

Course Code	Course Name	Credits
26BT002	PRINCIPLES OF GENETICS	04

Course Objectives

- Recall the historical introduction to Genetics and genetic materials
- Understand the mechanisms of genetic inheritance, linkage, and chromosome mapping
- Identify and demonstrate sex determination and sex-linked inheritances
- Understand the types of mutations and analyse their role in genetic diseases and evolution
- Recall the fundamentals of Mendel's law

Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Obtain acquaintance on historical overview of genetics and genetic materials
- Understand and apply Mendelian laws to predict phenotypic and genotypic ratios.
- Grasp the fundamental concept of mutation and its types
- Explain the basic concept of genes and their behaviour in population genetics
- Explain the mechanisms of genetic inheritance, linkage, and chromosome mapping

Unit 1 - Basics of Genetics (15 Hrs.)

History of Classical and Modern Genetics, Mendel's laws, Chromosomal theory of inheritance, Back cross and Test cross. Genetic model organisms and their significance (E.coli, Arabidopsis thaliana, Caenorhabditis elegans).

Unit 2 – Genetic Linkage and Mapping (10 Hrs.)

Genes and chromosomes, Variation in chromosome number and structure- linkage and crossing over, Chromosome mapping. Multiple alleles- blood groups, eye colour and Rh factor.

Unit 3 - Sex determination in human/Drosophila/plants (10 Hrs.)

Chromosomal theory of sex determination. Sex differentiation. Sex linked inheritance, Gynandromorphs/Intersexes.

Unit 4 - Mutation (15 Hrs.)

Chromosomal aberrations, Gene Mutation- Classification of mutation, Genome mutation, mutagen. Biochemical basis of mutation.

Unit 5 - Population genetics (10 Hrs.)

Gene pool and gene frequency. Cytogenetics- Human karyotype, Banding techniques, Human genetic diseases. Pedigree analysis.

Reference Books:

1. Robertis et al., Cell and Molecular Biology. Waverly publication. 8th Edition, 1995.
2. Gardener E.J, M.J.Simmons and D.P.Snustad, Principles of Genetics. John Wiley & Sons Publications.
3. Strickberger, M.W., Genetics –Printice Hall.4th Edition, 1997.
4. Alberts. Molecular Biology of the Cell. Garland publication.4th Edition, 2002.
5. Ajoy Paul., Text Book of Genetics from Genes to

