BM6005 BIO INFORMATICS

DETAILED SYLLABUS

OBJECTIVES:

The student should be made to:

- Exposed to the need for Bioinformatics technologies
- Be familiar with the modeling techniques
- Learn microarray analysis
- Exposed to Pattern Matching and Visualization

UNIT I INTRODUCTION

Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.

UNIT II DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS

Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics.

UNIT III MODELING FOR BIOINFORMATICS

Hidden Markov modeling for biological data analysis – Sequence identification –Sequence classification – multiple alignment generation – Comparative modeling –Protein modeling – genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling.

UNIT IV PATTERN MATCHING AND VISUALIZATION

Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

UNIT V MICROARRAY ANALYSIS

Microarray technology for genome expression study – image analysis for data extraction – pre-processing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark – Tradeoffs.

TEXT BOOK:

1. Yi-Ping Phoebe Chen (Ed), "BioInformatics Technologies", First Indian Reprint, Springer Verlag, 2007.

REFERENCES:

1. Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.

2. Arthur M Lesk, "Introduction to Bioinformatics", Second Edition, Oxford University Press, 2005