

PARUL UNIVERSITY - FACULTY OF APPLIED SCIENCE

Department of Biotechnology

SYLLABUS FOR 4th Sem PROGRAMME

Bioprocess Engineering and Technology (11202251)

Type of Course:

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/	Lab Hrs/		External		Internal			
				T	P	T	CE	P	
4	-	-	4	60	-	20	20	-	100

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	UNIT-I: Fermentation technology – Principles of fermentation, surface, submerged and solid state fermentations. Batch, fed batch, semi-continuous and continuous culture techniques. Design and operation of fermentors, Agitation and aeration, Types of fermentors- continuous stirred tank fermentor (CSTF), air-lift fermentor, Types of reactions in fermentations, Selection and characteristics of industrial microorganisms, Primary and secondary metabolites, Strategies for strain improvement and maintenance of the industrial strains, Raw materials, different types of fermentation media, Recovery of products, steps in downstream processing, Bioreactors.	25%	15
2	UNIT-II: Production of ethyl alcohol and beer by yeast, Fermentative production of Antibiotics - penicillin, streptomycin, tetracycline, Organic acids - citric acid, lactic acid, acetic acid, Enzymes - amylase, proteases, streptokinase, Amino acids - glutamic acid, lysine and Vitamins - B12, B2, and vitamin C. Production of biogas from agricultural wastes.	25%	15
3	UNIT-III: Immobilization of enzymes and cells – methods of immobilization, effect of partition on kinetic properties of enzymes, immobilization of multienzyme systems, enzyme reactors, packed bed reactors, fluidized bed reactors, problems in using immobilized biocatalysts, Industrial and medical applications of immobilized enzymes and cells. Principle and applications of Protein engineering. Principle, types and applications of Biosensors.	25%	15

4	UNIT-IV: Single cell protein- Production and applications, Microbial transformations (bioconversions)-: Types and applications, steroidal transformations. Bioleaching, biosorption, biodegradation, bioremediation. Biofertilizers – Blue-green algal fertilizers (<i>Azolla</i> , <i>Aneabena</i>), seaweed fertilizers, <i>Mycorrhiza</i> , Biocontrol agents- Siderophores, biopesticides – Insecticidal toxin of <i>Bacillus thuringiensis</i> , mode of action and control, Bacculoviruses.	25%	15
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

PARUL UNIVERSITY - FACULTY OF APPLIED SCIENCE

Department of Biotechnology

SYLLABUS FOR 4th Sem PROGRAMME

Genomics and Proteomics (11202252)

Type of Course:

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/ Week	Tut Hrs/ Week	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
4	-	-	4	60	-	20	20	-	100

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	UNIT-I: Origin and Evolution of genomics and genome mapping: Different databases, Alignment and homology tools, Origin of genomics, the first DNA genomes, microcolinearity, DNA based phylogenetic trees, genomes and human evolution, evolution of nuclear, mitochondrial and chloroplast genome, the concept of minimal genome and possibility of synthesizing it, genetic maps, physical maps, EST and transcript maps, functional maps, comparative genomics and colinearity, synteny in maps.	17%	10
2	UNIT-II: Whole Genome sequencing and analysis: Genome sequencing methods review, analysis of the genomes of viruses, bacteria, archae, eukaryotic – fungi, parasites, insects, plant genomes (Arabidopsis and rice), Animal genomes (fruit fly, mouse, human)	15%	10
3	UNIT-III: Annotation of whole genome sequence and functional genomics: <i>In Silico</i> methods, insertion mutagenesis (T-DNA and transport insertion), Targeting Induced Local Lesions in Genomes (TILLING), management of data, gene expression and transcript profiling, EST contigs and unigene sets, use of DNA chips and microarrays.	17%	10
4	UNIT-IV: Pharmacogenomics: Use in biomedicine involving diagnosis and treatment of diseases, genomics in medical practice, personalized medicine, DNA polymorphism and treatment of diseases, application of SNP-technology-mapping genes underlying monogenic and multigenic disorder, use of SNP in pharmacogenomics, pharmacogenomics and industry.	17%	10

5	UNIT-V: Proteomics: Introduction and overview of tools used in proteomics studies, protein - protein interaction, DNA- Protein interaction, application of quantitative proteomics for the analysis of protein - protein interactions and protein linkage maps, understand yeast two-hybrid and mass spectrometry based techniques for the analysis of protein complexes and their significance and limitations	17%	10
6	UNIT-VI: Drug Discovery and Development: Structure prediction and human proteomics, mutant proteins, use of computer simulations and knowledge-based methods in the design process, proteomic methods for the detection and analysis of protein biomarkers for the detection and classification of disease, De-novo design; making use of databases of sequence and structure, protein structure and drug discovery, proteins in disease, current issues, drug targets, drug efficacy, protein chips and antibody microarray, techniques and future approaches of proteomics in cancer research.	17%	10

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

PARUL UNIVERSITY - FACULTY OF APPLIED SCIENCE

Department of Applied Science & Humanities

SYLLABUS FOR 4th Sem PROGRAMME

Dissertation (11200251)

Type of Course:

Prerequisite:

Rationale:

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/	Tut Hrs/	Lab Hrs/ Week		External		Internal			
				T	P	T	CE	P	
-	-	28	28	-	200	-	100	-	300

Lect - Lecture, Tut - Tutorial, Lab - Lab, T - Theory, P - Practical, CE - CE, T - Theory, P - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Dissertation: Dissertation	30%	18

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.