AMBT17 BIOINFORMATICS

UNIT-1 THE INTERNET AND BIOLOGIST
Internet basics, FTP, Gopher, World wide web.

UNIT-2 THE GEN BANK SEQUENCE DATABASE
Introduction, Primary & Secondary databse, Format vs content: computer vs humans, GenBank Flat File dissection, GCG, ACDEB.

UNIT-3 STRUCTURE DATABASES
Introduction to structures, PDB, MMDB, Structure file formats, Visualizing structural information, Database structure viewers.

UNIT-4 INFORMATION RETRIEVAL FROM BIOLOGICAL DATABASES
Retrieving database entries, Integrated information retrieval: The entrez system, sequence databases beyond NCBI, Medical Databases

UNIT-5 THE NCBI DATABASE
Introduction, SeqIDS, Bioseq: Sequences, Bioseqsets: Collections of sequences, Seq. Annot: Annotating the sequence, Seqdiscr: Describing the sequence

UNIT-6 SEQUENCE ALIGNMENT AND DATABASE SEARCHING
Introduction, Evolutionary basis of sequence alignment, Optimal alignment methods, Substitution scores & gap penalties, Statistical significance of alignments, Database similarity searching, FASTA, BLAST, Low complexity regions, Repetitive elements

UNIT-7 MULTIPLE SEQUENCE ALIGNMENT
Progressive alignment methods, Motifs and patterns, Hocks, MOST, Probe, Presentation methods, Abscript

UNIT-8 PHYLOGENETIC ANALYSIS
Elements of phylogenetic models, data analysis: Alignment, substitution model building, tree building and tree evaluation, building methods, searching for trees, hooting trees, Evaluating trees and data, phylogenetic software Some simple practical consideration

UNIT-9 PREDICTIVE METHODS USING NUCLEOTIDE SEQUENCE
Framework, marking repetitive DNA, Database search, Codon bias detection, Detecting function sites in the DM, Integrated gene passing, finding tRMA genes

UNIT-10 PREDICTIVE METHODS USING PROTEIN SEQUENCES
Protein identity based on composition, Propsearch, Physical properties based on sequences, secondary structure and folding classes, Sspread sopma, Specialized structures of features, Tertiary structure

UNIT-11 GENOME MAPPING

Different types of maps: physical, genetical, etc. Synteny, Human genome project, Application of genome mapping, Chromosome maps.

UNIT-12 SUBMITTING DNA SEQUENCES TO THE DATABSES

Introduction, Where to submit, What to submit, How to submit on the world wide web, How to submit with sequin.

Reference Books

1. Bioinformatics: A practical guide to the analysis of genes and proteins A.D. Baxevanis and B.F.F. Ouellette (Eds). 2002 John Wiley and Sons.
2. Bioinformatics: Sequence and Genome Analysis by D.W. Mount, 2001, Cold Spring Harbor Laboratory Press.