

BTPC2006 – Bioinformatics and Biostatistics

Discipline: B.Tech in Biotechnology

Semester: 4th

No. of Days/Week: 3

No. of Weeks: 15

Faculty Name: Dr. Shubhasmita Panda

Week	Class Day	Topics
1st	1st	Introduction to bioinformatics and biological databases
	2nd	NCBI, EMBL, DDBJ: access and retrieval
	3rd	Uniprot, PIR, SwissProt, PDB
2nd	1st	Metabolic Pathway Databases: KEGG, MetaCyc
	2nd	Domain classification databases: SCOP, CATH, Pfam
	3rd	Microbial and viral genome resources
3rd	1st	Basics of Linux OS and commands
	2nd	FTP and TELNET protocols
	3rd	File formats and database management systems
4th	1st	Introduction to SQL and its structure
	2nd	Data lifecycle and DBMS models
	3rd	Sequence analysis: pairwise alignment
5th	1st	Dynamic programming for sequence alignment
	2nd	Needleman-Wunsch and Smith-Waterman algorithms
	3rd	BLAST, PSIBLAST, PHIBLAST tools
6th	1st	Multiple sequence alignment and motif generation
	2nd	Shotgun DNA sequencing
	3rd	Introduction to statistics in biology
7th	1st	Frequency distribution and graphical representation
	2nd	Measures of central tendency and dispersion

	3rd	Probability concepts and problems
8th	1st	Hypothesis testing – definitions and errors
	2nd	Z-test, t-test, F-test
	3rd	Chi-square test – goodness of fit, independence
9th	1st	Biostatistics in experimental design
	2nd	Use of statistical tools and software
	3rd	Sample data collection and analysis
10th	1st	Case studies and real-life applications
	2nd	Recap of algorithms
	3rd	Integration of bioinformatics and statistics
11th	1st	Interpreting statistical results
	2nd	Challenges and ethical concerns in data analysis
	3rd	Quiz and problem-solving
12th	1st	Revision of Modules I–III
	2nd	Class Test 1
	3rd	Student presentations on tools
13th	1st	Revision of Modules IV–V
	2nd	Application to biotech research
	3rd	Discussion on PYQs
14th	1st	CO Mapping
	2nd	Mock test
	3rd	Final doubt clearing
15th	1st	Internal Assessment
	2nd	Recap and feedback
	3rd	Course conclusion

