



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur
(Autonomous)
Department of Biotechnology
Structured Work Plan for Teaching
Academic Year 2019-20 (Term-I)

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: Plant Biotechnology Course Code : P-PLB-337 Course Title: Lab course XII Course Code: P-LAC-341

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	Plant Biotechnology	UNIT I Plant Tissue Culture-I <ul style="list-style-type: none"> ➤ 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. 	1 July 19 to 17 July 19	03 02 02 02 01 01	Group Discussion	Unit – I 24/07/19 Unit – II 18/08/19 Unit – III 23/08/19

		UNIT II ➤ Protoplast culture: Importance, Isolation of protoplasts, method of protoplast culture, culture media, Growth and division of protoplast, regeneration of plants ➤ 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.	18-07-19 To 09-08-19	02 02 03 03 02 02 03		
		UNIT III Plant molecular biology ➤ Gene structure, expression, and regulation in plants ➤ <i>Agrobacterium tumefaciens</i> and the genetic engineering of plants	31-08-19	02 02 02		

		<ul style="list-style-type: none"> ➤ Mechanism of gene transfer from <i>Agrobacterium</i> to plants ➤ Strategies for gene transfer in plants ➤ Molecular markers and marker assisted selection 	To 30-09-19	04 04		
		UNIT IV <div style="border: 1px solid black; padding: 2px; display: inline-block;">Transgenic Crops</div> <ul style="list-style-type: none"> ➤ Crops with Tolerance / resistance to biotic stresses, viruses, fungal and bacterial diseases: ➤ Crops with Tolerance / resistance to abiotic stresses (Herbicides and drought conditions): ➤ GM crops, ➤ Medical applications of GM plants ➤ Terminator technology ➤ Ecological risk assessment of genetically modified crops 	1-10-19 To 23-10-19	02 02 02 02 01		

Sr. No.	Subject	Practicals	Date	No. of Practical
1		Plant tissue culture laboratory design	08/07/19 To 24/10/19	05
2		Plant tissue culture laboratory design		05
3		Aseptic techniques		05
4		Media preparation		05
5		Micro propagation		05

6		Anther culture	Batch B,C,D	05
7		Plant DNA isolation		05
8		Protoplast isolation		05
9		Embryo culture		05
10		RAPD		05



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Sr. No.	Class	Name of Asstt. Professor	Subject	Paper
1	B.Sc. II	S. S. Kshirasagar	Biotechnology	Course Title: Environment Biotechnology Course Code:U-ENB-400 Course Title: Lab Course XI Course Code: U-LAC-404

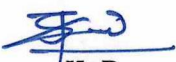
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		El Nino Effect, Ozone depletion, Biodiversity loss				
		Unit-II: Environmental pollution and Environmental Management 10 Pollution of air, water and land with reference to their causes, nature of pollutants & impact Environmental damage by agriculture, Perspectives of pollution in urban, industrial and rural areas. Habitat Pollution Environmental diseases – infectious (Water and air borne) and pollution related, Solid waste management.	10-07-19 To 08-08-19	04 02 02 03		
		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.	08-08-19 To 31-08-19	04 04 03		
		Unit IV Biodegradation and Bioremediation Biodegradation of Hydrocarbon Xenobiotics biodegradation-pesticide biodegradation Bioremediation: Introduction, Definition and Concept,	31-08-19 To 10-10-19	06 06		

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

Sr. No.	Subject	Practicals	Date	No. of Practicals
1		Determination of Dissolved oxygen(D.O.)	01/07/190 to 24/10/19 Batch A and B	02
2		Determination of carbon dioxide(CO_2)		02
3		Determination of Biochemical oxygen demand (BOD).		02
4		Presumptive test		02
5		Confirmed test		02
6		Completed test		02
7		Determination of Chemical Oxygen demand(COD)		02
8		Determination of Hardness of given water sample.		02
9		Determination of P^{H} of given water sample		02
10		Determination of alkalinity and chlorinity of given water sample.		04


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Structured Work Plan for Teaching
Academic Year 2019-20 (Term-II)

1. Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Professor	Subject	Paper
1	M.Sc. I	S. S. Kshirasagar	Biotechnology	Course Title: Immunology & Immunotechniques Course Code : P-IMI-233 Course Title: Lab course VI Course Code: P-LAC-237

