Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology

Structured Work Plan for Teaching

Academic Year 2020-21 (Term-I)

Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	B.Sc. III Year	Mr. S. D. Kadam	Biotechnology	Course Title: - Recombinant DNA technology Course Code: - U-RDT- 627 Lab Course: - Lab Course XVII Course Code:- U-LAC-633

1. **Summary of Lesson Plan**

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Biotechnology	**UNIT-I:** **Principles of Gene cloning** Molecular tools and their applications: Restriction Endonuclease and their types, DNA Ligases, Alkaline phosphatase. Vectors {Plasmids (pBR322, pUC18/19), Bacteriophages (λ Phage, M 13 Phage, Cosmids) and high capacity vector} Gene cloning strategies- insertion of DNA molecule into a vector (Calcium Chloride mediated gene transfer, Electroporation, Agrobacterium-mediated transformation, Microinjection, liposome fusion) Screening and selection of recombinant host cells-Blue/white screening.	06/07/2020 to 30/07/2020	01 01 04 02 02	Online class Seminar	Unit – I Chapters Assignment Quiz- online through Google classroom

2	Biotechnology	**UNIT -II:** **r- DNA Techniques.** Polymerase Chain Reaction & qPCR, Blotting techniques, Site directed mutagenesis, DNA Sequencing (Sanger's and Maxam Gilbert's Method) Reporter gene assays, DNA-Protein interaction assay, Protein-Protein interaction assay, DNA chips (Micro array). • and Ribozymes catalyze a variety of chemical reactions	01/08/2020 To 25/08/2020	02 02 02 03 03 02		
3	Biotechnology	**UNIT-III:** **Library construction and screening** Construction of Genomic library (Maniatis Strategy), cDNA cloning with conventional cDNA and full length cDNA, Probes (preparation and types-Nucleic Acid Probe) Screening of library (Probe based direct and indirect methods).	26/08/2020 To 25/09/2020	06 02 03	Guest Lecture	Assignment Quiz-2 online through Google classroom
4	Biotechnology	**UNIT - IV:** **Applications of r-DNA technology.** Agricultural and Industrial Applications: i) BT-Cotton, ii) Transgenic maize, iii) Golden rice iv) Protein engineering to Improve Detergent Enzymes. Pharmaceutical Applications i) Recombinant Human Insulin ii) Hepatitis B-vaccine iii) Monoclonal Antibodies iv) Clotting factors v) Tissue Plasminogen Activator vi) Erythropoietin v) Human growth hormone.	26/09/2020 To 30/10/2020	01 01 06 02		

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Recombinant DNA technology	Isolation of Genomic DNA from Bacterial cell.	13/07/20 To 29/10/20 Batch A,B,C,D	04
2		Isolation of Plasmid DNA from resistant clinical isolates.		04
3		Agarose gel electrophoresis and restriction digestion of DNA.		04
4		Ligation of DNA		04
5		Preparation of competent cells and Bacterial transformation		04
6		Screening of recombination by blue white selection.		04
7		Southern blotting		04
8		Western blotting		04
9		PCR amplification of isolated bacterial genomic DNA using universal primers		04
10		Extraction and purificationof amplified DNA fragment from gel.		04
11		RFLP and RAPD		04
12		GFP cloning		04
13		Visit to Molecular Biology & Genetic Engineering Research Laboratory		04

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Rajarshi Shahu Mahavidyalaya, Latur
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Department of Biotechnology and Food Processing Technology

Structured Work Plan for Teaching

Academic Year 2020-21 (Term-I)

Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
2	B. Voc. III Year	Mr. S. D. Kadam	Food Processing Technology	Sugar Processing Technology

2. Summary of Lesson Plan

Class: B.Voc FPT III (SEM V)

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	Food Processing Technology	**Unit I** Major sugar producing countries in the world. Area under sugarcane in different states of India. Sugarcane and sugar beet as sugar raw materials. Flow charts for manufacture of Granulated sugar and Liquid sugars. Properties of Granulated sucrose and Liquid Sugars. Invert sugar and their characteristics. Byproducts - molasses, bagasse and filter mud, Sugar Production Processes, Raw sugar from sugarcane	06/07/2020 to 30/07/2020	02 02 06 02	Online class Seminar	Unit – I Chapters Assignment Quiz- online through Google classroom
2	Food Processing Technology	**Unit II** Milling Operation, Clarification/ Purification, Carbonation process, Suphitation process, Filtration, Concentration/ Saturation, Crystallization, Centrifuging, Drying and Bagging	01/08/2020 To 30/08/2020	04 03 07 03		

