics
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1. Mendelian principles : Dominance, segregation, independent assortment.
2. Concept of gene : Allele, multiple alleles, pseudoallele, complementation tests
3. Extensions of Mendelian principles: Codominance, incomplete dominance, gene interactions, pleiotropy, genomic imprinting, penetrance and expressivity, phenocopy, linkage and crossing over, sex linkage, sex limited and sex influenced characters.
4. Gene mapping methods : Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants.
5. Extra chromosomal inheritance : Inheritance of Mitochondrial and chloroplast genes, maternal inheritance.
6. Human genetics : Pedigree analysis, lod score for linkage testing, karyotypes, genetic disorders.
7. Quantitative genetics : Polygenic inheritance, heritability and its measurements, QTL mapping.
8. Structural and numerical alterations of chromosomes : Deletion, duplication, inversion, translocation, ploidy and their genetic implications.



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Reference books:

- Genes VIII: Benjamin Lewin
- Molecular Biology of Gene: Watson et al.
- Cell & Molecular Biology: Lodish et al.
- Molecular Biology of cell – Bruce Alberts et al., Garland Publications
- Sambrook et al (2000) Molecular Cloning Volumes I, II, & III Cold spring Harbor Laboratory Press, New York, USA

TIU-PMB-P202	Project
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TIU-PMB-S201	CASD-Research paper writing
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TIU-PMB-G298	Seminar presentation and Grand viva
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TIU-PES-S298	ESD
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