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	Immunology & Immunotechniques	UNIT I Historical perspective and importance of Immunology Innate and Adaptive Immune response. Hematopoiesis, Cells of Immune system and their biological role. Humoral and cell mediated Immunity. Primary and Secondary immune responses. The Primary and secondary lymphoid organs and their interaction, MHC molecules, Antigen processing and presentation (antigen presenting	10-12-19 To 08-01-20	15L 01 02 03 01 01 01 01 01	Group Discussion	Unit – I 09/01/20


		cells, endocytic, cytosolic pathway). BCR and TCR (structure and properties), Cytokines & signal transduction.				
		UNIT II Antigen: Characteristics of antigen & its types, Factors that Influence Immunogenicity, Epitopes, Haptens and the Study of Antigenicity, adjuvant and its types. Antigen engineering for better immunogenicity, Antigenicity and Immunogenicity, Biology of superantigens. 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. Antibodies- Types, variation in structure of antibody and their biological significance. Organization and Expression of Immunoglobulin Genes. Antigen – Antibody Interaction: Strength of Antigen-Antibody Interactions, Cross-Reactivity.	09-01-20 To 04-02-20	12L 01 01 01 01 01 01	Home Assignment	Unit – II 05/02/20

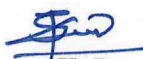
		Precipitation and Agglutination reactions, Radioimmunoassay, ELISA, Western Blotting, Flow cytometry and Fluorescence, Immunoprecipitation, Immunoelectronmicroscopy, chemiluminescence assay.		04		
		UNIT III Complement system: Activation of Complement systems (alternative, classical & lectin pathway) and its Functions. Hypersensitivity: Hypersensitivity reactions and its types. Immunodeficiency Conditions: Primary immunodeficiency (SCID), Secondary immunodeficiency (AIDS). Autoimmunity: Organ specific autoimmune diseases and Systemic autoimmune diseases. Immunity to infectious diseases: Immune response during bacterial (tuberculosis), parasitic (malaria) and viral (HIV) infections. Tumor Immunology: Tumor Antigens, Cancer Immunotherapy	05-02-20 To 26-02-20	10L 02 01 01 02 02 02	Quiz	Unit – III 25/02/20


		UNIT IV Transplantation Technology: Types of graft (auto, Iso, Allo, and xeno graft), Specificity and memory of rejection response, Mechanisms involved in graft rejection ,Bone marrow chimera. Vaccine Technology: Active and Passive Immunization, Live attenuated vaccines, subunit vaccines, conjugate vaccines, multivalent subunit vaccines, DNA vaccines, Recombinant vector vaccines, edible vaccines. Antibody engineering: Monoclonal antibody, Purification of antibodies, Chimeric antibodies, phage display, large scale production of MAb antibodies, Applications of MAb in diagnosis and therapy.	27-02-20 To 21-03-20	08L 02 02 04	Group discussion	Unit – IV 23/03/20
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Sr. No.	Subject	Practicals	Date	No. of Practicals
1	Immunology & immunotechniques	Agglutination reaction	16/12/19 To 31/03/20	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	Batch A & B	02
9		Widal		02
10		Rocket immunoelectrophoresis.		02
11		Microscopic observation of lymphoid organs		02


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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: 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. Ecology and its relevance to man, natural resources. Threats to Environment - Global and	10-12-19 To 02-01-20	12 02 02 04 02	Group Discussion	Unit – I 03/01/20

		regional threats to the environment. Sustainable management and conservation of environment. Agro ecology; cropping pattern as indicators of environments.		02		
		Unit-II: Environmental Pollution: Classification of pollutants. Air pollution and their properties, Water pollutants and their properties. Environmental pollution and associated hazards to crops, animals and humans. Greenhouse effect and global warming Climate change - International conventions and global initiatives.	03-01-20 To 25-01-20	11 02 01 02 03 03	Home Assignment	Unit – II 27/01/20
		Unit-III : Biotechnological processes: Waste water treatment plant. Physical, Chemical and Biological unit operations/processes-overview, Activated Sludge Process, Trickling Filters, Oxidation ponds, anaerobic biological treatment process. Biotechnology in Remediation: Introduction to bioremediation, Advantages, limitations and applications Types of Bioremediation and Factors	27-01-20 To 22-02-20	12 02 02 02	Quiz	Unit –III 24/02/20

		affecting: Natural, Engineered, Ex-situ and in-situ Phytoremediation, Bioaugmentation, Biostimulation. Bioconversion, Bioaccumulation, Bioconcentration, Biomagnification, Biodegradation.		02		
		Energy & Biofuels: Energy from Biomass. Biosensors and biochips, Bio filters, Biofuel cells.		02 02		
		Unit IV Advancement in environmental technology Remote sensing and GIS- Principal, terminologies and objectives. Types of remote sensing. Applications of Remote sensing Ecological / Niche modeling. Environmental Impact Assessment Case Study.	24-02-20 To 21-03-20	10 03 04 03	Group discussion	Unit –III 23/03/20

Sr. No.	Subject	Practical	Date	No. of practical
1	Environment	Estimation of T.S. / T.D.S. from given water sample.	16/12/19 to 31/03/20	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.	Batch A and B	02
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