Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Microbiology (UG)

Academic Year 2025-26

Sr.No	Syllabus Allotted	Syllabus Completed	Remaining Syllabus
1	B.Sc.I Sem I Paper II 2DSC03MIC 12: Bacteriology Unit I : A. General Principles of Microscopy : 1. Types of microscopes: B. Stains and Staining procedures 1. Definition of dye and stain 2. Classification of stains . 3. Principles, Procedure, Mechanism of staining procedures a) Monochrome staining b) Negative staining c) Differential staining : 4. Special staining methods Practical Course : I 1. Study of Laboratory instruments used in the microbiology laboratory: a)Laminar air flow, b) autoclave, incubator c)hot air oven d) colorimeter, e)colony counter f)bacteriological filter assembly 2. Study of compound microscope. 3. Amylase Production test 4. Monochrome staining	B.Sc.I Sem I Paper II 2DSC03MIC 12: Bacteriology Unit I : A. General Principles of Microscopy : 1. Types of microscopes: B. Stains and Staining procedures 1. Definition of dye and stain 2. Classification of stains . 3. Principles, Procedure, Mechanism of staining procedures a) Monochrome staining b) Negative staining c) Differential staining : 4. Special staining methods Practical Course : I 1. Study of Laboratory instruments used in the microbiology laboratory: a)Laminar air flow, b) autoclave, incubator c)hot air oven d) colorimeter, e)colony counter f)bacteriological filter assembly 2. Study of compound microscope. 3. Amylase Production test 4. Monochrome staining	NIL

Name of Teacher – Ms.V.V.Misal

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Dr.T.C. Goupale
I/C Head
Department of Microbiology
Vivekanand College,Kolhapur
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Academic Year 2025-26

Sr.No	Syllabus Allotted	Syllabus Completed	Remaining Syllabus
1 2	B.Sc.II Sem III **Paper V 2DSC 03MIC 21: Microbial Physiology and Metabolism** Unit I : A] **Growth :** Growth phases, measurement of growth, continuousgrowth, synchronous growth and diauxic growth B] **Effect of environmental factors on microbial growth** : i) Temperature: - i) pH ii) Osmotic pressure – Isotonic, hypotonic and hypertonicenvironments, xerophiles and halophiles. iii) Heavy metals iv) Radiations - U. V rays C] **Transport across cell membrane** : Diffusion, active transport and group translocation. Practical – 1. Micrometry. 2.Diauxic growth curve 3. Growth Curve	B.Sc.II Sem III **Paper V 2 DSC 03MIC 21: Microbial Physiology and Metabolism** Unit I : C] **Growth :** Growth phases, measurement of growth, continuousgrowth, synchronous growth and diauxic growth D] **Effect of environmental factors on microbial growth** : i) Temperature: - v) pH vi) Osmotic pressure – Isotonic, hypotonic and hypertonicenvironments, xerophiles and halophiles. vii) Heavy metals viii) Radiations - U. V rays C] **Transport across cell membrane** : Diffusion, active transport and group translocation. Practical – 1. Micrometry. 2.Diauxic growth curve 3. Growth Curve	NIL

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VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Empowered Autonomous)

Dr.T.C. Goupale

I/C Head
Department of Microbiology
Vivekanand College,Kolhapur
(Empowered Autonomous)

