


### Annual Teaching Plan

Academic Year: 2022-23 Semester: I ( B.Sc.I) Department: Microbiology


Subject: Microbiology Course Title: basic techniques in microbiology

Name of the teacher – Ms.V.V.Misal

Month : : October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Paper II Unit I	<b>A. General Principles of Microscopy :</b> 1. Types of microscopes: a) light microscopes b) electron microscopes, 2.Light microscopy:
5	8	13		
Month : November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Paper II Unit I	2. Ray diagram, special features and applications of : a) Compound Microscope b) Phase Contrast Microscope c) Electron Microscope d) Fluorescence Microscope
5	8	13		
Month : December			Module/Unit:	Sub-units planned
5	8	13	Paper II Unit I	<b>B. Stains and Staining procedures</b> 1. Definition of dye and stain 2. Classification of stains – Acidic, Basic and Neutral 3. Principles, Procedure, Mechanism of staining procedures a) Monochrome staining b) Negative staining c) Differential staining : i) Gram's staining ii) Acid fast staining
Month January			Module/Unit:	Sub-units planned
5	8	13	Paper II Unit I	. Special staining methods a) Cell wall (Chance's method)      b) Capsule (Manvel's method) c) Volutin granule (Albert's method)

  
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### Annual Teaching Plan

Academic Year: 2022-23 Semester: II ( B.Sc.I) Department: Microbiology

Subject: Microbiology Course Title: bacteriology & applied microbiology

Name of the teacher – Ms.V.V.Misal

Month : : March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Paper II Unit II	<b>Biochemistry</b> <b>A. Proteins :</b> i) Introduction to amino acids , peptide bond. ii) Types of amino acids based on R group
5	8	13		
Month : April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Paper II Unit II	<b>B. Carbohydrates:</b> i) Monosaccharides : Classification based on aldehyde and ketone groups ; structure of Ribose, Deoxyribose, Glucose, and Fructose. ii) Disaccharides : Glycosidic bond, structure of lactose and sucrose. ii) Polysaccharides : Structure of starch, glycogen and cellulose.
5	8	13		
Month : May			Module/Unit:	Sub-units planned
5	8	13	Paper II Unit I	<b>C. Lipids :</b> i) Simple lipids – Fats, oils and waxes ii). Compound lipids – Phospholipid, Glycolipids iii) Derived lipids – Cholesterol
Month : June			Module/Unit:	Sub-units planned
5	8	13	Paper II Unit I	D. Enzymes: E. Nucleic Acids

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### Annual Teaching Plan

Academic Year: 2022-23 Semester: III ( B.Sc.II) Department: Microbiology

Subject: Microbiology Course Title: microbial physiology , metabolism and applied microbiology

Name of the teacher – Ms.V.V.Misal

Month : : October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Paper III Sec II, Unit IV	<b>Industrial Microbiology</b> <b>A . Basic concepts of fermentation.</b> 1. Definition, concept of primary and secondary metabolites.
6	8	14		
Month : November			Module/Unit:	
Lectures	Practicals	Total	Paper III Sec II, Unit IV	2. Types of fermentations – Batch, continuous, dual and multiple fermentation.
6	8	14		
Month : December			Module/Unit:	
6	8	14	Paper III Sec II, Unit IV	3. Typical Fermentor design – Parts and their functions. 4. Factors affecting fermentation process.
Month January				
6	8	14	Paper III Sec II, Unit IV	<b>C. Fermentation media -</b> a. Water, carbon source, nitrogen source, precursors, growth factors, antifoam agents, chelating agents.

