

SECOND ALLIED COURSE - I : BIOINFORMATICS

UNIT – I

Biological Databases: Sequence databases – Nucleic Acid sequence Databases: Genbank ;Protein Sequence Databases: Swiss Prot; Searching Sequence Databases – Non-redundant Databases – Low Annotation Databases – Specialized sequence Databases – Structural Databases – Motif Databases – Genome Databases – Proteome Databases.

UNIT – II

Tools for Bioinformatics: Pairwise alignment – Dotplots – scoring matrices – Blosum Matrices – PAM Matrix – Gap Penalty – Alignment Algorithms: Needleman – Wunsch Global Alignment Algorithm ; Smith – Waterman Local Alignment Algorithm.

UNIT - III

Pairwise Sequence Analysis Tools : BLAST– Steps involved in using BLAST – Interpreting BLAST results; FASTA – Alignment Scores -Multiple Alignment – ClustalW – Phylogenetic Tree – Sequence Analysis using EMBOSS.

UNIT – IV

Protein Structure Prediction: Secondary structure Prediction –PDB-FSSP-SCOP-CATH- Chou-Fasman – Jpred – Q₃ – Transmembrane protein prediction – Tertiary structure prediction – Comparative Modelling – Fold recognition – Ab initio prediction – modeler – RASMOL.

UNIT – V

Emerging Areas of Bioinformatics: DNA microarrays – Structural genomics -Functional Genomics – Proteomics Comparative Genomics - Phylogeny – Whole Cell Simulation –Human Genome Project- Systems biology - Biodiversity informatics.

REFERENCES:

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2. Manikand Vijayaraj, 2002. Bioinformatics for beginners, Kalaikathir Achchagam, Coimbatore
3. Mount, D.W. 2005. Bioinformatics Sequence and genome analysis (II edition) CBS Publishers. New Delhi
4. Sundarajan. S. and R. Balaji.(2005), Introduction of Bioinformatics, Himalaya Publishing house, Mumbai.
5. Westhead, D.R, H.J. Parish and R.M. Twyman. (2003) Bioinformatics Viva books Private Ltd. New Delhi.