



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2020-21 (Term-I)

1. Details of Classes to be taught


Sr. No.	Class	Name of Asstt. Professor	Subject	Paper	Total Lectures
1	M.Sc. II	S. S. Kshirasagar	Biotechnology	Course Title: Plant Biotechnology Course Code : P-PLB-337	60 (4 Credit)


2. Summary of Lesson


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		UNIT I Plant Tissue Culture-I ➤ Introduction to cell and tissue culture ➤ Tissue culture media: Composition and Preparation. ➤ Initiation and maintenance of callus and suspension culture ➤ Organogenesis: Principle, Concept and Applications of Somatic embryogenesis ➤ Rapid clonal propagation and production of virus free plants.	06/07/2020 To 31/07/2020	10L 01 02 02 03 02	Group Discussion	Unit – I
		UNIT II ➤ Protoplast culture: Importance, Isolation of protoplasts, method of	01/08/2020 To	10L 03	Home Assignment	Unit – II

		<p>protoplast culture, culture media, Growth and division of protoplast, regeneration of plants</p> <ul style="list-style-type: none"> ➤ Embryo culture and embryo rescue ➤ Anther, Pollen and Ovary culture for production of haploid plants and homozygous lines ➤ Cryopreservation, slow growth and DNA banking for germ plasm conservation ➤ Commercial application of tissue culture technology, examples: banana and Sugarcane. 	31/08/2020	01 02 02 02		
		<p>UNIT III</p> <p>Plant molecular biology</p> <ul style="list-style-type: none"> ➤ Gene structure, expression, and regulation in plants ➤ <i>Agrobacterium tumefaciens</i> and the genetic engineering of plants ➤ Mechanism of gene transfer from <i>Agrobacterium</i> to plants ➤ Strategies for gene transfer in plants ➤ Molecular markers and marker assisted selection 	01/09/2020 To 24/10/2020	15L 02 04 03 03 05	Quiz	Unit – III
		<p>UNIT IV</p> <p>Transgenic Crops</p> <ul style="list-style-type: none"> ➤ Crops with Tolerance / resistance to biotic stresses, viruses, fungal and bacterial 	26/10/2020 To 23/11/2020	10L 02	Group discussion	Unit – IV

		diseases:			
		➤ Crops with Tolerance / resistance to abiotic stresses (Herbicides and drought conditions):		02	
		➤ GM crops,		01	
		➤ Medical applications of GM plants		01	
		➤ Terminator technology		02	
		➤ Ecological risk assessment of genetically modified crops		02	


Course Teacher


HoD
Head
Department of Biotechnology
Rajarshi Shahu Mahavidyalaya,
(Autonomous) Latur-413 53


Principal
PRINCIPAL
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2020-21 (Term-I)

1. Details of Classes to be taught


Sr. No.	Class	Name of Asstt. Professor	Subject	Paper	Total Lectures
1	B.Sc. II	Sanghapal Kshirasagar	Biotechnology	Course Title: Environment Biotechnology Course Code:U-ENB-400	45 (3 Credit)


2. Summary of Lesson

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	Environment Biotechnology	Unit I Components of Environment and Global Environmental Problems 08 Hydrosphere, lithosphere, atmosphere and biosphere – definitions with examples; Interaction of man and environment; Environmental Studies as a multidisciplinary subject. Green House Effect, Acid rain, El Nino Effect, Ozone depletion, Biodiversity loss	06/07/2020 To 31/07/2020	08 04 02 02	Group Discussion	Unit – I

		Unit-II: Environmental pollution and Environmental Management 10 Pollution of air, water and land with reference to their causes, nature of pollutants & impact Environmental damage by agriculture, Perspectives of pollution in urban, industrial and rural areas. Habitat Pollution Environmental diseases – infectious (Water and air borne) and pollution related, Solid waste management.	01/08/2020 To 29/08/2020	10 02 02 03 03	Home Assignment	Unit – II
		Unit-III : Waste water treatment and management Domestic Waste Water Treatments: Preliminary, Primary, Secondary and Tertiary. Waste water treatment Reactors: Introduction and types in brief Aerobic Biological Treatments: Activated sludge process, Lagoons Anaerobic Biological Treatments: upflow anaerobic sludge blanket (UASB) reactor, Fluidized bed reactor.	31/08/2020 To 30/09/2020	10 02 05 02 02 02 02	Quiz	Unit –III
		Unit IV Biodegradation and Bioremediation Biodegradation of Hydrocarbon Xenobiotics biodegradation-pesticide biodegradation Bioremediation: Introduction, Definition and Concept,	01/10/2020 To 26/11/2020	12 02 03 02	Group discussion	Unit –III

		Methods of Bioremediation (In Situ and Ex Situ Methods)		02		
		Phytoremediation: Concept and Types		03		


Course Teacher


HoD
Head
Department of Biotechnology
Rajarshi Shahu Mahavidyalaya
(Autonomous) Latur-413 531


Principal
PRINCIPAL
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)**

**Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2020-21 (Term-I)**

1. Details of Classes to be taught


Sr. No.	Class	Name of Teacher	Subject	Paper	Total Lectures
1.	M. Sc. I	Sanghapal Kshirasagar	Biotechnology	Course Title: Cell & Cancer Biology Course Code: P-CDB-134	60 (4 Credit)