3	Food Processing Technology	**Unit III** Equipment for Sugar Production. Major Equipment for Sugar Production: Crushers, Pressure mills, Shredders, Filter Press, Evaporators, Crystallizers, Centrifuge, Vacuum pump.	01/09/2020 To 30/09/2020	06 03 03	Guest Lecture	Assignment Quiz-2 online through Google classroom
4	Food Processing Technology	**Unit IV** **15** Technology of Chocolate manufacturing and Miscellaneous Products: Chocolate manufacturing ingredients and their role as food additives. Machineries involved in the process of manufacturing chocolates. Caramel, Toffee and fudge-Licorice paste and aerated confectionary, Lozenges, sugar panning and chewing gum.	01/10/2020 To 31/10/2020	06 04 05		

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स्थापना - १९७०

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur
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Department of Biotechnology

Structured Work Plan for Teaching
Academic Year 2020-21 (Term-I)
Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
3	BSc BT I Year	Mr. S. D. Kadam	Biotechnology	Course Title: - Cell Biology Course Code: - U-CEB-187 Lab Course: - Lab Course I Course Code:- U-LAC-191

Sr. No.	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	**Unit I:** Cell – Shapes, morphology, Cell theory, origin of life –Stanley miller Experiment. Origin of Mitochondria, Chloroplast, Coactivate Theory, Introduction to prokaryotic and eukaryotic cell, Microscopic techniques in cell biology. Broad classification of cell types.	10-09-2020 To 30-09-2020	05 03 03	Classroom Group Discussion	
	Unit II: Biological membrane structure organization, Chemical component of Biological membrane, membrane proteins, lipids. Structure-function relationship including organelles(e.g., Cell wall, Endoplasmic reticulum, Mitochondria, Chloroplast, Golgi body, nucleus and nuclear membrane, Microbodies: Glyoxysome, Peroxisome, Melanosome, lysosomes, vacuoles) Cytoskeleton, Extracellular matrix, Cell junctions.	30-09-2020 To 20-10-2020	04 02 03 02 02		Unit I Online assignment

	Unit III: Membrane transport, Transport across cell membrane, simple diffusion, passive transport, active transport, Na/K ion channel, vesicular transport, concept of ETC Membrane Role of high energy compound. Membrane potential, Depolarization, hyperpolarization of membrane (neuronal). Generation of action potential. Types of biopotentials. Biopotential measurement instrument.	21-10-2020 To 31-10-2020	04 01 02 03		Unit – II 29/10/2020
	Unit IV: The mechanism of cell division, Cell division cycle and its regulation, **Symmetric and Asymmetric cell division.** Cell Signalling; Cell Transduction by Cytokines and Nuclear Receptor. GProtein coupled receptor, Nitrous oxide, Calcium as secondary messenger and its role in plant and animals. Cell differentiation, Neoplasia & Cell death, Brief introduction to stem cells	01-11-2020 To 31-11-2020	03 02 03 03	Class Seminar	

Sr. No.	Subject	Practical's	Date	No. of Practical's
1	Cell Biology	Cell Diversity	12/09/20 To 30/11/2020	02
2		Study of sub cellular organelles		02
3		Study of Karyotyping		02
4		Study of Mitosis, Meiosis		02
5		Cell harvesting and cell lysis- methodology		02
6		Immunoprecipitation		02
7		Demonstration of Antigen- Antibody reaction through clinical approach.		02
8		Preparation of blood smear and morphological study of different cells.		02
9		Determination of cell density by turbidometer		02
10		Study of Tissue by Microtomy		02
11		Study of osmosis		02
12		Separation of cells using sedimentation and velocity Centrifugation		02

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Structured Work Plan for Teaching
Academic Year 2020-21 (Term-II)

स्थापना - १९७०

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	B.Sc. III	Suraj D. Kadam	Biotechnology	Course Title: Pharmaceutical Biotechnology Course Code : U-PHB-706 Course Title: Lab Course XXII Course Code: U-LAC-710

1. Summary of Lesson Plan

Class : B.Sc. BT. III (VI Semester)

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	**Pharmaceutical Biotechnology**	**Unit I:** Drug Development in Pharmaceutical Process - Production of pharmaceuticals by genetically engineered cells (hormones, interferons) -Microbial transformation for production of important pharmaceuticals (steroids and semi-synthetic antibiotics) -Techniques for development of new generation antibiotics	20-02-2021 To 12-03-2021	05 03 03	Classroom Group Discussion	
		UnitII: Antibodies in research, diagnostics and therapeutics Production of monoclonal antibodies and techniques to make them clinically applicable Gene therapy –background, types of gene therapy (ex vivo & in vivo) Vaccines –Vaccine vectors, nucleic acid vaccines, immuno-enhancing	13-03-2021 To 29-03-2021	04 02 03 02 02		Unit I Online assignment

