

Module-I

Genome Organization Prokaryotes and Eukaryotes, Nuclear genome and Organellar genome, DNA as the genetic material, Central dogma of molecular biology, Genome complexity, C- value Paradox, Cot curve analysis, Repetitive DNA, satellite DNA; Gene structure in prokaryotes and Eukaryotes, Cistron, Recon, Muton; Variants of gene- Split genes, pseudogenes, Overlapping genes and selfish DNA. DNA Replication: Models of DNA replication, Enzymology of DNA replication, Process of DNA replication (Initiation, Elongation, Termination), DNA replication at the telomere, Replication of Mitochondrial and Chloroplast genome, DNA-protein interaction, DNA repair.

Module-II

Transcription: Components of transcription machinery in prokaryotes and eukaryotes, Transcription factors, Transcription process (Initiation, Elongation, Termination), Transcription factors, m-RNA processing, Pre and Post transcriptional processing, Capping and poly (A) tailing, m-RNA stability, m-RNA editing, Gene Silencing

Module-III

Translation: Genetic code- the principle of translation, Translation machinery (t-RNA, Aminoacyl synthetase, Ribosome), Translation process, Post translational modification of protein. Regulation of Gene Expression: Constitutive and Induced gene expression, Regulation of gene expression in prokaryotes and eukaryotes, Operon model (Lac-operon and Trp- operon), DNA methylation. Molecular evolution (DNA based phylogenetic trees and its applications), Introduction to recombinant DNA technology.

Books :

1. Text Book of Molecular Biology By Padmanabhan and Shastri.
2. MOLBIO – Avinash & K. Upadhyaya, Himalaya Publishing House.
3. Mol. Biology. by Turner.
4. Mol. “Biology of Gene” – Watson
5. Principles of Mol. Biology - OS Prim Rose
6. Recombinant DNA Technology – Watson
7. Mol. Cell Biology. – Baltimore