

CORE COURSE V - MOLECULAR GENETICS

UNIT -I

Principles of Mendelian inheritance, Chromosome structure and function: Organisation of chromosomes, specialized chromosomes, chromosome abnormalities: Numerical and structural changes in chromosomes. Epistasis. Linkage and crossing over - three point cross -tetrad analysis- chromosome mapping.

UNIT- II

Human Chromosomes - Pedigree analysis, Mendelian traits and sex-linked traits in human -. Population genetics – Hardy -Weinberg genetic equilibrium.

Extra chromosomal inheritance (Episomes, Mitochondria and Chloroplast), Genetic polymorphism, Mechanism of sex determination.

UNIT -III

DNA as the genetic material – RNA as a genetic material – replication of DNA and RNA.- The law of DNA constancy and C - value paradox- genetic code- Organization and function of prokaryotic and eukaryotic genetic material,- Organization of coding sequences and repetitive sequences- Molecular basis of spontaneous and induced mutations-DNA damage – mechanism of repair – excision repair, recombinational repair.

UNIT -IV

Viruses and their genetic system: Life cycles (lytic and lysogenic), RNA Phages, Retro viruses.

Discovery of types and structure of plasmids - natural and artificial plasmid transfer and their applications. Insertion sequence in prokaryotes. Transposable elements – discovery and characterization.- Transposons in Bacteria, Maize, Yeast. - Insertional elements.

UNIT- V

Genetic recombination: Transformation, transduction, sexduction and conjugation – linkage and genetic mapping in bacteria – genetic system of Neurospora.

Regulation of Gene Expression In Prokaryotes And Eukaryotes: Operon concept: lac, trp, sigma factors-. promotor,operator, terminator and attenuator. DNA methylation- Hetero chromatinization-Environmental regulation of genes- Molecular genetics in relation to human diseases.

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4. Coriffiths.1996 Introductions to Genetic Analysis. Freeman and Co.,U.K.
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6. Friedberg EC.,WalkerCC.Siede W. 1995.DNA Repair and Mutagenesis. ASM Press, Washington D.C.
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