

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(July – 2020 to April 2021)

Details of Classes to be taught

| Sr. No. | Class | Name of Asstt. Professor | 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 | B.Sc. II | | | Course Title: Environment Biotechnology Course Code:U-ENB-400 Course Title: Lab Course XI Course Code: U-LAC-404 |
| 3. | M.Sc.I | | | Course Title: Cell & cancer Biology Course Code: P-CCB-134 |

1. Summary of Lesson Plan

Name of Teacher: S. S. Kshirasagar

Class : M.Sc. BT. I (Second 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 | | UNIT I Plant Tissue Culture-I ➤ Introduction to cell and tissue culture ➤ Tissue culture media: Composition and Preparation. ➤ Initiation and maintenance of | 06/07/2020 To 31/07/2020 | 10L 01 02 02 | | Unit – I |

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|--|--|---|--------------------------------|---|------------------|------------|
| | | <p>callus and suspension culture</p> <ul style="list-style-type: none"> ➤ Organogenesis: Principle, Concept and Applications of Somatic embryogenesis ➤ Rapid clonal propagation and production of virus free plants. | | 03 | Group Discussion | |
| | | | | 02 | | |
| | | <p>UNIT II</p> <ul style="list-style-type: none"> ➤ 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. | 01/08/2020 To 31/08/2020 | <p>10L</p> <p>03</p> <p>01</p> <p>02</p> <p>02</p> <p>02</p> | Home Assignment | Unit – II |
| | | <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 | 01/09/2020 To 24/10/2020 | <p>15L</p> <p>02</p> <p>04</p> <p>03</p> | Quiz | Unit – III |

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| | | <p>from <i>Agrobacterium</i> to plants</p> <ul style="list-style-type: none"> ➤ Strategies for gene transfer in plants ➤ Molecular markers and marker assisted selection | | 03 05 | | |
| | | <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 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 | 26/10/2020 To 23/11/2020 | 10L 02 02 01 01 02 02 | Group discussion | Unit – IV |

| Sr. No. | Class | Name of Asstt. Professor | Subject | Paper |
|---------|----------|--------------------------|---------------|--|
| 1 | M.Sc. II | S. S. Kshirasagar | Biotechnology | <p>Course Title: Plant Biotechnology Course Code : P-PLB-337</p> <p>Course Title: Lab course XII</p> <p>Course Code: P-LAC-341</p> |
| 2 | B.Sc. II | | | <p>Course Title: Environment Biotechnology</p> |

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| | | | | Course Code:U-ENB-400 Course Title: Lab Course XI Course Code: U-LAC-404 |
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Name of Teacher: S. S. Kshirasagar

Class : B.Sc. BT. II (Fourth 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 | 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 | 01/08/2020 To 29/08/2020 | 10 02 02 | Home Assignment | Unit – II |

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| | | Environmental diseases – infectious (Water and air borne) and pollution related, Solid waste management. | | 03 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. | 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, Methods of Bioremediation (In Situ and Ex Situ Methods) Phytoremediation: Concept and Types | 01/10/2020 To 26/11/2020 | 12 02 03 02 02 03 | Group discussion | Unit –III |

Name of Teacher: Sanghapal S. Kshirasagar

Class : M.Sc. BT. I (First Semester)

| Sr. | Subject | Unit and Chapter to be covered | Date | No. of | Academic | No. of |
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| No. | | | | Lectures | activities to be organized | Test / Assignment with topic and date |
|-----|-------------------------|--|---|---|----------------------------|---------------------------------------|
| 1 | Cell and cancer biology | <p>Unit I: 15L</p> <p>Cell as the basic unit of life, History & Evolution, Salient features of cell.</p> <p>Prokaryotes vs eukaryotes, Plant cell vs Animal cell.</p> <p>Scheilden & Schwann's cell theory, Modern cell theory, Significance of cell theory.</p> <p>Structure and function of cell membrane, Fluid-Mosaic Model and its components.</p> <p>Membrane Transport: Non-mediated transport, Mediated transport - Passive transport, Active transport, Bulk transport.</p> <p>Membrane Potential & Transmission of nerve impulse.</p> | <p>21-12-20</p> <p>To</p> <p>16-01-20</p> | <p>02</p> <p>02</p> <p>03</p> <p>04</p> <p>02</p> <p>02</p> | <p>Home Assignments</p> | <p>Assignment I: 15-02-21</p> |
| | | <p>Unit II: 12L</p> <p>Structural organization & functions of intracellular organelles: Cell wall, Nucleus, Mitochondria, Golgi bodies, Lysosomes, Endoplasmic reticulum, Peroxisomes, Plastids and chloroplast, Vacuoles.</p> <p>Function & structure of cytoskeleton & its role in motility.</p> | <p>18-01-21</p> <p>To</p> <p>09-02-21</p> | <p>03</p> <p>06</p> <p>03</p> | | |
| | | <p>Unit III: 08L</p> | | | | <p>Assignment</p> |

