

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(June – 2021 to December- 2021) Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	BSc I Year	Mr. S. D. Kadam	Biotechnology	Course Title: Cell Biology Course Code : U-CEB-187
2	MSc I Year			Bioinstrumentation and Biostatistics P-BIB-137
3	BSc III Year			Immunology and Virology

1. Summary of Lesson Plan

Name of Teacher: Mr. S. D. Kadam

Class: B.Sc. biotech I Year (I SEM)

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	Cell Biology	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.	21-09-2021 To 15-10-2021	05 03 03	Classroom Group Discussion	
		Unit II: Biological membrane structure organization, Chemical component of Biological membrane, membrane proteins, lipids. Structure-function relationship including	16-10-2021 To 05-11-2021	04 02		Unit I Online assignment

	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.		03 02 02		
	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.	06-11-2021 To 30-11-2021	04 01 02 03 03		Unit – II
	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	01-12-2021 To 31-12-2021	03 02 03 03	Class Seminar	

		oxide, Calcium as secondary messenger and its role in plant and animals. Cell differentiation, Neoplasia & Cell death, Brief introduction to stem cells				
--	--	---	--	--	--	--

Sr. No.	Subject	Practical's	Date	No. of Practical's
1	Cell Biology	Cell Diversity	30/09/21 To 31/12/2021	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

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(June – 2021 to December- 2021) Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	BSc I Year	Mr. S. D. Kadam	Biotechnology	Course Title: Cell Biology Course Code : U-CEB-187
2	MSc I Year			Bioinstrumentation and Biostatistics
3	BSc III Year			Immunology and Virology

1. Summary of Lesson Plan

Name of Teacher: Mr. S. D. Kadam

Class: BSc. biotech III Year (III SEM)

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	Immunology and Virology	UNIT I Overview of Immunology 1. Historical perspective 2. Innate and Adaptive Immune response. 3. Hematopoiesis, 4. Cells of Immune system and their biological role. 5. Humoral and cell mediated Immunity. 6. The Primary and secondary lymphoid organs.	27-09-21 To 15-10-21	01 05 02 02 01 03	Classroom Group Discussion	Assignment On online platform Unit – I MCQ exam

		UNIT II Basics of Immunology 1. Antigen: Antigens- General properties, types, 2. Factors that influence antigenicity, 3. Epitopes, Paratopes, Haptens, adjuvant and its types. 4. Antibody: General Structure of antibody molecule, 5. Antibodies- variation in structure of antibody and their biological significance. 6. Antibody Antigen interactions: Strength of Antigen-Antibody Interactions, K_a and K_d with its importance, Affinity and avidity 7. Immunological reactions: Precipitation and Agglutination reactions, ELISA.	16-10-21 To 30-10-21	01 02 02 02 02 03 04		Unit – II Assignment
--	--	--	----------------------------	--	--	-------------------------

Sr. No.	Subject	Practicals	Date	No. of days Practicals
1	Immunology and Virology	Agglutination reaction.	27/09/21 To 31/10/21 Batch A,B,C,D	01
2		Immunoprecipitation.		01
3		Immunodiffusion.		01
4		Blood film preparation and identification of cells.		01
5		Differential leucocyte count		01
6		Microscopic observation of lymphoid organs.		01
7		Widal, VDRL		01
8		Demonstration of ELISA.		01
9		Isolation of Bacteriophages from sewage.		01
10		Titration of phage, Isolation of plant virus.		01
11		Demonstration of one step growth curve of Bacteriophages.		01
12		Cultivation of virus in embryonated eggs.		04

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(June – 2021 to December- 2021) Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	BSc I Year	Mr. S. D. Kadam	Biotechnology	Course Title: Cell Biology Course Code : U-CEB-187
2	MSc I Year			Bioinstrumentation and Biostatistics P-BIB-137
3	BSc III Year			Immunology and Virology

1. Summary of Lesson Plan

Name of Teacher: Mr. S. D. Kadam

Class: M.Sc. BT. I (First 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	Bioinstrumentation and Biostatistics	UNIT I: Microscopy: Light microscope, Fluorescence microscope Phase contrast microscope, Electron microscope, confocal microscopy. Centrifugation: Principle of centrifugation, Small bench top centrifuges, large capacity refrigerated centrifuges, High speed refrigerated centrifuges, preparative and analytical ultra, Centrifuge. Electrochemical techniques: Principles of electrochemical techniques, redox reactions, the pH electrode, ion-sensitive and gas-sensitive electrodes, The Clark oxygen electrode, Biosensors.	27-09-21 To 20-10-21	04 04	MCQ based assignment	Unit – I
		UNIT II: Chromatographic techniques: Principles of chromatography,				

