Bio Informatics
IT705A
Contracts: 3L
Credits- 3

Module 1: INTRODUCTION TO MOLECULAR BIOLOGY   [5]
Concepts of Cell, tissue, types of cell, components of cell, organelle. Functions of different organelles.
Concepts of DNA: Basic Structure of DNA; Double Helix structure; Watson and crick model. Exons and
Introns and Gene Concept.
Concepts of RNA : Basic structure, Difference between RNA and DNA. Types of RNA.
Concept of Protein: Basic components and structure. Introduction to Central Dogma: Transcription and
Tranlation
Introduction to Metabolic Pathways.

Module 2: Sequence Databases   [2]
Introduction to Bioinformatics. Recent challenges in Bioinformatics. Protein Sequence Databases, DNA
sequence databases. sequence database search programs like BLAST and FASTA. NCBI different modules:
GenBank; OMIM, Taxonomy browser, PubMed;

Module 3: DNA SEQUENCE ANALYSIS   [14]
DNA Mapping and Assembly : Size of Human DNA ,Copying DNA: Polymerase Chain Reaction (PCR),
Hybridization and Microarrays, Cutting DNA into Fragments, Sequencing Short DNA Molecules, Mapping
Long DNA Molecules. DeBruijn Graph.

Sequence Alignment: Introduction, local and global alignment, pair wise and multiple alignment, Dynamic
Programming Concept. Alignment algorithms: Needleman and Wunsch algorithm, Smith-Waterman.

Module 4 : Introduction Probabilistic models used in Computational Biology   [8]
Probabilistic Models; Hidden Markov Model : Concepts, Architecture, Transition matrix, estimation matrix.
Application of HMM in Bioinformatics : Genefinding, profile searches, multiple sequence alignment and
regulatory site identification. Bayesian networks Model :Architecture, Principle ,Application in
Bioinformatics.

Module 5: Biological Data Classification and Clustering   [6]
Assigning protein function and predicting splice sites: Decision Tree