

**CLUSTER UNIVERSITY SRINAGAR**  
Syllabus for B.Sc. I<sup>st</sup> Year (Semester - II)  
**Subject: Bioinformatics**  
(Session 2017-18)

**SEMESTER-II**

**Course title: Foundations of Bioinformatics-II**

**Unit-I**

DNA damage and repair: Types of mutations (Base substitution, Missense mutation, nonsense mutation, Polypeptide chain termination, Deletion mutations, Insertion mutations, Frameshift mutations, Silent mutations). Chemical and Physical mutagens, Mismatching and recombination, Hot spots, Overview of recombination. Molecular basis of homologous recombination, Recombination in higher organisms, DNA repair: DNA mismatch repair system, General excision repair system, Repair by excision of specific bases, Specialized DNA repair mechanism, Photoreactivation.

**Unit-II**

Gene Analysis Methods: Genomic Libraries, DNA library construction, Screening library by DNA hybridization, Preparation of probes. Nucleic acid staining, Radioactive and non-radioactive labeling, Characterization of genome organization: E. coli K-12 genome, Yeast (*Saccharomyces cerevisiae*), Human genome.

**Unit-III**

Bioinformatics and internet basics, Content providers and ISPs and electronic mail (Bulk mail and E-mail servers). File transfer protocol, World Wide Web (WWW), Navigation on the WWW, Introduction to different browsers, Internet and intranet, Applications of computers in Bioinformatics research.

**Unit-IV**

Introduction to Biostatistics: Concept of sample and population, Mean, Mode, Median, Variance, Standard deviation, Coefficient of variance, Graphical representation of data: Bar charts, histograms, frequency distributions, Pie charts, Dendrograms.

**Practicals:-**

1. Agarose gel electrophoresis of DNA.
2. Demonstration of PCR.
3. Hands on practicals for calculation of mean, mode, median & standard deviation.

**Books Recommended:**

1. Genetics: A Conceptual Approach: Benjamin A. Pierce
2. Applied Molecular Genetics: Roger I. Miesfeld
3. Basic Biostatistics: Sunder Rao

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