		<p>Types of Chromatography: Paper chromatography, Thin layer Chromatography, size exclusion, Ion exchange, Affinity chromatography, High performance liquid chromatography (HPLC), Gas liquid chromatography (GLC), Reverse Phase Chromatography, Mass Spectrometry, GC-MS and LC-MS.</p> <p>Electrophoresis: General principles, Electrophoresis of proteins: SDSPAGE, Native gels, Gradient gel, Isoelectric focusing , 2-D gel electrophoresis (2-D PAGE), cellulose acetate electrophoresis, continuous flow electrophoresis; Detection, estimation and recovery of proteins, Electrophoresis of nucleic acids: Agarose gel electrophoresis of DNA, DNA sequencing gels, Pulse field gel electrophoresis, electrophoresis of RNA, Capillary electrophoresis.</p>	<p>21-10-21 To 10-11-21</p>	<p>02 03 02 02 01 04 01 06 01 04</p>		Unit – II
		<p>UNIT III: Spectroscopic techniques: Properties of electromagnetic radiation, interaction with matter. Gamma ray spectroscopy, X-ray spectroscopy, UV and Visible spectroscopy, Infrared and Raman spectroscopy, Electron spin resonance spectroscopy, Nuclear magnetic resonance spectroscopy, Circular dichorism spectroscopy, Atomic spectroscopy. Lasers, Spectrofluorimetry, Luminometry, turbidometry and nephelometry.</p>	<p>11-11-21 To 05-12-21</p>	<p>04 02 01 02 02 03</p>		Unit –III
		<p>UNIT IV: Radio isotope techniques:</p>		<p>01</p>		

		<p>The nature of radioactivity, detection and measurement of radioactivity: Detection based on gas ionization- Geiger Muller counter- principles and applications. Detection based on excitation- Liquid Scintillation counter-principle and applications.</p> <p>Supply, storage and purity of radiolabelled compounds, specific activity, inherent advantages and restrictions of radiotracer experiments, safety aspects, applications- of radio isotopes in biological sciences. Flow cytometry, ELISA, Immunoblotting</p>	06-12-21 To 31-12-21	04 02 02 03		Unit-IV
--	--	---	----------------------------	----------------------------------	--	---------

Sr. No.	Subject	Practicals	Date	No. of days Practicals
1	Bioinstrumentation and Biostatistics	Practical's Based on Microscopy	27/09/21 To 31/12/21 Batch A,B,C,D	01
2		Practical's based on centrifugation		01
3		Practical's Based on Electrochemical Techniques		01
4		TLC , Paper Chromatography		01
5		Separation of proteins / pigments using column/Affinity chromatography		01
6		Demonstration of techniques : gas chromatography high performance liquid		01
7		Chromatography HPLC		01
8		Electrophoresis Of DNA		01
9		Electrophoresis of proteins under native and denaturing conditions (PAGE)		01
10		To find out isoelectric point of amino acid		01
11		Western blotting		01
12		ELISA		01
13		Absorption spectrum of protein		01
14		Problems based on Spectroscopy		01
15		Problems based on Radioactivity		01
16		Problems based on Biostatistics		01

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(DEC.– 2021 to June. 2022)

Details of Classes to be taught

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

Name of Teacher: Suraj D. Kadam

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	15-12-2021 To 10-01-2022	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	11-01-2022 To 04-02-2022	04 02		Unit I Online assignment

		gene therapy (ex vivo & in vivo) Vaccines –Vaccine vectors, nucleic acid vaccines, immuno-enhancing technology. Toxicogenomics		03 02 02		
		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	05-02-2022 To 01-03-2022	04 01 02 03 03		Unit – II Activity Based
		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	02-03-2022 To 05-04-2022	03 02 03 03	Class Seminar	

Teacher

Head

S.D.Kadam

Dr.S.S.Kulkarni

Sr. No.	Subject	Practicals	Date	No. of Practical
1	Pharmaceutical Biotechnology	1. Assay of antimicrobial activity of Penicillin, Chloramphenicol, streptomycin and Quinolones	20-12-2021 To 05/04/2022 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 disinfectant on growth of bacteria		04
9		Study of microbial spoilage of pharmaceuticals.		04
10		Visit to Pharmaceutical industry		04

Teacher

Head

S.D.Kadam

Dr.S.S.Kulkarni

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
2	M.Sc. I			Course Title: Molecular Biology Course Code: P-MOB-232 Course Title: Lab Course V Course Code: P-LAC-236

1. Summary of Lesson Plan

Name of Teacher: Suraj D. Kadam

Class : M.Sc. BT. I (II 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	Molecular Biology	Unit 1 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,	15-04-21 To 30-04-21	02 01 02 01 02 02	Classroom Group Discussion	

		C-value paradox, Cot curve.		01		
		<p>Unit 2</p> <p>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.</p>	01-05-2021 To 20-05-2021	02 02 03 03 03		
		<p>Unit 3</p> <p>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</p>	21-05-2021 To 05-06-2021	04 01 02 02 03 05		Unit – II 29/05/21

		repression Gene regulation in eukaryotes:-Conserved mechanism, activation and repressor role in gene regulation. Gene silencing,Signal integration.				
		Unit 4 1. 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, transduction) 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		