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Sr.No	Syllabus Allotted	Syllabus Completed	Remaining Syllabus
1	B.Sc.III Sem V Paper IX DSC 03 MIC 51: Immunology and Medical Microbiology SEC- I Unit I 1.Cells of Immune system – 2. Membrane receptors for antigen and their role in antigen recognition 3. Molecular mechanism of antibody production. 4. Cytokines - 5. Immunological tolerance : 6. Interferon –	B.Sc.III Sem V Paper IX DSC 03 MIC 51: Immunology and Medical Microbiology SEC- I Unit I 1.Cells of Immune system – 2. Membrane receptors for antigen and their role in antigen recognition 3. Molecular mechanism of antibody production. 4. Cytokines - 5. Immunological tolerance : 6. Interferon –	NIL
2	Unit – II 1. Complement – 2.Monoclonal antibodies - 3.New diagnostic techniques :- 4. Hypersensitivity – 5 . Autoimmune disease : Practical –II IMMUNOLOGY 1. Determination of Antibacterial activity of the serum. 2. Enzyme Linked Immunosorbent Assay (ELISA)- DOT 3.Determination of C- Reactive Protein (CRP) in Blood. 4.Detection of Rheumatoid factor in blood .(Slide agglutination test) 5.Sample handling 6.Determination of Total Blood cell count 7.Determination of Differential blood cell count. 8.Separation of serum and plasma from blood. 9. EstimationofhaemoglobinbySahli'smethod.	Unit – II 1. Complement – 2.Monoclonal antibodies - 3.New diagnostic techniques :- 4. Hypersensitivity – 5 . Autoimmune disease : Practical –II IMMUNOLOGY 1. Determination of Antibacterial activity of the serum. 2. Enzyme Linked Immunosorbent Assay (ELISA)- DOT 3.Determination of C- Reactive Protein (CRP) in Blood. 4.Detection of Rheumatoid factor in blood .(Slide agglutination test) 5.Sample handling 6.Determination of Total Blood cell count 7.Determination of Differential blood cell count. 8.Separation of serum and plasma from blood. 9. EstimationofhaemoglobinbySahli'smethod.	

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Dr.T.C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

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Syllabus completion report 2025- 2026

Sr.No	Syllabus Allotted	Syllabus Completed	Remaining Syllabus
1 2	B.Sc.I Sem II Paper IV 2DSCMIC03 22 : Basic Biochemistry Unit I : **A. Proteins:** 1) Introduction to amino acids, peptide bond. 2) Types of amino acids based on R group– a) Nonpolar, aliphatic amino acids. b) Polar, Uncharged amino acids. c) Aromatic amino acids. d)Positively charged(basic) amino acids e) Negatively charged(acidic) amino acids. 3) primary, secondary, tertiary and quaternary. **B. Enzymes:** 1. Definition and types of enzymes 2. Concept of apoenzyme, coenzyme, cofactor and active site 3. Mechanism of Enzyme Action- Lock and key hypothesis, Induced fit hypothesis.	B.Sc.I Sem II Paper IV 2DSCMIC03 22 : Basic Biochemistry Unit I : **B. Proteins:** 4) Introduction to amino acids, peptide bond. 5) Types of amino acids based on R group– a) Nonpolar, aliphatic amino acids. b) Polar, Uncharged amino acids. c) Aromatic amino acids. d)Positively charged(basic) amino acids e) Negatively charged(acidic) amino acids. 6) primary, secondary, tertiary and quaternary. **B. Enzymes:** 4. Definition and types of enzymes 5. Concept of apoenzyme, coenzyme, cofactor and active site 6. Mechanism of Enzyme Action- Lock and key hypothesis, Induced fit hypothesis. Unit II	NIL

	Unit II **A. Carbohydrates:** 1) Monosaccharides: Classification based on aldehyde and ketone groups; structure of Ribose ,Deoxyribose ,Glucose ,and Fructose. 2) Disaccharides: Glycosidic bond, structure of lactose and sucrose. 3) Polysaccharides: Structure of starch, glycogen and cellulose. **B. Lipids:** 1) Simple lipids– Fats, oils and waxes. 2) Compound lipids–Phospholipid, Glycolipids 3) Derived lipids–Cholesterol **C. Nucleic Acids:** 1) DNA – Structure (Watson and Crick Model) and function. RNA–Types(m-RNA, t-RNA, r-RNA),structure and functions. Practical – 1. Study of *Staphylococcus aureus* 2. SPC of soil 3. Serial dilution technique 4. SPC of Milk 5.Sugar fermentation test	**D. Carbohydrates:** 1) Monosaccharides: Classification based on aldehyde and ketone groups; structure of Ribose ,Deoxyribose ,Glucose ,and Fructose. 2) Disaccharides: Glycosidic bond, structure of lactose and sucrose. 3) Polysaccharides: Structure of starch, glycogen and cellulose. **E. Lipids:** 4) Simple lipids– Fats, oils and waxes. 5) Compound lipids–Phospholipid, Glycolipids 6) Derived lipids–Cholesterol **F. Nucleic Acids:** 2) DNA – Structure (Watson and Crick Model) and function. RNA–Types(m-RNA, t-RNA, r-RNA),structure and functions. Practical – 1. Study of *Staphylococcus aureus* 2. SPC of soil 3. Serial dilution technique 4. SPC of Milk 5.Sugar fermentation test	