2. Summary of Lesson


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 and cancer biology	Unit I: 15L Cell as the basic unit of life, History & Evolution, Salient features of cell. Prokaryotes vs eukaryotes, Plant cell vs Animal cell. Scheilden & Schwann's cell theory, Modern cell theory, Significance of cell theory. Structure and function of cell membrane, Fluid-Mosaic Model and its components. Membrane Transport: Non-mediated transport, Mediated transport - Passive transport, Active transport, Bulk transport.	21-12-20 To 16-01-20	02 02 03 04 02	Home Assignments	Assignment I: 15-02-21

		Membrane Potential & Transmission of nerve impulse.		02		
		Unit II: 12L Structural organization & functions of intracellular organelles: Cell wall, Nucleus, Mitochondria, Golgi bodies, Lysosomes, Endoplasmic reticulum, Peroxisomes, Plastids and chloroplast, Vacuoles. Function & structure of cytoskeleton & its role in motility.	18-01-21 To 09-02-21	03 06 03		
		Unit III: 08L Cell Signalling: Introduction, Stages of cell signalling. Signal transduction: Concept, Factors determining signal transduction pathways. Signal amplification process. Cell receptors: Introduction and Types of receptors. Second messengers: Introduction & classes of second messengers. G - Proteins in signal transduction.	10-02-21 To 14-03-21	01 02 01 01 02 01	Home Assignment	Assignm ent II: 25-02-21
		Unit IV: 10L				

	Cell cycle: Introduction, Phases of cell cycle, Cell cycle regulation, Cell Cycle checkpoints. Mechanism of apoptosis. Cancer: Introduction, Benign tumor, malignant tumor, Properties of cancer cells. Molecular basis of cancer: Cancer critical genes; proto-oncogenes, tumor suppressor genes, carcinogen, oncovirus. Therapeutic interventions of uncontrolled cell growth.	15-03-21 To 4-04-21	02 02 01 03 02		
--	---	---------------------------	--	--	--


Course Teacher


HoD
Head
Department of Biotechnology
Rajarshi Shahu Mahavidyalaya
(Autonomous) Latur-413 51


Principal
PRINCIPAL
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2020-21 (Term-II)

1. Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	M.Sc. II	S. S. Kshirasagar	Biotechnology	Course Title: Environment Biotechnology Course Code: P-ENB-435 Course Title: Lab Course XIV Course Code: P-LAC-437


2. Summary of Lesson


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	Environment Biotechnology	Unit I 12 lectures Ecology & Environment: Ecosystem structure and functions, abiotic and biotic component. Energy flow, food chain, food web. Ecological Pyramids-types. Biogeochemical cycles. Ecological succession, Ecads and ecotypes. Sustainable management and conservation of environment.	22-02-21 To 17-03-21	12 02 02 02 02 02	Group Discussion	Unit – I 19/03/21


		Unit II 11 lectures Environmental Pollution: Classification of pollutants. Air pollution and their properties, Gaseous pollutants. Water pollutants and their properties. Environmental pollution and associated hazards to crops, animals and humans. Greenhouse effect and global warming.	18-03-21 To 31-03-21	11 02 01 02 03 03	Home Assignment	Unit – II 29/03/21
		Unit III 12 lectures Biotechnological processes: Waste water treatment plant- Physical, Chemical and Biological unit operations/processes-overview, Activated Sludge Process, Trickling Filters, anaerobic biological treatment process. Biotechnology in Remediation: Introduction to bioremediation, Advantages, limitations and applications Types of Bioremediation: Microbial bioremediation- Natural, Engineered, Ex-situ and in-situ Phytoremediation- Types Energy & Biofuels: Non conventional or renewable sources of energy, Energy from Biomass. Biofuel cells.	01-04-21 To 18-04-21	12 02 02 02 02	Quiz	Unit –III 15/04/21
		Unit IV 10 lectures Advancement in environmental technology: Remote sensing and GIS- Principal, terminologies and objectives. Energy sources for remote sensing, Types of remote sensing. Applications- Agricultural, Forestry, Water Resource, Urban Planning,	19-04-21 To 15-05-21	10 03 02 02	Group discussion	Unit –III 29/04/21

	Environmental Impact Assessment: Introduction, Objectives, Classification, Guidelines, Case Study.	02 01	
--	---	--------------	--

Sr. No.	Subject	Practical	Date	No. of practical
1	Environment	Estimation of T.S. / T.D.S. from given water sample.	24/02/21 to 15/05/21 Batch A and B	02
2	Biotechnology	Estimation of Hardness of given water sample.		02
3		Determination of Presumptive test		02
4		To perform Confirmed test		02
5		Analysis of Completed test		02
6		Gram staining of coliform group of bacteria		02
7		Determination of Biological Oxygen Demand of polluted water.		02
8		Determination of Dissolved Oxygen of polluted water.		02
9		Determination of Chemical Oxygen Demand of polluted water.		02
10		Isolation of pathogens from air		02
11		Isolation of pathogens from water		
12		Estimation of alkalinity of given sample.		02


