

**Title: Genetics [3-0-0-3]****Content :**

Introduction to Genetics : Impact of Genetics on society and study of biology, divisions of Genetics, concept and history of Genetics

Chromosome and cellular reproduction : DNA to chromosomes, cell cycles, genetic variation

Principles of heredity: Contribution of Mendel, monohybrid and dihybrid crosses, concept of dominance and recessive, allele concept, law of segregation, principle of independent assortment, back cross, test cross, testing hypothesis, Chi-square test,

Chromosomal basis of heredity : Sex chromosome and determination, Morgan and Bridge's experiments, Y chromosome, dosage compensation

Extension and modifications of Mendelism: Incomplete dominance, co-dominance, multiple allele, epistasis, complementation, cytoplasmic inheritance, maternal effect

Linkage, crossing over and mapping: recombination frequency and linkage analysis, chiasmata and crossing over, chromosome mapping, interference and coefficient of coincidence.

Yeast genetics: Mating type switching, cloning of genes using complementation, tetrad analysis, synthetic interaction, suppressor analysis

Quantitative Genetics: Complex traits, quantitative trait loci (QTL), statistics of quantitative Genetics, QTL analysis

Population Genetics: Allele frequency, Hardy-Weinberg principle, natural selection, genetic drift, mutation-selection and mutation-drift balance

Evolutionary Genetics: Polymorphism, genetic variation in natural population, molecular evolution-neutral theory, phylogenetic analysis,

**Texts / References:**

1. Benjamin A P. Genetics, a conceptual approach (6th ed.) New York: Freeman.
2. Snustad DP & Simmons MJ (6<sup>th</sup> Ed). Principles of Biochemistry (6th ed.). John Wiley & Sons.
3. Hartl DL. Essential Genetics and Genomics (7<sup>th</sup> Ed). Jones & Bartlett learning