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## Annual Teaching Plan

Academic Year: 2022-23 Semester: IV ( B.Sc.II) Department: Microbiology

Subject: Microbiology Course Title: microbial genetics, molecular biology ,basics in medical microbiology & immunology

Name of the teacher – Ms.V.V.Misal

Month : March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Paper II Unit II	<b>Molecular Biology</b> 1. Gene transfer in bacteria. 2. Fate of exogenote in recipient cell.
5	8	13		
Month : April			Module/Unit:	
Lectures	Practicals	Total	Paper II Unit II	3. Modes of gene transfer – a. Transformation. b. Conjugation c. Transduction
5	8	13		
Month : May			Module/Unit:	
5	8	13	Paper II Unit I	1. Plasmids – a. Natural – Properties, types , structure & applications b. Artificial – pBR 322- structure and applications
Month : June			Module/Unit:	
5	8	13	Paper II Unit I	2. DNA repair : i) Photoreactivation ii) Dark repair mechanism ( Excision repair)

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### Annual Teaching Plan

Academic Year: 2022-23 Semester: V ( B.Sc.III) Department: Microbiology

Subject: Microbiology Course Title: immunology and medical microbiology

Name of the teacher – Ms.V.V.Misal

Month : October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit I	1.Cells of Immune system – 2. Membrane receptors for antigen and their role in antigenrecognition 3. Molecular mechanism of antibody production.
12	8	20		
Month : November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit I	.1Cytokines 2 Immunological tolerance : 3 Interferon
12	8	20		
Month : December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit II	1. Complement 2.Monoclonal antibodies
12	8	20		
Month : January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit II	1.New diagnostic techniques 2.Hypersensitivity 3.Autoimmunedisease
12	8	20		

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### Annual Teaching Plan

Academic Year: 2022-23 Semester: VI ( B.Sc.III) Department: Microbiology

Subject: Microbiology Course Title: virology And Microbial Genetics

Name of the teacher – Ms.V.V.Misal

Month : March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit I	1. One cistron - one polypeptide hypothesis. 2. Molecular mechanism of gene expression
12	8	20		
Month : April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit I	1. Mutations 2. Methods of isolation and detection of mutants based on – a. Relative survival b. Relative growth c. Visual detection
12	8	20		
Month : May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit II	1. Genetic complementation 2. Extrachromosomal inheritance:
12	8	20		
Month : June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit II	Techniques in Molecular Biology – Genetic engineering
12	8	20		

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc I Sem I


Department: Microbiology

Subject: Microbiology

Course Title: Introduction to microbiology and microbial diversity

Name of the teacher: Mr. Suraj D. Gabale

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. History and milestones in Microbiology a. Spontaneous generation vs biogenesis b. Contributions of scientists
5	2	7	Unit I	
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. History and milestones in Microbiology a. Beneficial and harmful activities of Microorganisms b. Classification of organisms
5	2	7	Unit I	
Month: December			Module/Unit:	Sub-units planned
5	2	7	Section I	2. Scope of Microbiology a. Introduction to applied branches of Microbiology
			Unit I	
Month: January			Module/Unit:	Sub-units planned
5	2	7	Section I	3. Bacterial systematic a. Taxonomic ranks b. Bacterial nomenclature
			Unit I	

Mr. S. D. Gabale 

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc I Sem II


Department: Microbiology

Subject: Microbiology

Course Title: Bacteriology and applied microbiology

Name of the teacher: Mr. Suraj D. Gabale

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. Bacterial cell organization. a. Cell size shape and arrangement b. Cell wall
5	2	7	Unit I	
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	c. Cell membrane d. Capsule and slime layer e. Flagella
5	2	7	Unit I	
Month: May			Module/Unit:	Sub-units planned
5	2	7	Section I	f. Pili g. Endospores h. Nucleoid i. Mesosome j. Ribosome
			Unit I	
Month: June			Module/Unit:	Sub-units planned
5	2	7	Section I	1. Reserve food material a. Nitrogenous b. Non-nitrogenous
			Unit I	

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Academic Year: 2022-2023

Semester: B.Sc II Sem III


Department: Microbiology

Subject: Microbiology

Course Title: Microbial Physiology, Metabolism and Applied Microbiology


Name of the teacher: Mr. Suraj D. Gabale

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. Catabolism of glucose
6	2	8	Unit II	a. HMP pathway
Month: November			Section I	b. EMP pathway
Lectures	Practicals	Total	Unit II	c. ED pathway
6	2	8		d. TCA cycle
Month: December			Section I	2. Substrate level
6	2	8	Unit II	phosphorylation
Month: January			Section I	a. Homolactic acid
6	2	8	Unit II	fermentation
			Unit II	b. Heterolactic acid
			Unit II	fermentation
			Section I	3. Oxidative
6	2	8	Unit II	phosphorylation
			Unit II	Chemiosmotic hypothesis

