LSC 505 — BIOSTATISTICS AND BIOINFORMATICS

1. Biostatistics - brief history and definitions.

2. Biological data: populations and samples, variables, classification of data, frequency distributions.

3. Descriptive statistics, measures of central tendency, dispersion and variability.

4. Probability distribution, binomial and Poisson, Normal probability distribution.

5. Estimation and hypothesis testing, student t-distribution, chi-square distribution.

6. Analysis of variance, variances of samples and their means, F distribution, the hypothesis, partitioning of the total sum of squares and degrees of freedom, Model-I & Model-II ANOVA.

7. Introduction to Bioinformatics and Computational biology with historical background, major developments.

8. Biological databases, data query and data mining, Boolean operators, problems and applications to biological problems.

9. Nucleic acid sequence analysis, alignment, similarity searches including remote similarity searches, secondary structure element, motifs.

10. Protein sequence analysis, alignment, similarly searches including remote similarity searches, secondary structure elements, motifs.

11. Genomics and annotation.

12. RNA, secondary structure, small noncoding RNAs.

13. Evolutionary analysis, use of the PHYLIP package, tree construction.

14. Artificial neural network.

Suggested Readings

1. Biostatistical Analysis - by J. H. Zar
2. Biometry - by Robert R. Sokal & James F. Rohlf
3. Statistical Methods in Biology - by N. T. J. Bailey
4. Bioinformatics - by David W. Mount
5. Bioinformatics Principles and Applications - by Zhumur Ghosh & Bibekanand Mallick