

B.Tech. Biotechnology: Semester-V BBT 505: GENOMICS AND PROTEOMICS	
Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

### Course Objective

The course is aimed to impart knowledge of structural and functional aspects of cells and approaches to study genomes and proteomes. The application of genomics and proteomics and tools and techniques will be covered.

### Course Learning Outcomes

After completing the course, the student shall be able to:

- CO1: Understand the concept of genome evolution.
- CO2: Analyze DNA with the help of sequencing techniques.
- CO3: Differentiate various tools to analyze protein structure.
- CO4: Understand different sequence comparison techniques like BLAST, FASTA.
- CO5: Analyze protein with gel electrophoresis, 2D gel electrophoresis, MALDI TOF, IEF etc..
- CO6: Understand the structure, function and protein- protein interactions.
- CO7: Analyze protein and genomic database with software tools

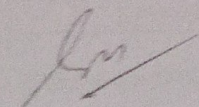
#### Unit 1: Introduction to Genomics

Genome evolution and phylogenetics, Origin of genomes, Acquisition of new genes, DNA sequencing – chemical and enzymatic methods, The origins of introns, DNA and RNA fingerprinting, The human genome. Structural and Functional Genomics: Technology, Sequences Comparison Techniques [BLAST], Genome, Annotation, ESTs, Digital Northern, SAGE, Relational Data Base Basics, cDNA Microarrays, Oligonucleotide Microarray Chips, Cancer and genomic microarrays, Application of Microarrays with examples, Microarray Data Analysis; Gene finding tools.

#### Unit 2: Introduction to proteomics:

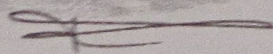
How to analyze a Proteome - 2D-gel electrophoresis, high-throughput proteome analysis with 2D-IEF, Gel documentation analysis, MALDI-TOF mass spectrometry. Identification of mass spectrometry data by mascot search engine.

**Protein Structure and Function: Structure function relationship, Protein-protein interactions.**

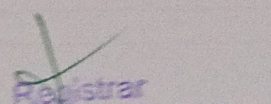


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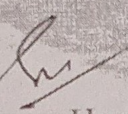


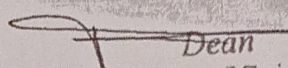
**Unit 3: Application of Genomics and Proteomics**

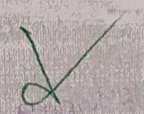
Genome sequencing projects (technology of sequencing and assembly, bioinformatics of genome annotation, current status of genome sequencing projects) Genomic browsers and databases. Study of Post translational Modifications: Methods of applications, Aspects of Clinical Proteomics; Protein micro arrays and MS Imaging

**Suggested Readings**

- Genomes II, T.A. Brown
- Biotechnology and Genomics by P.K.Gupta
- A Primer of Genome Science, Greg Gibson and Spencer V. Muse
- Database Annotation in Molecular Biology : Principles and Practice, Arthur M. Lesk

  
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