

Details of course:-

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Fundamentals of computational biology (BT 207)	3	0	2	

Course Objective: The objective of the course is to introduce students to the current bioinformatics algorithm concepts and their implementation

Course Outcome (CO):

- 1 Explain mathematical concepts involved in biology.
- 2 Gain basic knowledge of modern molecular biology and genomics
- 3 Develop an algorithm for analysis of biological sequences.
- 4 Apply molecular methods to study genetic variation within and between species
- 5 Explain and evaluate different phylogenetic optimal criteria.
- 6 Choose systems biology tools that will help in reconstructing and redefining complex biological processes.

S.No.	Content	Contact Hours
Unit 1	Introduction to Biological Databases: Types, Overview of Biological Databases and Retrieve Nucleic acid databases: NCBI: Pubmed, Entrez, Blast, OMIM, Books, Taxonomy, Structure, Locuslink. Protein Databases- Primary, secondary & Composite, databases Structural classification database, Sequence Formats & storage, Sequence submission to sequence Database.	8
Unit 2	Genomics: Structure of DNA, Polymorphisms in DNA Sequence, Human Genome Project, Complete Genome Sequences, Functional Annotation	8
Unit 3	Data analysis in Bioinformatics: Visualize and explore genomic data using genome browser, explore webbased platforms for data intensive biomedical research	8
Unit 4	Pairwise Sequence Alignment: Local alignment, Global alignment, Scoring matrices- PAM, BLOSUM, Gaps, Dot Plots. Dynamic programming Approach: Needleman and Wunsch Algorithm, Smith and waterman Algorithm, Heuristic Approach: BLAST, FASTA.	9
Unit 5	Multiple Sequence Alignment: global and local alignments, scoring matrices and gap penalties, filtering, position specific scoring matrices, internet resources, uses of multiple sequence alignment, programs and methods for multiple sequence alignment, representation, structural inference.	9
Total		42