

CSIR NET UNIT 8 SYLLABUS

INHERITANCE BIOLOGY

CSIR NET UNIT 8 includes: Mendelian principles, gene concepts, extensions of Mendelian principles, gene mapping methods, extra-chromosomal inheritance, microbial genetics, human genetics, quantitative genetics, mutation, structural and numerical alterations of chromosomes, and recombination. Topics include gene interactions, pedigree analysis, mutation types, and chromosome alterations.

CSIR NET UNIT 8	Topics
A) Mendelian Principles	<ul style="list-style-type: none">- Dominance- Segregation- Independent assortment
B) Concept of Gene	<ul style="list-style-type: none">- Allele- Multiple alleles- Pseudoallele- Complementation tests
C) Extensions of Mendelian Principles	<ul style="list-style-type: none">- Codominance- Incomplete dominance- Gene interactions- Pleiotropy- Genomic imprinting- Penetrance and expressivity- Phenocopy- Linkage and crossing over- Sex linkage- Sex-limited and sex-influenced characters
D) Gene Mapping Methods	<ul style="list-style-type: none">- Linkage maps- Tetrad analysis- Mapping with molecular markers- Mapping by using somatic cell hybrids- Development of mapping population in plants
E) Extra Chromosomal Inheritance	<ul style="list-style-type: none">- Inheritance of mitochondrial and chloroplast genes- Maternal inheritance

- F) Microbial Genetics
- Methods of genetic transfers – transformation, conjugation, transduction, and sexduction
 - Mapping genes by interrupted mating
 - Fine structure analysis of genes
- G) Human Genetics
- Pedigree analysis
 - Lod score for linkage testing
 - Karyotypes
 - Genetic disorders
- H) Quantitative Genetics
- Polygenic inheritance
 - Heritability and its measurements
 - QTL mapping
- I) Mutation
- Types, causes, and detection
 - Mutant types – lethal, conditional, biochemical, loss of function, gain of function
 - Germinal versus somatic mutants
 - Insertional mutagenesis
- J) Structural and Numerical Alterations of Chromosomes
- Deletion
 - Duplication
 - Inversion
 - Translocation
 - Ploidy and their genetic implications
- K) Recombination
- Homologous and non-homologous recombination including transposition