

# Rajarshi Shahu Mahavidyalaya, Latur

## ( Autonomous )

### Structured Work Plan for Teaching

(June – 2019 to March . 2019)

Details of Classes to be taught

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	B.Sc. I	Kalyani N. Dhule	Biotechnology	<b>Course Title: Introduction To Microbiology</b> <b>Course Code : U-INM-189</b> <b>Course Title: Lab Course III</b> <b>Course Code: U-LAC-193</b>
2	B. Voc I			<b>Course Title: Introductory Dairy Technology</b> <b>Course Code: U-IFP-</b>

#### 1. Summary of Lesson Plan

Name of Teacher: Kalyani N. Dhule

Class : B.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	Metabolism	<b>Unit 1</b> <b>History of Microbiology:</b>  Discovery of microscope and Microbial world: Micrographia of Anton von Leeuwenhoek and Robert Hooke.  Controversy over Abiogenesis: Aristotle's notion about spontaneous generation, Redi's experiment,  Louis Pasteur's & Tyndall's	1 July 19 to 17 July 19	03   02   01	Classroom   Group Discussion	Unit – I 27/07/19 Unit – II 14/08/19 Unit – III 29/08/19

	<p>experiment.</p> <p>Theory of fermentation,</p> <p>Discovery of anaerobic life &amp; physiological significance of fermentation.</p> <p>Surgical antiseptics,</p> <p>Germ theory of disease –Koch’s postulates &amp; River’s postulates.</p>		01		
2	<p><b>Unit II</b></p> <p><b>Morphology of Bacteria, Size and shape, Arrangements.</b></p> <p>Ultrastructure of Bacteria Structure, function and chemical composition of Capsule, Flagella, Pili and Fimbriae,</p> <p>Cell Wall (Gram positive &amp; Gram negative),</p> <p>Cell membrane,</p> <p>Mesosome, Cytoplasm,</p> <p>Nucleoid and ribosome’s.</p> <p>Cytoplasmic inclusion – PHB granules, glycogen, carbohydrates,</p> <p>Magnetosome, Gas vesicles, chlorosome, sulphur, granules.</p> <p>Spore and Cyst Endospore and Exospores,</p>	<p>18-07-19</p> <p>To</p> <p>09-08-19</p>	02		
			02		
			01		
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			01		
			03		
			01		
			03		
			02		
			02		

		Germination and Sporulation of endospore.		03		
3		<p><b>Unit III</b></p> <p>Concept of Systematic and Classical taxonomy including Bergey's Manual of Bacteriology</p> <p><b>Microbial Nutrition, cultivation</b></p> <p>Nutritional requirements – Major and Minor elements and growth factors.</p> <p>Nutritional types of microorganisms.</p> <p>Types of Culture media with examples (Defined, Selective, Natural, Differential, enrichment, Synthetic).</p> <p>Pure culture techniques -Streak, pour, Spread plate and roll tube method.</p>	<p>31-08-19 To 30-09-19</p>	<p>02</p> <p>02</p> <p>02</p> <p>04</p> <p>04</p>		
4		<p><b>Unit IV</b></p> <p><b>Bacterial Growth:</b></p> <p>Growth curve; Generation time, Growth rate, Specific growth rate.</p> <p>Methods of Enumeration</p>	<p>1-10-19 To 23-10-19</p>	<p>01</p> <p>02</p>		

	Microscopic methods, Plate counts, Biomass, Chemical methods, Optical density.		02 02 03		
	Continuous culture – Chemostat and Turbidostat models,		02 02 01		
	Diauxic growth and Synchronous culture				

