

Syllabus: Tools and Techniques in Bioinformatics (Minor-1/GE) Table 4 for Science Commerce and Art Discipline

Course objectives

Objectives of this course is to provide basic information about the field of Bioinformatics, its applications. After successful completion of Tools and Techniques in Bioinformatics (Minor-1) Course the graduates will be able to understand Basics of Bioinformatics and its applications in the field of Biotechnological research and related field.

Learning outcome: CO1: Students understand basics of computer and bioinformatics. Aims and applications of bioinformatics in modern biological sciences

CO2: students will get used to with the biological databases, types of databases, organization, Data retrieval systems used by various databases and searching the correct database to obtain the desired results. Students will also know about the tools and algorithms used analyze biological data.

Unit 1: Basics of computer structure, input and out devices, memory devices, Internet – IP address, TCP/IP, DNS, URL, and email

Unit 2: Bioinformatics definition, what is Bioinformatics and its relation with molecular biology? History, Aims, Scope and applications

Unit 3: Biological databases

- DNA Databases – GenBank, EMBL, DDBJ, understanding structure of DNA databases
- Protein Databases – UniprotKB, Swiss Prot, TrEMBL understanding structure these databases
- Structure Databases – PDB and Understanding its structure
- Literature Databases – PubMed

Unit 4: Sequence Alignment – Pairwise and Multiple sequence alignment, Global and Local Alignment, DotPlot method, BLAST an FASTA tools for sequence similarity search, Basics of phylogenetics, online tools for sequence alignment

Unit 5: Amino Acids and Protein structure - primary, secondary, tertiary and quaternary, basics of secondary and tertiary structure prediction methods, Ramachandran Plot, Homology Modeling, Bioinformatics Companies & Research Institutes – India & International

References:

1. Bioinformatics. Baxevanis, A.D. and Quelette, B.F.F.
2. Bio informatics. Des Higgins & Willie Taylor
3. Bioinformatics. Methods and protocols. Macsewer, S.
4. Bioinformatics. Sequence and genome analysis. Mount, D.W.
5. Computer fundamentals. Nagpal, D.P.