Course No: MCA-5EL2
Course Title: Bioinformatics

Unit I

Introduction tobioinformatics, Definitions and concepts, Biological complexity, The role of bioinformatics.
Types of biological data, types of Biological Databases – flat file databases, relational databases, object-oriented databases, XML representation of biological databases, Sequence databases (EMBL, GenBank, DDBJ, SWISS-PROT, PIR, TrEMBL), Protein family/domain databases (PROSITE, PRINTS, Pfam, SMART, etc), Protein structure and fold classification databases (PDB, CATH, SCOP), pathway databases, Cluster databases (ProDom, Systers, etc)

Unit II

PubMed database, Search engines - SRS, Entrez, Functional Genomics (The Genome) - Data production and data flow (mapping, DNA sequencing, generation of scaffolds &contigs), BIAST, FASTA, Gene prediction (*ab initio* & similarity based), Genome annotation (pipelines, databases), Technology platforms, Introduction to Proteomes

Unit III

Ontologiesin Bioinformatics: The need for ontologies (Gene naming, functional classifications, references schemes), Classification of ontologies – one dimensional, 2 dimensional, three dimensional, Gene ontology, EcoCyc etc. Introduction to Markup Languages for biological data: BioML, ProML, CML, GAME, AGAVE, BSML.

Unit IV

Querying and Integration of Biological Databases: Warehouse Integration, mediator-wrapper based integration, navigational integration. Existing systems and their drawbacks.XPath query language for querying biological data.

Reference Books:
1. Developing Bioinformatics Computer Skills, Cynthia Gibas& Per Jambeck, O'Reily
2. Introduction to bioinformatics, T. K. Attwood & D J Parry-Smith, Pearson Education
3. Bioinformatics – A beginner's Guide, Jean-Michel Claveriw, CerdricNotredame, WILEYDreamTechIndia Pvt.
4. Krane ,"Bioinformatic", Pearson Education.