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Academic Year: 2022-2023

Semester: B.Sc II Sem IV


Department: Microbiology

Subject: Microbiology


Course Title: Microbial Genetics, Molecular Biology, Basics in Medical Microbiology & Immunology

Name of the teacher: Mr. Suraj D. Gabale

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	IMMUNOLOGY
6	2	8	Unit II	1. Immunity 2. Non-specific defense mechanism
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	3. Antigens
6	2	8	Unit II	a. Chemical nature b. Types c. factors affecting antigenicity 4. Antibodies
Month: May			Module/Unit:	Sub-units planned
6	2	8	Section II	5. Theories of antibody production
			Unit II	6. Immune response
Month: June			Module/Unit:	Sub-units planned
6	2	8	Section II	7. Mechanism of Ag-Ab reaction
			Unit II	8. Types of Ag-Ab reactions 9. Types of immune response 10. Organs of Immune system

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## Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc III Sem V


Department: Microbiology

Subject: Microbiology

Course Title: Immunology and Clinical Microbiology

Name of the teacher: Mr. Suraj D. Gabale

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. <i>Mycobacterium leprae</i> 2. <i>Clostridium perfringenes</i> 3. <i>Treponema pallidum</i>
12	4	16	Unit I	
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. <i>Pseudomonas aeruginosa</i> 2. <i>Vibrio cholerae</i> 3. <i>Helicobacter pylori</i> 4. <i>Leptospira interrogans</i>
12	4	16	Unit II	
Month: December			Module/Unit:	Sub-units planned
12	4	16	Section II	1. <i>Plasmodium falciparum</i> 2. <i>Candida albicans</i> 3. Dengue virus 4. Hepatitis A and B virus 5. Rabies virus 6. SARS virus
			Unit III	
Month: January			Module/Unit:	Sub-units planned
12	4	16	Section II	1. Chemotherapy 2. Gene therapy 3. Antimicrobial chemoprophylaxis 4. Drug resistance 5. Vaccines
			Unit IV	

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc III Sem VI

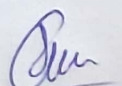
Department: Microbiology

Subject: Microbiology

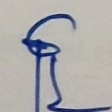
Course Title: Virology and Microbial Genetics

Name of the teacher: Mr. Suraj D. Gabale

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit I	1. General characteristics of Viruses 2. One step growth experiment 3. Viroids 4. Prions 5. Capsid, envelope and nucleic acid of viruses
12	4	16		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit II	1. Isolation and cultivation of- a. Bacteriophages b. Animal viruses c. Plant viruses 2. Enumeration of viruses 3. Purification of viruses
12	4	16		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit III	Multiplication cycles of- a. Adenoviruses b. TMV c. Lambda phage d. T4 bacteriophage
12	4	16		
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit IV	1. Types of cancer cells 2. Types of cancer 3. Oncogenic viruses 4. Hypothesis about cancer
12	4	16		

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc I Sem I

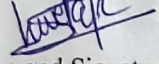
Department: Microbiology

Subject: Microbiology

Course Title: Introduction to microbiology and microbial diversity

Name of the teacher: Ms. S.A.Pise

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit I	1. Types of Microorganisms: A .General characteristics of different group- Acellular , Cellular microorganism
5	2	7		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit I	1. Structure of Prokaryotic & eukaryotic cell. 2. Difference between prokaryotic and eukaryotic microorganisms.
5	2	7		
Month: December			Module/Unit:	Sub-units planned
5	2	7	Section I Unit I	2. Control of Microorganisms – A. Definitions
Month: January			Module/Unit:	Sub-units planned
5	2	7	Section I Unit I	B. Mode of Action and application of –a) Physical agents
Month: February			Module/Unit:	Sub-units planned
5	2	7	Section I Unit I	b) Chemical Agents

