

Subject Code: 2SC2010305	Subject Title: Advance Biotechnology
COURSE TYPE: CORE COURSE	

Course Objective: The course covers Proteomics, Genomics and Metagenomics in enough details necessary to understand the principles, tools and techniques applied in concerned fields. Apart from them, Recent Advances in Biotechnology puts emphasis on various topics such as discovering new pathogens and treatment methods.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
4	-	4	-	4	60	40	-	-	100

Unit	Content	Lectures	Weightage
1	➤ Biological Databases: Structure database: PDB, MMDB, Classification database: CATH,SCOPE, Protein Database: Protein sequence database:PIR, Swiss-Prot ➤ Nucleotide sequence database: EMBL, gene bank, DDBJ ➤ Sequence-based Database Searches: BLAST, PSI-BLAST, RPS BLAST & FASTA, Rasmol,Cn3D,Clustal W ➤ Genomics: Genome and Genome analysis, Gene Finding,Genome annotation ➤ Proteomics: Types of proteomics, Microarray, SAGE, 2-D, PAGE ➤ Metagenomics: What and Why for metagenomics(Science of uncultivablemicroorganisms), Purification of DNA from different environmental samples, Designing a successful Metagenomics project	20	30%
2	➤ Human Genome Project ➤ Pharmacogenomics (Drug Discovery) ➤ Crop Genomics(Agro infomatics) ➤ Metabolomics ➤ Chemo informatics ➤ Phylogeny ➤ Secondary structure prediction ➤ Protein Modeling ➤ Molecular Interaction and Docking	15	25%
3	➤ Biofuels: biogas ,Gasohol, bioethanol, biodiesel and biohydrogen production, Bioconversion of agriculture waste, Hydrogen, electricity, Biodiesel production from Jatropa ➤ Bio-control of pathogens: Side rophores, antibiotics enzymes, ice Nucleation andantifreeze Proteins ➤ Bio-insecticides: Bacillus thuringiensis, Baculoviruses	10	20%
4	➤ Overview and Current status of Anti HIV, Anti Malaria, Anti Tuberculosis and Anti Cancer treatment; ➤ Multidrug resistance : Introduction, development, detection and treatment ➤ Discovering New Pathogens & New disease: SARS, bird flu , swine flu etc.; ➤ Immobilization: Basic concept of immobilization in biotechnology, Principles and mechanism of Immobilization, Methods of Immobilization with examples	15	25%

Learning Outcome: Students, by offering this course will acquire enough knowledge about the recent advancements in the fields of Proteomics, Genomics, Metagenomics and biotechnology.

Reference Books:

1. Genomics, Proteomics and clinical bacteriology by Woodford
2. Computing for Comparative Microbial Genomics by Andreas
3. Microbial Proteomics by Humphery-Smith
4. Protein Biochemistry and Proteomics by Rehm
5. Introduction to Proteomics by Daniel
6. Industrial Pharmaceutical Biotechnology by Heinrich
7. Bio safety in Microbiological and Biomedical Laboratories by Richmond
8. Drugs: From Discovery to Approval by Rick
9. Handbook of Pharmaceutical Biotechnology by Gad
10. Biopharmaceuticals Biochemistry and Biotechnology by Walsh
11. Pharmaceutical Microbiology, Blackwell scientific Publications by Hugo
12. Molecular Biotechnology by Glick