Sr. No.	Subject	Practical's	Date	No. of Practicals
1	Introduction to Microbiology	1. General Rules and Safety in Microbiology Laboratory.	08/07/19 To 24/10/19  Batch A,B,C,D,E.	05
2		2. Study of basic requirements in Microbiology Laboratory- Autoclave, Hot air oven & Incubator		05
3		Staining techniques (Monochrome staining, Grams staining ,Negative staining)		05
4		Preparation of solid and liquid media.		05
5		Isolation of bacteria by spread plate, streak plate and pours plate method		05
6		Isolation of microorganisms from soil, water and air		05
7		Isolation of microorganisms by using selective media.		05
8		Study of motility of Microorganisms by hanging drop method.		05
9		Study of bacterial growth curve .		05
10		Effect of environment on growth of microorganisms.		05

Sr. No.	Class	Name of Asstt. Prof.	Subject	Paper
1	B.Sc. I	Kalyani N. Dhule	Biotechnology	<b>Course Title: Introduction To Microbiology</b> <b>Course Code : U-INM-189</b> <b>Course Title: Lab Course III</b> <b>Course Code: U-LAC-193</b>
2	B.Voc. I			<b>Course Title: Introductory Dairy Technology</b> <b>Course Code:U-IFP-</b>

Name of Teacher: Kalyani N.Dhule

Class : B.Voc 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	Introductory Dairy Technology	<b>UNIT I</b> Introduction to Milk and milk products - Definition, Production and processing status of milk Types of Milk Products – Equipment's used in dairy industry.	11-07-19 To 30-08-19	02   04 03	Dought discussion  Group Discussion	Unit – I 03/09/19 Unit III- 25/10/19

		Physical properties of milk: Colour, taste, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, OR, electrical conductivity.		03  03		
		<b>UNIT III</b>  Market milk industry and milk products: Systems of collection of milk,  Reception, Platform testing, various stages of processing: Filtration, Clarification, Standardization,  Homogenization, Pasteurization, Sterilization,  Packaging and Storage, Cleaning and Sanitation  Milk fat: Composition and structure, and physical properties, crystallization, structure of fat granules,  lipolysis, autoxidation, fat constants (saponification value, iodine value, RM value, peroxide value).  Protein and Enzymes: General structure, amphoteric nature,  difference between casein and serum protein, different types of casein (acid and rennet), uses of casein, fractionation of protein.  Enzymes- catalase, alkaline phosphatase, lipases and proteases.	05-09-19  To  23-10-19	02  01  02  02  01  02  01  01  01		

# **Rajarshi Shahu Mahavidyalaya, Latur**

**(Autonomous)**

## **Structured Work Plan for Teaching**

**(Dec – 2019 to March. 2020)**

### **1. Details of Classes to be taught**

<b>Sr. No.</b>	<b>Class</b>	<b>Name of Astd. Prof.</b>	<b>Subject</b>	<b>Paper</b>
1	B.Sc. I Year	Miss. K.N. Dhule	Biotechnology	<b>Course Title: Biophysics &amp; Bioinstrumentation</b> <b>Course Code : U-BBI-287</b> <b>Course Title: Lab Course VI</b> <b>Course Code: U-LAC-292</b>
2	B.Sc. II Year			<b>Course Title: Lab Course XIII</b> <b>Course Code: U-LAC</b> <b>Course Title: Algal Cultivation Technology</b> <b>Course Code: U-LAC</b>

