

BIOINFORMATICS

Bioinformatics – an overview

Introduction, objectives of bioinformatics, kind of data used, information molecules, basic structures of nucleic acids, DNA ,RNA, DNA sequencing and polymerise chain reaction(PCR), proteins structure, functions, protein folding and characterization.

Biological Databases

Introduction, types of databases, nucleotide and protein sequence database, major bioinformatics databases, Introduction to biostatics, data integration, data analysis. Operating systems (LINUX, UNIX), HTML, XML, CML, BSML, etc,.

Sequence analysis

Models for sequence analysis, methods for alignment (Dot matrices), methods for optimal alignment (gap penalties and storing matrices), tools for sequence alignment – Fasts, BLAST, PSI –blast, Multiple Sequence Alignment(MSA) – tool and applications.

Phylogenetic analysis

Phylogenetic trees, distance matrix (MD) and character based methods, gene prediction tools , gene mapping, DNA sequencing, algorithms for alignment of sequencing fragments , DNA micro arrays.

Proteomics

Proteomics analysis, tools for proteome analysis, different structural proteins, protein classification, methods of structure prediction (known folds and unknown folds), protein function prediction, metabolic pathways , gene networks their properties and analysis.

BOOKS RECOMMENDED

1. Introduction to bioinformatics : Attwood.
2. Bioinformatics sequence and genome analysis – David W. Mount
3. Bioinformatics- concept, skills and applications – S.C.Rastogi
4. Recent advances in Bioinformatics- Irfan K. Khan.