



Semster-6

BRANCH	Subject Title	Subject Code
B.Sc. (Biotechnology - Discipline Specific Elective)	Bioinformatics	BTDSE2-161

Course learning outcomes

On successful completion of this course, the students will be able to:

1. Will know the use of Bioinformatics tools and their applications.
2. Develop an understanding of basic theory of these computational tools.
3. Gain working knowledge of these computational tools and methods.
4. Appreciate their relevance for investigating specific contemporary biological questions.
5. Critically analyses and interpret results of their study.

Unit 1

Introduction to computers and Bioinformatics: History of Bioinformatics, Computer Organization: components, Memory devices Comparison of different operating systems DOS Windows, Linux Comparison of different operating systems DOS, Windows, Linux. Computers in biology and medicine, Internet Technologies Web Services - WWW; URL; Servers: Client/ Server essentials - Domain Name Server, FTP server; E-mail server, WEB server Web publishing Browsers-IP Addressing. Sequence files formaceGenBank, FASTA, PIR, ALN ChustalW2, GCGMSF, and PDB

Unit 2

Proteomics and genomics:

Aims, strategies and challenges in proteomics proteomics technologies: Brief overview of prokaryotic and eukaryotic genome organization; extra-chromosomal DNA: bacterial plasmids, mitochondria and chloroplast
Genetic and physical maps; markers for genetic mapping; methods and techniques used for gene mapping, physical mapping, linkage analysis, cytogenetic techniques, FISH technique in gene mapping, somatic cell by bridization, radiation hybrid maps, in situ hybridization, comparative Gene mapping.

Unit 3

Overview of biological databases, nucleic acid & protein databases, primary, secondary,



functional, composite, structural classification database, Sequence formats & storage, Access databases, Extract and create sub databases, limitations of existing databases.databases and search tools: biological background for sequence analysis; Identification of protein sequence from DNA sequence; searching of databases similar sequence; NCBI; publicly available tools; resources at EBI; resources on web; database mining tool

Unit 4

Database:

Database concept Database management system; Data generating techniques, Database browsing and Data retrieval; Data structures and Sequence and Genome Databases: Databases such as GenBank; EMBL; DOBJ; Swisspectetc

Unit 5

Applications and techniques:

Clinical and biomedical applications of proteomics;
Identification and classification of organisms using molecular markers- 16S rRNA typing/sequencing, SNPS; use of genomes to understand evolution of eukaryotes, track emerging diseases and design new drugs; determining gene location in genome sequence

Practical's

1. Searching PubMed, Introduction to NCBI, NCBI data bases,
2. Multiple sequence alignment, Primer designing, Phylogenetic Analysis.
3. Sequence information resource:. Understanding and use of various web resources: EMBL, Genbank, Entrez, Unigene, Protein information resource (PIR)
4. Understanding and using: PDB, Swiss rot, TREMBL
5. Using various BLAST and interpretation of results.