Name of Teacher – Ms.V.V.Misal

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Dr.T.C. Goupale
I/C Head
Department of Microbiology
Vivekanand College,Kolhapur
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Department of Microbiology

Syllabus completion report 2025- 2026

Sr.No	Syllabus Allotted	Syllabus Completed	Remaining Syllabus
1 2	B.Sc.II Sem IV Paper VII 2DSC03MIC 41: Microbial Genetics and Molecular Biology Unit- I A) Basic concepts of genetics – ii)Forms of DNA iii) Genetic code – iv) Organization of Chromosomal DNA in *E.coli.* Unit - II A) Mutation: - i) Basic Concepts of Mutation ii) Spontaneous mutation – Definition and basic concepts. iii) Induced mutations – iv) Mutagens that distort DNA – Unit - III 1.Genetransfer inbacteria. 2.Fateofexogenoteinrecipientcell. 3.Modesofgenetransfer– a.Transformation.	B.Sc.II Sem IV Paper VII 2DSC03MIC 41: Microbial Genetics and Molecular Biology Unit- I A) Basic concepts of genetics – ii)Forms of DNA iii) Genetic code – iv) Organization of Chromosomal DNA in *E.coli.* Unit - II A) Mutation: - i) Basic Concepts of Mutation ii) Spontaneous mutation – Definition and basic concepts. iii) Induced mutations – iv) Mutagens that distort DNA – Unit - III 1.Genetransfer inbacteria. 2.Fateofexogenoteinrecipientcell. 3.Modesofgenetransfer– a.Transformation.	NIL

	b.Conjugation c. Transduction Unit - IV A. DNArepair: Photoreactivation Darkrepairmechanism(Excisionrepair) B. Plasmids– Natural–Properties, types, structure & applications Artificial-pBR322-structureandapplications Practical – 1. Preparation of phenyl alanine media 2. Phenyl alanine deamination test 3. Preparation of Arginine broth 4. Arginine hydrolysis test 5. Study of *Staphylococcus aureus* 6.Preparation of Christensons urea agar 7. Urease activity 8.Preparation of triple sugar iron agar 9.Study of *Proteus* species 10.Preparation of decarboxylation medium 11.Decarboxylase test	b.Conjugation c. Transduction Unit - IV A. DNArepair: Photoreactivation Darkrepairmechanism(Excisionrepair) B.Plasmids– Natural–Properties, types, structure & applications Artificial-pBR322-structureandapplications Practical – 1. Preparation of phenyl alanine media 2. Phenyl alanine deamination test 3. Preparation of Arginine broth 4. Arginine hydrolysis test 5. Study of *Staphylococcus aureus* 6.Preparation of Christensons urea agar 7. Urease activity 8.Preparation of triple sugar iron agar 9.Study of *Proteus* species 10.Preparation of decarboxylation medium 11.Decarboxylase test	

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Name of Teacher – Ms.V.V.Misal

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Gaupale

Dr.T.C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College,Kolhapur
(Empowered Autonomous)

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Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms. M. M. Nadkarni

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B.Sc. I** **Paper I Introduction Microbiology** **Unit 1: Introduction to microbiology** 1. Spontaneous generation *vs.* biogenesis. 2. Contributions of scientist 3. Classification of microorganisms– 4.Taxonomic ranks 5.Beneficial and harmful activities of microorganisms **Unit-2: Types of Microorganisms** a) Acellular microorganisms b) Cellular microorganisms-	**B.Sc. I** **Paper IIntroduction Microbiology** **Unit 1: Introduction to microbiology** 1. Spontaneous generation *vs.* biogenesis. 2. Contributions of scientist 3. Classification of microorganisms 4. Taxonomic ranks 5. Beneficial and harmful activities of microorganisms **Unit-2: Types of Microorganisms**: a) Acellular microorganisms b) Cellular microorganisms-	Nil
	Practicals	**Practical**: Capsule staining	**Practical**: Capsule satining	**Nil**