### **2. Summary of Lesson Plans**

**Name of Teacher: Miss. K. N. Dhule**

**Class: B.Sc. biotech I Year (II / IV SEM)**

<b>Sr. No.</b>	<b>Subject</b>	<b>Unit and Chapter to be covered</b>	<b>Date</b>	<b>No. of Lectures</b>	<b>Academic activities to be organized</b>	<b>No. of Test / Assignment with topic and date</b>
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1	Biotechnology	<p><b>Unit -II:</b></p> <p><b>Chapter 1. Chromatography</b></p> <ul style="list-style-type: none"> <li>• General Principle, Plane Chromatography: Paper/TLC, Column Chromatography: Ion Exchange.</li> </ul> <p><b>Chapter 2. Spectroscopy</b></p> <ul style="list-style-type: none"> <li>• Definition.</li> <li>• Electromagnetic wave.</li> <li>• Electromagnetic spectrum.</li> <li>• Applications of each region of electromagnetic spectrum for spectroscopy.</li> <li>• Introduction to molecular energy levels.</li> <li>• Excitation.</li> <li>• Absorption.</li> <li>• Emission.</li> <li>• Rotational spectra.</li> <li>• Vibrational spectra.</li> <li>• Principle, Construction and working of colorimeter, U.V-visible Spectrophotometer.</li> <li>• Application to biomolecules (Proteins, DNA, Hb, Chlorophyll )</li> </ul>	10 Dec to 6Jan 20	02  03  02  01  02  01  01  01  03  02  02	Quiz Contest	Unit – I  6/01/20  Unit – II  5/02/20  Unit – III  3/03/20
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2	Biotechnology	<p><b>Unit -1:</b></p> <p><b>Chapter 1. Magnetism</b></p> <ul style="list-style-type: none"> <li>• The magnetic field.</li> <li>• The definition of B. Poles.</li> <li>• Gauss law of magnetism.</li> <li>• Magnetism of earth.</li> <li>• Para magnetism.</li> <li>• Diamagnetism.</li> <li>• Ferromagnetism.</li> <li>• Nuclear magnetism.</li> <li>• Biomagnetism with examples.</li> </ul> <p><b>Chapter 2. Fluid Statics</b></p> <ul style="list-style-type: none"> <li>• Fluids Definition, Pressure and Density.</li> <li>• The variation of pressure in a fluid at rest.</li> <li>• Pascal's Principle.</li> <li>• Measurement of pressure.</li> <li>• Various units of pressure and their inter-conversion.</li> </ul> <p><b>Chapter 3. Atomic Structure</b></p> <ul style="list-style-type: none"> <li>• Historical background upto Bohr model.</li> <li>• Significance of second and third postulate of Bohr's model.</li> <li>• Derivation of radius and energy value.</li> <li>• Quantization of energy</li> </ul>	<p>7Jan 2020 To 5 Feb2020</p>	<p>01 01 01  02 02  01  02 02 01 01 01</p>	<p>Classroom Seminar</p>	
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		<p>levels using Rydberg's constant, Atomic spectra is signature of the element.</p> <ul style="list-style-type: none"> <li>• Bohr- Sommerfeld model.</li> <li>• Vector atom model.</li> <li>• Quantum numbers.</li> <li>• Selection rules.</li> <li>• Uncertainty Principle, Pauli's exclusion principle.</li> <li>• Emission spectra to understand selection rule.</li> </ul>		02 02 01 01 01 01		
3	Biotechnology	<p><b>Unit III</b> Chapter 1. Electrophoresis</p> <ul style="list-style-type: none"> <li>• General Principle, Electrophoretic mobility, Factors affecting electrophoretic mobility,</li> <li>• Example: Agarose Electrophoresis</li> </ul> <p>Chapter 2. Radioactivity</p> <ul style="list-style-type: none"> <li>• Atomic Nucleus.</li> <li>• Properties.</li> <li>• Nuclear forces.</li> <li>• Nuclear models (liquid drop and shell model).</li> <li>• Radioactive nucleus.</li> <li>• Types of Radioactive decay.</li> <li>• Half-life- physical and biological.</li> </ul>	06 Feb 2020 To 27 March 2020	01 01 02 01 01 01 02 01 02 01	Classroom Seminar	

		<ul style="list-style-type: none"> <li>• Handling and standardization of alpha and beta emitting isotopes.</li> <li>• Measurement of radiation – Dosimetry and detectors.</li> <li>• Principle, Construction and Working of- pen and batch dosimeter. and batch dosimeter.</li> </ul>		01 02 01		
4	Biotechnology	<p><b>Unit IV</b></p> <p>Chapter1. Bioinstruments</p> <ul style="list-style-type: none"> <li>• Principle, Construction, Working and applications for analysis of biomolecules of following instruments.</li> <li>• pH meter</li> <li>• Centrifuge (RCF, sedimentation concept), Different types of centrifuges.</li> </ul> <p>Chapter 2. Thermoregulation</p> <ul style="list-style-type: none"> <li>• Thermometric properties and types of thermometers (Clinical, thermocouple, bimetallic, platinum resistance, thermistor-thermometers).</li> <li>• Body temperature and its regulation.</li> </ul>	04 March 2019  To 31 March 2020	01 02  01  01 02  01	Classroom Seminar	