Course Teacher


HoD
Head
Department of Biotechnolog
Rajarshi Shahu Mahavidyal
(Autonomous) Latur-413


Principal
PRINCIPAL
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2020-21 (Term-II)**

1. Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	M.Sc. I	S. S. Kshirasagar	Biotechnology	<p>Course Title: Immunology & immunotechniques</p> <p>Course Code : P-IMI-233</p> <p>Course Title: Lab course VI</p> <p>Course Code: P-LAC-237</p>

2. Summary of Lesson

Sr. No.	Subject	Unit and Chapter to be covered	Date	No. of Lectures	Academic activities to be organized	No. of Test / Assignment with topic
1	Immunology & Immunotechniques	<p>UNIT I Overview of Immunology</p> <p>10L</p> <p>The origin of immunology, Innate and Adaptive Immune response.</p> <p>Hematopoiesis, Cells of Immune system and their biological role.</p> <p>Humoral and cell mediated Immunity.</p> <p>Primary and Secondary immune</p>	15-04-21 To 02-05-21	<p>10L</p> <p>01</p> <p>01</p> <p>01</p>	Group	Unit – I


		<p>interaction.</p> <p>Antigen Processing and Presentation: MHC molecules, Role of MHC and non-MHC molecules in antigen presentation, Antigen processing and presentation (antigen presenting cells, endocytic, cytosolic pathway).</p> <p>Cytokines, signal transduction.</p>		01 01 01		
		<p>UNIT II Basics of Immunology</p> <p>15L</p> <p>Antigen: Characteristics of antigen, types, Factors that Influence Immunogenicity, Epitopes, Haptens and the Study of Antigenicity, adjuvant and its types.</p> <p>Antigenicity and Immunogenicity, The epitopes seen by B Cells and T Cells, Biology of superantigens.</p> <p>Antibody: Discovery of antibody structure by chemical and enzymatic Methods. General Structure of antibody molecule, Function of antibody molecule. Affinity and Avidity, Valency of Antibody.</p> <p>Antibodies- Types, variation in structure of antibody and their biological significance.</p> <p>Organization and Expression of</p>	<p>03-05-2021</p> <p>To</p> <p>20-05-2021</p>	15L 01 01 03 01 01 01 01 01	Home Assignment	Unit – II


		<p>Immunoglobulin Genes.</p> <p>Antibody Antigen interactions: Strength of Antigen-Antibody Interactions, Cross-Reactivity.</p> <p>Immunological reactions: Precipitation and Agglutination reactions, Radioimmunoassay, ELISA, Western Blotting, Flow cytometry and Fluorescence, Immuno electronmicroscopy, chemiluminescence assay, CFT.</p>		01		
				04		
		<p>UNIT III Clinical immunology</p> <p>10L</p> <p>Phagocytosis.</p> <p>Complement system: Activation of Complement systems (alternative, classical & lectin pathway) and its Functions.</p> <p>Hypersensitivity: Hypersensitivity reactions and its types.</p> <p>Immunodeficiency Conditions: Immunodeficiency: Primary immunodeficiency (SCID), Secondary immunodeficiency (AIDS), Treatment of immunodeficiency diseases.</p> <p>Autoimmunity: Organ specific autoimmune diseases and Systemic autoimmune diseases, Treatment of Autoimmune Diseases.</p>	<p>21-05-2021</p> <p>To</p> <p>04-06-2021</p>	<p>10L</p> <p>02</p> <p>01</p> <p>01</p> <p>02</p> <p>02</p>	Quiz	Unit – III


		Tumor Immunology: Tumor Antigens, Immune Response to Tumors, Cancer Immunotherapy		02		
		UNIT IV Immunotechnology 10L Transplantation Technology: Types of graft (auto, Iso, Allo, and xeno graft), Specificity and memory of rejection response, Mechanisms involved in graft rejection. Vaccine Technology: Active and Passive Immunization, Live attenuated vaccines, subunit vaccines, conjugate vaccines, multivalent subunit vaccines, DNA vaccines, Recombinant vector vaccines, edible vaccines. Identifications of B and T epitopes for vaccine development. Antibody engineering: Monoclonal antibody, Purification of antibodies, phage display, large scale production of MAb antibodies, Applications of MAb in diagnosis and therapy.	10L 05-06-2021 To 15-06-2021	02 02 04 04	Group discussion	Unit – IV

--	--	--	--	--	--	--

Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Immunology & immunotechniques	Agglutination reaction	15-04-21 To 15-06-2021 Batch A & B	02
2		Blood film preparation & Identification of cells		02
3		Determination of bleeding time		02
4		Determination of clotting time		02
5		VDRL		02
6		Radial immunodiffusion,		02
7		Simple Double diffusion		02
8		Ouchterlony Double diffusion		02
9		Widal		02
10		Rocket immunoelectrophoresis.		02
11		Microscopic observation of lymphoid organs		02


Course Teacher


HoD
Head
Department of Biotechnology
Rajarshi Shahu Mahavidyalaya
(Autonomous) Latur-413 50.


Principal
PRINCIPAL
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)