(IT617) BIO INFORMATICS

(ELECTIVE - II)

Objective of the Course :

To equip students with computational skills and to help them use computational methods to study, organise, analyse and interpret biological information at molecular, genetic and genomics levels.

UNIT - I

Introduction to Bioinformatics: Basics of Bioinformatics, Elementary commands and protocols, ftp, telnet, http,html. Scope of Bioinformatics.

UNIT - II

Sequencing Alignment & Dynamic Programming: Heuristic Alignment algorithms. Global sequence alignments-Neddleman-Wunsch Algorithm, Smith-Waterman Algorithm-Local sequence alignments (Amino acid substitution Matrices (PAM, BLOSUM).

UNIT - III

Biological Databases & Their Use : Introduction to Biological databases, Organization and management of databases. Searching and retrieval of information from the World Wide Web. Structure databases - PDB (Protein Data Bank), Molecular Modeling Databases (MMDB). Primary Databases NCBI,EMBL, DDBJ,Introduction to Secondary Databases Organization and management of databases Swissprot, PIR,KEGG,Introduction to BioChemical databases-organization and Management of databases. KEGG, EXPASY,BRENDA, WIT.

UNIT - IV

Evolutionary Trees & Phylogeny : Ultrasonic trees – parsimony – Ultrametric problem – Perfect phylogeny – Phylogenetic alignment – connection between multiple alignment and tree construction.

UNIT - V

Applications of Bioinformatics: DNA Mapping and sequencing –Map alignment – Large scale sequencing and alignment – Shotgun – DNA sequencing – Sequence assembly – Gene predictions – Molecular predictions with DNA strings.

TEXT BOOKS :

1. D. Baxivanis and Foulette - Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, Wiely Indian Edition, 2001.
2. Mount. D. - Bioinformatics: Sequence and Genome Analysis Indian Edition, Cold Spring Harbor Lab, 2001.
3. T K Attwood, D J parry-Smith, Introduction to Bioinformatics, 1st ed., Pearson Education, 11th Reprint 2005.

REFERENCE BOOKS :

1. C S V Murthy - Bioinformatics, 1st ed., Himalaya Publishing House, 2003.
2. Harshawardhan P. Bal - Bioinformatics – Principles and Applications, First Reprint, Tata McGraw-Hill, 2006.