Ms. M. M. Nadkarni

ESTD JUNE 1964 VIVEKANAND KOLHAPUR (Empowered Autonomous)

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

Shri Swami VivekanandShikshanSanstha's

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Microbiology (UG)

Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms. M. M. Nadkarni

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B.Sc. II** **Paper VI Applied Microbiology** **Unit II Water Microbiology** 1. Sources of microorganisms in water. 2. Fecal pollution of water. 3. Indicators of fecal pollution 4. Routine Bacteriological analysis of water. a. SPC b. Tests for Coli forms i) Qualitative test ii) Quantitative test – 5. Municipal water purification process and its significance. **Unit IIAir Microbiology**	**B.Sc. II** **Paper VI Applied Microbiology** **Unit II Water Microbiology** 1. Sources of microorganisms in water. 2. Fecal pollution of water. 3. Indicators of fecal pollution 4. Routine Bacteriological analysis of water. a. SPC b. Tests for Coli forms i) Qualitative test ii) Quantitative test – 5. Municipal water purification process and its significance. **Unit IIAir Microbiology**	Nil

		a. Source of microorganism b. Definitions of: Infectious dust, Droplets c. Samplingmethodsformicrobialexaminationofair	a. Source of microorganism b. Definitions of: Infectious dust, Droplets c. Samplingmethodsformicrobialexaminationofair	
	Practicals	1. Effect of Temperature on the growth of microorganisms 2. Effect of pH on the growth of microorganisms 3. . Effect of antibiotic on the growth of microorganisms 4. Screening of antibiotic producing microorganism 5. Micrometry	1. Effect of Temperature on the growth of microorganisms 2. Effect of pH on the growth of microorganisms 3. . Effect of antibiotic on the growth of microorganisms 4. Screening of antibiotic producing microorganism 5. Micrometry	**Nil**

Ms. M. M. Nadkarni

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

Shri Swami VivekanandShikshanSanstha's

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Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms.M. M. Nadkarni

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Theory	**B.Sc. III** **Paper XI AGRICULTURAL MICROBIOLOGY** **Unit I** 1. SoilMicrobiology. 2. Role of microorganisms inelemental cycle **Unit II** 1. Manure andCompost **Unit III** 1.Types, production, methods of application and uses- a. Biofertilizer b. Biopesticides 2. Biodegradation by bacteria & fungi- a. Cellulose b. Pesticides	**B.Sc. III** **Paper XI AGRICULTURAL MICROBIOLOGY** **Unit I** 1. SoilMicrobiology. 2. Role of microorganisms inelemental cycle **Unit II** 1. Manure andCompost **Unit III** 1.Types, production, methods of application and uses- a. Biofertilizer b. Biopesticides 2. Biodegradation by bacteria & fungi- a. Cellulose b. Pesticides	Nil

		Unit IV PlantPathology – a. Commonsymptomsproducedbyplantpathogens b. Modesoftransmissionofplantdisease c. Plant diseases– i. CitrusCanker ii. Tikkadisease ofgroundnut iii.BacterialBlightofPomegranate. iv. Control of plant disease caused by bacteria.	**Unit IV** PlantPathology – a. Commonsymptomsproducedbyplantpathogens b. Modesoftransmissionofplantdisease c. Plant diseases– i. CitrusCanker ii. Tikkadisease ofgroundnut iii.BacterialBlightofPomegranate. iv. Control of plant disease caused by bacteria.	
		Practical V Section III -: Agriculture Microbiology 1. Isolation of *Rhizobium.* 2. Isolation of *Azotobacter* 3. Isolation of *Xanthomonas* 4. Isolation of Phosphate solubilizing bacteria 5. Production of *Azotobacter* bio fertilizer 6. Estimation of Calcium 7. Estimation of Magnesium 8. Estimation of Organic carbon.	**Practical V Section III -: Agriculture Microbiology** 1. Isolation of *Rhizobium.* 2. Isolation of *Azotobacter* 3. Isolation of *Xanthomonas* 4. Isolation of Phosphate solubilizing bacteria 5. Production of *Azotobacter* bio fertilizer 6. Estimation of Calcium 7. Estimation of Magnesium 8. Estimation of Organic carbon.	**Nil**

