8. **INHERITANCE BIOLOGY**

A) **Mendelian principles**: Dominance, segregation, independent assortment.

B) **Concept of gene**: Allele, multiple alleles, pseudoallele, complementation tests

C) **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.

D) **Gene mapping methods**: Linkage maps, tetrad analysis, mapping with molecular markers, mapping by using somatic cell hybrids, development of mapping population in plants.

E) **Extra chromosomal inheritance**: Inheritance of Mitochondrial and chloroplast genes, maternal inheritance.

F) **Microbial genetics**: Methods of genetic transfers – transformation, conjugation, transduction and sex-duction, mapping genes by interrupted mating, fine structure analysis of genes.

G) **Human genetics**: Pedigree analysis, lod score, co- 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 verses 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.

9. **DIVERSITY OF LIFE FORMS:**

A. **Principles & methods of taxonomy**:

   Concepts of species and hierarchical taxa, biological nomenclature, classical & quantitative methods of taxonomy of plants, animals and microorganisms.

B. **Levels of structural organization**:

   Unicellular, colonial and multicellular forms. Levels of organization of tissues, organs & systems. Comparative anatomy, adaptive radiation, adaptive modifications.