		<p>Chapter 3. Microscopes</p> <ul style="list-style-type: none"> <li>• <b>Optics:</b> Properties of light Reflection, refraction, dispersion, diffraction, Interference and Polarization.</li> <li>• Concept of polarization</li> <li>• Polarization by reflection – Brewster’s law.</li> <li>• Polarization by double refraction – Nicol Prism.</li> <li>• <b>Concepts:</b> Resolving power.</li> <li>• Chromatic and achromatic aberrations.</li> <li>• Construction and working of following microscopes- Dissecting, Compound light and contrast.</li> <li>• Fluorescence.</li> <li>• Electron microscopes: Concept of vacuum, working of electron gun.</li> <li>• Construction and working of SEM, TEM, STEM.</li> <li>• Sample preparation.</li> </ul>		<p>02</p> <p>01</p> <p>01</p> <p>01</p> <p>01</p> <p>01</p> <p>01</p> <p>02</p> <p>01</p> <p>02</p>		
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Sr. No.	Subject	Practical's	Date	No. of Practical's
1	Biophysics &	Safety measure – time	16/12/19 To 31/03/20	02
2	Bioinstrumentation	Temperature measurement: using thermocouple, RTD		02
3		Study of Lambert's & Beer's law		02
4		Absorption spectrum of protein		02
5		Paper/ TLC		02
6		Instrumentation – Colorimeter		02
7		pH meter		02
8		Microscopy – light		02
9		Agarose Electrophoresis		02
10		Problems based on Radioactivity		02

Sr. No.	Subject	Practical's	Date	No. of Practical's
1	Plant Biotechnology	General laboratory design for establishing plant tissue culture.	16/12/19	02
2		Collection of explants, washing of explants and sterilization of explants		02
3		Surface sterilization and aseptic manipulations		02
4		Media preparation, sterilization and subculture		02

5		Callus culture	To 31/03/20	02
6		Cell suspension culture		02
7		Anther and pollen culture		02
8		Embryo culture		02
9		Artificial seed production		02
10		Field visit-National research laboratories		02
11		Visit to commercial Plant tissue culture laboratory.		02

Sr. No.	Subject	Practical's	Date	No. of Practical's
1	Algal Cultivation Technology	<b>Theory:</b> Introduction to Algae, Life cycle of Algae, Role Algae in Ecosystem. <b>Practical:</b> 1. Collection & Microscopic observation of algae. 2. Quantification of collected algae.	16/12/19	02
2		<b>Theory:</b> Techniques for cultivation of Algae in laboratory, seed culture & its maintenance. Designing of photo bioreactor and Raceway Ponds for algal cultivation & its application. <b>Practical:</b> 1. Isolation, Identification of economic important algae. 2. Inoculum development pilot scale production	To 31/03/20	02

3		<p><b>Theory:</b> Algal Biotechnology – potential of microalgae for SCP, carotene, Biofertilizer, Biodiesel; Principles of mass cultivation of microalgae and its Economic Importance.</p> <p><b>Practical:</b> 1. Qualitative estimation of protein from algae. 2. Chromatographic separation of essential biomolecules from algae.</p>		02
4		<p><b>Theory</b> Business economics for algal cultivation, production and processing and Futuristic Approaches in algal biotechnology.</p> <p><b>Practical</b> 1 Visit to industry actively engaged in algal technology. 2. Project report on algal technology. 3. Study of Spirulina production and its products</p>		02

**Miss. K.N. Dhule**

**Name of Lecturer**

**Signature**