Ms. M. M. Nadkarni

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Dr. T. C. Kanpale
Department of Microbiology
Vivekanand College, Kolhapur
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Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms. M. M. Nadkarni

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B.Sc. I** **UNIT I: Microbial Nutrition** 1. Nutritional requirements of microorganisms. 2. Nutritional types of microorganism based on carbon and energy sources. **UNIT II Culture Media:** 1. Components of media 2. Types of media based on- 3. Cultivation of microorganisms:	**B.Sc. I** **UNIT I: Microbial Nutrition** 3. Nutritional requirements of microorganisms. 4. Nutritional types of microorganism based on carbon and energy sources. **UNIT II Culture Media:** 4. Components of media 5. Types of media based on- Cultivation of microorganisms:	Nil
	Practicals	1. Isolation of *Bacillus spp.*	Isolation of *Bacillus spp.*	Nil

Ms. M. M. Nadkarni

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Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
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Shri Swami VivekanandShikshanSanstha's

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Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms. M. M. Nadkarni

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B.Sc. II Paper VII Medical Microbiology** **UNIT I – Medical microbiology** A. Definitions– Host, Parasite, Saprophytes, Commensal, Infection, Etiological agent, Disease, Pathogen, Opportunistic pathogen, True pathogen, Virulence, Pathogenicity, Fomite, Incubation period, Carriers, Morbidity rate, Mortality rate, epidemiology, etiology, Prophylaxis, Antigen, Antibody, Hapten, Vaccine, Immunity. B. Virulence factors- C. Types of infections– D. Types of diseases **Unit II -Transmission of diseases**	**B.Sc. II Paper VII Medical Microbiology** **UNIT I – Medical microbiology** A. Definitions– Host, Parasite, Saprophytes, Commensal, Infection, Etiological agent, Disease, Pathogen, Opportunistic pathogen, True pathogen, Virulence, Pathogenicity, Fomite, Incubation period, Carriers, Morbidity rate, Mortality rate, epidemiology, etiology, Prophylaxis, Antigen, Antibody, Hapten, Vaccine, Immunity. B. Virulence factors- C. Types of infections– D. Types of diseases **Unit II -Transmission of diseases**	Nil

		A. Modes of transmission of diseases B. General principles of prevention and control of microbial diseases. C. Normal flora of human body& its significance (Flora of skin, throat, GI tract & Urogenital tract). Concept of antibiosis.	A. Modes of transmission of diseases B. General principles of prevention and control of microbial diseases. C. Normal flora of human body& its significance (Flora of skin, throat, GI tract & Urogenital tract). Concept of antibiosis.	
	Practicals	1. To prepare Peptone nitrate broth 2. To prepare Hugh and Leifson's medium 3. Nitrate reductase test 4. Hugh and Leifson's test 5. Isolation and identification of *Salmonella species* from clinical sample. 6. Serological tests-Widal test–qualitative slide test.	1. To prepare Peptone nitrate broth 2. To prepare Hugh and Leifson's medium 3. Nitrate reductase test 4. Hugh and Leifson's test 5. Isolation and identification of *Salmonella species* from clinical sample. 6. Serological tests-Widal test–qualitative slide test.	**Nil**

Ms. M. M. Nadkarni

VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 Autonomous

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

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- ShikshanmaharshiDr.BapujiSalunkhe

Shri Swami VivekanandShikshanSanstha's

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Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms. M. M. Nadkarni

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Theory	**B.Sc. III Paper XVI Environmental Microbiology** **Unit I** 1.General characteristics of waste- a. Liquid waste -. b. Solid waste- c. Standards as per MPCB 2.Eutrophication. **Unit II** Sewage Microbiology a. Physico-chemical and biological characteristics	**B.Sc. III Paper XVI Environmental Microbiology** **Unit I** 1.General characteristics of waste- a. Liquid waste -. b. Solid waste- c. Standards as per MPCB 2.Eutrophication. **Unit II** Sewage Microbiology a. Physico-chemical and biological characteristics	**Nil**