		technology. Toxicogenomics				
		Unit III: Delivery of Biotechnology products: transdermal, parenteral, oral, mucosal, ocular, buccal, rectal and pulmonary delivery Tissue Engineering –Skin, Liver, Pancreas, Xenotransplantation – terminology, technology behind it, organ donors, social & ethical issues Stability of Biotechnology products: Physical instability-denaturation, aggregation, adsorption; Chemical instability-oxidation, hydrolysis	30-03-2021 To 10-04-2021	04 01 02 03 03		Unit – II 29/04/2021
		Unit IV: Diagnosis and Kit Development -Use of enzymes in clinical diagnosis -Use of biosensors for rapid clinical analysis -Diagnostic kit development for microanalysis Products of Biotechnology-current FDA approved biotechnology: drugs-human insulin, growth hormone, interferon; Future biotechnology drugs	11-04-2021 To 31-04-2021	03 02 03 03	Class Seminar	

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Pharmaceutical Biotechnology	1. Assay of antimicrobial activity of Penicillin, Chloramphenicol, streptomycin and Quinolones	25-02-2021 To 31/04/2021 Batch A,B,C,D	04
2		Determination of Minimum Inhibitory Concentration (MIC) of Antibiotic		04
3		Extraction of natural molecules		04
4		Stability of drugs using spectrophotometry		04
5		Determination of shelf life of antibiotics (Expired drugs)		04
6		Sterility testing of commercial pharmaceuticals.		04
7		Sterility testing of injectable as per IP.		04
8		Effect of chemical disinfectantson growth of bacteria		04
9		Study of microbial spoilage of pharmaceuticals.		04
10		Visit to Pharmaceutical industry		04

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Academic Year 2020-21 (Term-II)

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
2	M.Sc. I (II Sem)	Suraj D. Kadam	Biotechnology	Course Title: Molecular Biology Course Code: P-MOB-232 Course Title: Lab Course V Course Code: P-LAC-236

Summary of Lesson Plan

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic and date
1	**Molecular Biology**	**Unit I** Genome organization: Genome organization of Prokaryotes-Bacteria and virus system. Genome organization of Eukaryotes-Structure and types of chromosome, chromatin and nucleosome, Variation in chromosome number, Concepts of ploidy, conditions and types of ploidy, variation in chromosome structure, Denaturation and Renaturation DNA, complex DNA structures, C-value paradox, Cot curve.	15-04-21 To 30-04-21	02 01 02 01 02 02 01	Classroom Group Discussion	

		Unit II Genome replication:DNA as genetic material, Genome Replication in prokaryote, various modes of DNA replication, enzymes involved, Initiation elongation and termination, & Eukaryotic organisms, Replication regulation in Eukaryotics, enzymes involved, Molecular basis of genome evolution: Mutations, causes types and effects, Hyper mutation, DNA Repair, Recombination: homologous, site specific, transposition.	01-05-2021 To 20-05-2021	02 02 03 03 03		
		Unit III Transcription: Initiation, elongation and termination, Post transcriptional processing of m-RNA, t-RNA, r-RNA, RNA Stability &Half-life period. Translation:Initiation, elongation and termination, Post translational modifications of proteins-Chemical modification, intron splicing, and protein folding and protein localization. Gene regulation in prokaryotes:-Operon concept, Lactose, Tryptophan and Arabinose. Role of cAMP and CRP in lac operon, tryptophan operon,Catabolite repression Gene regulation in eukaryotes:-Conserved mechanism, activation and repressor role in gene regulation. Gene silencing,Signal integration.	21-05-2021 To 05-06-2021	04 01 02 02 03 05		Unit – II 29/05/21
		Unit IV Basic concepts of developmental biology (molecular insight):-Zygote formation, Embryogenesis, organogenesis and morphogenesis. Study of molecular development of Drosophila, gene regulation. Molecular development of Arabidopsis as model organisms, Homeobox-gene expression, Role of RNAi in development	05-06-2021 To 15-06-2021	03 02 03 03	Class Seminar	

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Molecular Biology	Genetic recombination (conjugation, transformation, tranduction) in bacteria..	15-04-21 To 05-06-2021 Batch A and B	02
2		Isolation of genomic DNA from bacteria, animal and plant cells.		02
3		Isolation of plasmid DNA by using alkaline lysis method.		02
4		Agarose gel electrophoresis by using DNA markers for molecular wt. determination.		02
5		Isolation of antibiotic resistant bacteria by gradient plate method.		02
6		Replica plating for transfer of bacterial colony		02
7		Study of Hens embryo for developmental stage study.		02
8		Study of in vitro transcription and translation		02
9		Study of mutations, Ames test		02
10		In vitro transcription and translate		02
11		Isolation of RNAs		

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