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| | <p>Cell Signalling: Introduction, Stages of cell signalling.</p> <p>Signal transduction: Concept, Factors determining signal transduction pathways.</p> <p>Signal amplification process.</p> <p>Cell receptors: Introduction and Types of receptors.</p> <p>Second messengers: Introduction & classes of second messengers.</p> <p>G - Proteins in signal transduction.</p> | <p>10-02-21 To 14-03-21</p> | <p>01</p> <p>02</p> <p>01</p> <p>01</p> <p>02</p> <p>01</p> | <p>Home Assignment</p> | <p>ent II: 25-02-21</p> |
| | <p>Unit IV: 10L</p> <p>Cell cycle: Introduction, Phases of cell cycle, Cell cycle regulation, Cell Cycle checkpoints.</p> <p>Mechanism of apoptosis.</p> <p>Cancer: Introduction, Benign tumor, malignant tumor, Properties of cancer cells.</p> <p>Molecular basis of cancer: Cancer critical genes; proto-oncogenes, tumor suppressor genes, carcinogen, oncovirus.</p> <p>Therapeutic interventions of uncontrolled cell growth.</p> | <p>15-03-21 To 4-04-21</p> | <p>02</p> <p>02</p> <p>01</p> <p>03</p> <p>02</p> | | |

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structured Work Plan for Teaching

(Feb. – 2020 to May 2021)

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 | 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 |

Name of Teacher: S. S. Kshirasagar

Class : M.Sc. BT. II (Fourth 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 | 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 |

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| | | | | | | |
| | | <p>Unit II</p> <p>11 lectures</p> <p>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.</p> | <p>18-03-21 To 31-03-21</p> | <p>11</p> <p>02</p> <p>01</p> <p>02</p> <p>03</p> <p>03</p> | <p>Home Assignment</p> | <p>Unit – II</p> <p>29/03/21</p> |
| | | <p>Unit III</p> <p>12 lectures</p> <p>Biotechnological processes: Waste water treatment plant- Physical, Chemical and Biological unit operations/processes-overview, Activated Sludge Process, Trickling Filters, anaerobic biological treatment process.</p> <p>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.</p> | <p>01-04-21 To 18-04-21</p> | <p>12</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p> | <p>Quiz</p> | <p>Unit –III</p> <p>15/04/21</p> |
| | | <p>Unit IV</p> <p>10 lectures</p> <p>Advancement in environmental</p> | <p>19-04-21</p> | <p>10</p> | <p>Group discussion</p> | <p>Unit –III</p> |

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| | | 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, Wildlife Ecology, Disaster Assessment. Environmental Impact Assessment: Introduction, Objectives, Classification, Guidelines, Case Study. | To 15-05-21 | 03 02 02 02 01 | | 29/04/21 |
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| 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 |

| 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 | M.Sc. I | S. S. Kshirasagar | Biotechnology | Course Title: Immunology & immunotechniques Course Code : P-IMI-233 Course Title: Lab curse VI |

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| | | | | Course Code: P-LAC-237 |
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Name of Teacher: S. S. Kshirasagar

Class : M.Sc. BT. I (Second 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 |
|---------|-------------------------------|---|--|--|-------------------------------------|-------------------------------------|
| 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 responses.</p> <p>The Primary and secondary lymphoid organs and their 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> | <p>15-04-21 To 02-05-21</p> | <p>10L</p> <p>01</p> <p>01</p> <p>01</p> <p>03</p> <p>01</p> <p>01</p> <p>01</p> | <p>Group Discussion</p> | Unit – I |
| | | <p>UNIT II Basics of Immunology</p> | | 15L | | Unit – II |

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| | | <p style="text-align: center;">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. Organization and Expression of 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> | <p style="text-align: center;">03-05-2021 To 20-05-2021</p> | <p>01</p> <p>01</p> <p>03</p> <p>01</p> <p>01</p> <p>01</p> <p>01</p> <p>01</p> | <p>Home Assignment</p> | |
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| | | | | 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>Tumor Immunology: Tumor</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>Quiz</p> | <p>Unit – III</p> |

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| | | Antigens, Immune Response to Tumors, Cancer Immunotherapy | | 02 | | |
| | | | | 02 | | |
| | | <p>UNIT IV Immunotechnology</p> <p>10L</p> <p>Transplantation Technology: Types of graft (auto, Iso, Allo, and xeno graft), Specificity and memory of rejection response, Mechanisms involved in graft rejection.</p> <p>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.</p> <p>Antibody engineering: Monoclonal antibody, Purification of</p> | <p>05-06-2021</p> <p>To</p> <p>15-06-2021</p> | <p>10L</p> <p>02</p> <p>02</p> <p>02</p> | Group discussion | Unit – IV |

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| | | antibodies, phage display, large scale production of MAb antibodies, Applications of MAb in diagnosis and therapy. | | 04 | | |
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| 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 |