		b. Treatment methods -Physical treatment, biological treatment, Chemical treatment **Unit III** 1.Biological safety in laboratory a. Good Laboratory Practices b. Bio safety levels (BSL) 2. Environmental monitoring 3. Environmental Impact Assessment- **Unit IV** 1.Characteristics and treatment of waste generated by Hospitals 2. Bioremediation 3. Bioleaching	b. Treatment methods -Physical treatment, biological treatment, Chemical treatment **Unit III** 1.Biological safety in laboratory a. Good Laboratory Practices b. Bio safety levels (BSL) 2. Environmental monitoring 3. Environmental Impact Assessment- **Unit IV** 1. Characteristics and treatment of waste generated by Hospitals 2. Bioremediation 3. Bioleaching	
		Practicals DSC 1. Determination of COD 2. Determination of BOD 3. Determination of TS 4. Determination of TSS &TDS 5. Determination of TVS & TFS 6. Determination of hardness of sewage 7. Isolation of oil degrading microbes 8. Demonstration of surface monitoring 9. Determination of H2S test of sewage	**Practicals DSC** 1. Determination of COD 2. Determination of BOD 3. Determination of TS 4. Determination of TSS &TDS 5. Determination of TVS & TFS 6. Determination of hardness of sewage 7. Isolation of oil degrading microbes 8. Demonstration of surface monitoring 9. Determination of H2S test of sewage	**Nil**

		Practicals VSC 1. Determination of alkalinity of sewage 2. Determination of acidity of sewage 3. Determination of calcium content of sewage 4. Determination of coagulant dosage of sewage 5. Determination of temperature, pH, color and odor of sewage	**Practicals VSC** 1. Determination of alkalinity of sewage 2. Determination of acidity of sewage 3. Determination of calcium content of sewage 4. Determination of coagulant dosage of sewage 5. Determination of temperature, pH, color and odor of sewage	

Ms. M. M. Nadkarni

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Syllabus Completion report 2025-26

Name of Teacher: Ms. S. S. Shaikh

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B. Sc. I** **Paper II: Bacteriology** **UNIT II Control of Microorganisms** 1. Definitions 2. Mode of action and application of a) Physical agents: (i) Temperature (ii) Dessication a) Physical agents (iii) Ultrasonication (iv) Radiations (v) Filtration b) Chemical agents: (i) Phenol and phenolic compounds (ii) Alcohols	**B. Sc. I** **Paper II: Bacteriology** **UNIT II Control of Microorganisms** 1. Definitions 2. Mode of action and application of a) Physical agents: (i) Temperature (ii) Dessication a) Physical agents (iii) Ultrasonication (iv) Radiations (v) Filtration b) Chemical agents: (i) Phenol and phenolic compounds (ii) Alcohols	**Nil**

		b) Chemical agents: (iii) Halogen compounds (iv) Heavy metals (v) Fumigation by gaseous agents (vi) Osmotic Pressure	b) Chemical agents: (iii) Halogen compounds (iv) Heavy metals (v) Fumigation by gaseous agents (vi) Osmotic Pressure	
	Practicals	**DSC MICRO PR-I MICROBIOLOGY LAB I** **Introduction to Microbiology and Bacteriology** 1. Study of compound microscope. 2. Study of laboratory instruments used in the microbiology laboratory.	**DSC MICRO PR-I MICROBIOLOGY LAB I** **Introduction to Microbiology and Bacteriology** 1. Study of compound microscope. 2. Study of laboratory instruments used in the microbiology laboratory.	**Nil**

Ms. S. S. Shaikh

VIVEKANAND COLLEGE KOLHAPUR (Autonomous)
ESTD JUNE 1964

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
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Syllabus Completion report 2025-26

Name of Teacher: Ms. S. S. Shaikh

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	Unit I Industrial and Water Microbiology Industrial Microbiology A. Basic concepts of fermentation. B. Fermentation Media: C. Screening of industrially important microorganisms. UNIT IV Applied microbiology A. Bioinstrumentation: Principle, working and application of A. Electrophoresis (Agarose gel, PAGE) B. U.V. –visible spectrophotometer. B. Bioinformatics: 1. Introduction of basic terminologies-Database, Genomics and Proteomics. 2. Applications of bioinformatics C. Space Microbiology: Introduction & application	Unit I Industrial and Water Microbiology Industrial Microbiology A. Basic concepts of fermentation. B. Fermentation Media: C. Screening of industrially important microorganisms. UNIT IV Applied microbiology A. Bioinstrumentation: Principle, working and application of A. Electrophoresis (Agarose gel, PAGE) B. U.V. –visible spectrophotometer. B. Bioinformatics: 1. Introduction of basic terminologies-Database, Genomics and Proteomics. 2. Applications of bioinformatics	Nil

