SARDAR PATEL UNIVERSITY
Programme: MSC (Microbiology)
Semester: IV
Syllabus with effect from: June 2011

Paper Code: PS04EMIC02	Total Credits: 4
Title Of Paper: Bioinformatics	

Unit	Description in detail	Weightage (%)
1	Introduction to Bioinformatics: Overview, Internet and bioinformatics, Applications, Databases: Databases in Bioinformatics, various biological databases, Protein and Nucleotide sequence Data bases. Protein sequence, structure and Classification databases. Sequence analysis: Pairwise alignment, local and global alignment, Scoring matrices, multiple sequence alignment, tools for sequence alignment, programming algorithms	25 %
2	Gene prediction: Gene structure in Prokaryotes and Eukaryotes, Gene prediction methods: Neural Networks, Pattern Discrimination methods, Signal sites Predictions, Evaluation of Gene Prediction methods. Transcriptomics: Complete transcript cataloguing and gene discovery sequencing based approach, Microarray based technologies and computation based technologies. RNA secondary structure prediction	25 %
3	Protein Computational Biology: Structural classification of proteins, Protein structure analysis structure alignment and comparison, Secondary and tertiary structure prediction and evaluation, prediction of specialized structures, Active site prediction, Protein folding, Protein modeling and drug design Tools in Bio informatics: Protparam, Translate, Bioedit, findmod, Coils, TMHMM, Rasmol, Deep view.	25 %
4	Genomics: Comparative Genomics Proteomics: Types of proteomics, tools for proteomics- separation and isolation of proteins, acquisition of protein structure information, databases and applications. Phylogenetic analysis: molecular basis of evolution, Phylogenetic trees & different methods for phylogenetic inference	25 %

Basic Text & Reference Books:

- Bioinformatics: A Beginners Guide, Clavarie and Notredame
- Bioinformatics: David Mount
- Bioinformatics: Rastogi
- Introduction to Bioinformatics:Arthur M. Lesk
- Bioinformatics: Principles and applications, Ghosh and Mallick
- Bioinformatics: Genes, Proteins and Computer, C A Orengo
- Protein Structure Prediction: Methods and Protocols, Webster, David (Southern Cross Molecular Ltd., Bath, UK)