

CLUSTER UNIVERSITY,
SYLLABUS FOR BIOINFORMATICS (BIF)
COURSE FOR B.Sc PROGRAM UNDER CBCS
Course: Bioinformatics (BIF) (Credits: Theory-4, Practicals-2)

SEMESTER I

Course title: Foundations of Bioinformatics-I

Unit I

Introduction to genetics and its importance: Mendelian Genetics, Population Genetics and Its applications. Gene Concept, Alleles, Transposable elements, Genetic linkage and Mapping, Brief idea of genetic disorders.

Unit II

DNA: Nucleosides and Nucleotides, DNA Structure, Coding and Non-coding DNA, Repeated Sequences, Satellite DNA, Tandem Repeats, VNTRs, Junk DNA, Palindromes, Inverted Repeats. Conformation (A, B, Z). Super-coiling of DNA (Linking No, Twisting, Contour length) RNA, and its types and functions, t-RNA Structure and Function.

Unit III

Amino acids, Structure, Classification and Properties, Levels of protein structure, Importance and determination of primary structure, Secondary Structure (Alpha helix, Beta sheet and Beta turns), Characteristics of peptide bond (Ψ and Φ bonds), Tertiary structure of proteins, Quaternary Structure of Proteins.

Unit IV

Chemical and Enzymatic Synthesis of DNA and RNA, Purification of Nucleic acids. Gel electrophoresis, Blotting Techniques and Hybridization. DNA Finger Printing, Foot Printing, PCR and Chromosome Walking, DNA Sequencing.

Practicals:

1. Good Lab Practices. Do's and Don'ts in Laboratory.
2. Introduction to the use of various Equipments used in Biotechnology Laboratory.
3. Different Sterilization Techniques
4. Preparation of and buffers with different concentrations based on Molarity, Molality and Normality.
5. Isolation of DNA from different sources.

Books Recommended:

1. Genetics: A Conceptual Approach: Benjamin A Pierce.
2. Instant Notes in Molecular Biology: Phil Turner *et al.*,
3. Applied Molecular Genetic: Roger I Miesfeld.
4. Molecular Biology: David P Clark.
5. Principles of Biochemistry: David N. Nelson, Michael M. Cox.
6. Genomes: T.A. Brown (Recent Edition).



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