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc I Sem II

Department: Microbiology

Subject: Microbiology

Course Title: Bacteriology and applied microbiology

Name of the teacher: Ms. S. A. Pise

Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Enrichment and Isolation of Microorganisms from natural environment
5	2	7	Unit IV	
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	2. Preservation of microbial cultures –
5	2	7	Unit IV	
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	3. Systematic study of pure cultures:
5	2	7	Unit IV	
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	4. Concept Culture collection centres.
5	2	7	Unit IV	

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*S. A. Pise*



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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc II Sem III

Department: Microbiology

Subject: Microbiology

Course Title: Microbial Physiology, Metabolism and Applied Microbiology

Name of the teacher: Ms. S. A. Pise

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	A] Air Microbiology:
6	2	8	Unit III	
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	B] Food Microbiology
6	2	8	Unit III	
Month: December			Module/Unit:	Sub-units planned
6	2	8	Section II	1. General Principles & methods of food preservation.
			Unit III	
Month: January			Module/Unit:	Sub-units planned
6	2	8	Section II	1. Biostatistics
			Unit III	
Month: February			Module/Unit:	Sub-units planned
6	2	8		1. Bioinformatics .

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## Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc II Sem IV

Department: Microbiology

Subject: Microbiology

Course Title: Microbial Genetics, Molecular Biology, Basics in Medical Microbiology & Immunology

Name of the teacher: Ms. S. A. Pise

Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Definitions 2. Virulence factor
6	2	8	Unit III	
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Types of diseases 2. Types of infections
6	2	8	Unit III	
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Modes of transmission of diseases 2. General principles of prevention and control of microbial diseases
6	2	8	Unit III	
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Normal flora of human body & its significance (flora of skin, throat, GI tract & Urinogenital tract)
6	2	8	Unit III	

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc III Sem V

Department: Microbiology

Subject: Microbiology

Course Title: Industrial microbiology and microbial biochemistry

Name of the teacher: Ms. S. A. Pise

Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Enzymes
12	4	16	Unit I	
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Extraction & purification of enzymes. 2. Assay of enzymes - 3. Immobilization of enzymes 4. Confirmation of purified enzymes
12	4	16	Unit I	
Month: November			Module/Unit:	Sub-units planned
12	4	16	Section II	1. Basic concepts of Glyoxylate bypass, Phosphoketolase pathway, Bioluminescence -
			Unit II	
Month: December			Module/Unit:	Sub-units planned
12	4	16	Section II	1. Assimilation of Carbon, Nitrogen, Sulphur
			Unit II	
Month: January			Module/Unit:	Sub-units planned
12	4	16	Section II	1. Prokaryotic Biosynthesis of RNA, DNA
			Unit II	
Month: February			Module/Unit:	Sub-units planned
12	4	16	Section II	1. Prokaryotic Biosynthesis of Proteins, Peptidoglycan
			Unit II	

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## Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc III Sem VI

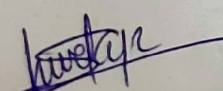
Department: Microbiology

Subject: Microbiology


Course Title: Agricultural and Environmental microbiology

Name of the teacher: Ms. S.A.Pise

Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. Soil Microbiology. 2. Role of microorganisms in elemental cycle
12	4	16	Unit I	
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. . Manure and Compost
12	4	16	Unit I	
Month: June			Module/Unit:	Sub-units planned
12	4	16	Section I	1. Types, production, methods of application and uses.
			Unit II	
Month: July			Module/Unit:	Sub-units planned
12	4	16	Section I	1. Biodegradation by bacteria & fungi 2. Plant Pathology
			Unit II	

  
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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc I Sem I

Department: Microbiology

Subject: Microbiology

Course Title: Introduction to microbiology and microbial diversity

Name of the teacher: Ms. T.K.Ulhalkar

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	1. Microbial Nutrition  A) Nutritional requirements of microorganisms:
5	2	7	Unit IV	
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	B) Nutritional types of microorganism based on carbon and energy sources
5	2	7	Unit IV	
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	2. Culture media:
5	2	7	Unit IV	
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	3. Cultivation of microorganisms
5	2	7	Unit IV	