		D. Gnotobiology: Introduction	C. Space Microbiology: Introduction & application D. Gnotobiology: Introduction	
	Practicals	1. Effect of environmental factor on microorganisms: Heavy metals – Copper Salt (NaCl) 2. Spore staining (Dorner's method)	1. Effect of environmental factor on microorganisms: Heavy metals – Copper Salt (NaCl) 2. Spore staining (Dorner's method)	**Nil**

Ms. S. S. Shaikh

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
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- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

VIVEKANAND COLLEGE, KOLHAPUR (AN EMPOWERED AUTONOMOUS INSTITUTE)

Department of Microbiology (UG)

Syllabus Completion report 2025-26

Name of Teacher: Ms. S. S. Shaikh

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
2.	Theory	**B. Sc. III** **Paper XI- DSE:1010 E3 Industrial Microbiology** UNIT-I 1. **Food Microbiology** a. Food as a substrate for microorganisms. b. Foodborne diseases– c. Food spoilage and its causes. d. General principles of food preservation. UNIT-II 1. **Industrial Microbiology** a. Strain Improvement b. Scale up of fermentations c. Microbiological assays 2.Preservation of industrially important microorganisms	**B. Sc. III** **Paper XI- DSE:1010 E3 Industrial Microbiology** UNIT-I 1. **Food Microbiology** a. Food as a substrate for microorganisms. b. Foodborne diseases– c. Food spoilage and its causes. d. General principles of food preservation. UNIT-II 1. **Industrial Microbiology** a. Strain Improvement b. Scale up of fermentations c. Microbiological assays 2.Preservation of industrially important microorganisms	**Nil**

		Culture collection centers **UNIT III** **1. Industrial production of -** a. Amylase production b. Grape wine Production c. Penicillin production d. Citric acid production e. SCP by using yeast **2. Microbial production of** a. Vitamins b. Amino acids **3.Probiotics** **UNIT IV** 4.Downstream processing and Product Recovery 5.Testing of sterility, pyrogen, carcinogenicity, toxicity and allergens	Culture collection centers **UNIT III** **1. Industrial production of -** a. Amylase production b. Grape wine Production c. Penicillin production d. Citric acid production e. SCP by using yeast **2. Microbial production of** a. Vitamins b. Amino acids **3.Probiotics** **UNIT IV** 4.Downstream processing and Product Recovery 5.Testing of sterility, pyrogen, carcinogenicity, toxicity and allergens	
	Practical	**DSC Microbiology Lab-V. PRACTICALS BASED ON FOOD AND INDUSTRIALMICROBIOLOGY** 1. Production of wine. 2. Examination of wine for pH, color and alcohol content. 3.Determination of microflora of vegetables and fruits. 4. Isolation and detection of aflatoxins from given food sample. 5. Detection for the presence of yeast and mold from given sample.	**DSC Microbiology Lab-V. PRACTICALS BASED ON FOOD AND INDUSTRIALMICROBIOLOGY** 1. Production of wine. 2. Examination of wine for pH, color and alcohol content. 3.Determination of microflora of vegetables and fruits. 4. Isolation and detection of aflatoxins from given food sample. 5. Detection for the presence of yeast and mold from given sample.	**Nil**