*T.K.Ulhalkar*  
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T.K. Ulhalkar



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## Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc I Sem II

Department: Microbiology

Subject: Microbiology

Course Title: Bacteriology and applied microbiology

Name of the teacher: Ms. T.K.Ulhalkar

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	I Water microbiology a) Sources of microorganisms in water. b) Fecal pollution of water.
5	2	7	Unit III	
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II	c) Indicators of fecal pollution d) Routine Bacteriological analysis of water.
5	2	7	Unit III	
Month: May			Module/Unit:	Sub-units planned
5	2	7	Section II	2) Milk Microbiology a) General composition of Milk. b) Sources of contamination in milk
			Unit III	
Month: June			Module/Unit:	Sub-units planned
5	2	7	Section II	c) Microbiological examination of Milk d. Spoilage of milk
			Unit III	

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## Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc II Sem III

Department: Microbiology

Subject: Microbiology

Course Title: Microbial Physiology, Metabolism and Applied Microbiology

Name of the teacher: Ms. T.K.Uihalkar

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	A] Growth : Growth phases, measurement of growth,
6	2	8	Unit I	
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	continuous growth, synchronous growth and diauxic growth
6	2	8	Unit I	
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	B] Effect of environmental factors on microbial growth
6	2	8	Unit I	
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	c. Transport across the cell membrane
6	2	8	Unit I	

*T.K.Uihalkar*  
Name and Signature of Teacher  
T.K. Uihalkar



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Name and Signature of HOD  
**HEAD**  
DEPARTMENT OF MICROBIOLOGY  
VIVEKANAND COLLEGE, KOLHAPUR  
(AUTONOMOUS)



### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc II Sem IV

Department: Microbiology

Subject: Microbiology

Course Title: Microbial Genetics, Molecular Biology, Basics in Medical Microbiology & Immunology

Name of the teacher: Ms. T.K.Ulhalkar

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	1. Forms of DNA. 2. Basic concepts – Gene, genome, genotype, phenotype, mutagen, recon, muton, cistron, split genes.
6	2	8	Unit I	
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	3. Genetic code 4. Organization of chromosomal DNA in <i>E.Coli</i>
6	2	8	Unit I	
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	B] Mutation: - 1. Basic Concepts of Mutation 2. Spontaneous mutation
6	2	8	Unit I	
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I	3. Induced mutations
6	2	8	Unit I	

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc III Sem V

Department: Microbiology

Subject: Microbiology

Course Title: Industrial microbiology and microbial biochemistry

Name of the teacher: Ms. T.K.Ulhalkar

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit I	1. Food Microbiology 2. Industrial Microbiology
12	4	16		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit II	1. Industrial production of a. Amylase b. Grape wine c. Penicillin d. Citric acid e. SCP
12	4	16		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit II	2. Microbial production of a. Vitamin B12 b. Amino acid- Lysine 3. Probiotics
12	4	16		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section I Unit II	4. Downstream processing and product recovery 5. Testing of sterility, pyrogen, carcinogenicity, toxicity and allergens
12	4	16		

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### Annual Teaching Plan

Academic Year: 2022-2023

Semester: B.Sc III Sem VI

Department: Microbiology

Subject: Microbiology

Course Title: Agricultural and Environmental microbiology

Name of the teacher: Ms. T.K.Ulhalkar

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit I	1.General characteristics of waste
12	4	16		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Section II Unit I	2.Sewage Microbiology 3.Characteristics and treatment of waste 4.Eutrophication
12	4	16		
Month:May			Module/Unit:	Sub-units planned
12	4	16	Section II Unit II	1. Biological safety in laboratory
Month: June			Module/Unit:	Sub-units planned
12	4	16	Section II Unit II	2. Environmental monitoring 3. Environmental Impact Assessment

*T.K.Ulhalkar*  
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T.K.Ulhalkar



*[Signature]*  
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