		6. Sterility testing of pharmaceutical product. 7. Rapid detection of food pathogens (E.coli&Staphylococcus) from given food sample Minor: 1. Citric acid fermentation and recovery. 2. Estimation of citric acid by titration. 3. Amylase production by using Bacillus species. 4. Isolation of lactic acid bacteria from fermented food. 5. Sauerkraut production. 6. Examination of milk by Direct microscopic count (DMC) **PRACTICALS BASED ON SOIL MICROBIOLOGY** 1. Estimation of total nitrogen content of soil 2. Determination of water content of soil.	6. Sterility testing of pharmaceutical product. 7. Rapid detection of food pathogens (E.coli&Staphylococcus) from given food sample Minor: 1. Citric acid fermentation and recovery. 2. Estimation of citric acid by titration. 3. Amylase production by using Bacillus species. 4. Isolation of lactic acid bacteria from fermented food. 5. Sauerkraut production. 6. Examination of milk by Direct microscopic count (DMC) **PRACTICALS BASED ON SOIL MICROBIOLOGY** 1. Estimation of total nitrogen content of soil 2. Determination of water content of soil.	

Ms. S. S. Shaikh

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Dr. H. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B. Sc. I** **Paper IV: 2 DSC03 MIC22 Microbial Nutrition and Techniques** **UNIT II** **A. Enrichment and Isolation Of Micro-organisms from natural environment.** 1. Pure culture techniques- a. Streak plate b. Spread plate c. pour plate 2.Isolation and Cultivation of anaerobic organisms by using media components by exclusion of air. **B.Preservation of microbial culture by-** 1.Subculturing 2.Overlaying cultures with mineral oils 3.Storage at low temperatures 4.Lyophilization. **C. Systematic study of pure cultures:** 1.Morphological Characteristics	**B. Sc. I** **Paper IV: 2 DSC03 MIC22 Microbial Nutrition and Techniques** **UNIT II** **A. Enrichment and Isolation Of Microorganisms from natural environment.** 1. Pure culture techniques- a. Streak plate b. Spread plate c. pour plate 2.Isolation and Cultivation of anaerobic organisms by using media components by exclusion of air. **B.Preservation of microbial culture by-** 1.Subculturing 2.Overlaying cultures with mineral oils 3.Storage at low temperatures 4.Lyophilization **C. Systematic study of pure cultures:** 1.Morphological Characteristics 2. Cultural Characteristics –	Nil

		Colony on solid media, growth in liquid media. 3. Biochemical Characteris[illegible]- i) Sugar fermentation ii) H2S gas production iii)Detection of enzyme activity- Amylase Caseinase Catalase 4. Serological characters **D. Concept of Culture collection centres.**	media. 3.Biochemical Characteristics- i) Sugar fermentation ii) H2S gas production iii)Detection of enzyme activity- Amylase Caseinase Catalase 4.Serological characters **D. Concept of Culture collection centres.**	
	Practicals	**DSC MICRO PR-I MICROBIOLOGY LAB II** **Introduction to Microbiology and Bacteriology** 1. Biochemical tests: i) Detection of H2S production of ability of bacteria 2. Isolation of actinomycetes from soil by slide culture technique	**DSC MICRO PR-I MICROBIOLOGY LAB II** **Introduction to Microbiology and Bacteriology** 1. Biochemical tests: i) Detection of H2S production of ability of bacteria 2. Isolation of actinomycetes from soil by slide culture technique.	**Nil**

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Dr. T. C. Gaupale
I/C Head
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Vivekanand College, Kolhapur
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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Practicals	**BS.c II** **DSC-VII Medical Microbiology-I** **Unit III A. Immunity:** 1. Definition 2. Innate Immunity-types, factors influencing innate immunity 3. Acquired Immunity– Active & passive B. Non Specific defense mechanisms of the vertebrate body 1. First line of defense 2. Second line of defense C.Organs of Immune system-Types of Primary and secondary lymphoid organs **UNIT IV Antigen And Antibodies** 8 A. Antigen-Chemical nature, types of antigens, factors affecting antigenicity. B.Antibody-Structure, properties and functions, types of	**BS.c II** **DSC-VII Medical Microbiology-I** **Unit III A. Immunity:** 1. Definition 2. Innate Immunity-types, factors influencing innate immunity 3. Acquired Immunity– Active & passive B. Non Specific defense mechanisms of the vertebrate body 1. First line of defense 2. Second line of defense C.Organs of Immune system-Types of Primary and secondary lymphoid organs **UNIT IV Antigen And Antibodies** 8 A. Antigen-Chemical nature, types of antigens, factors affecting antigenicity. B.Antibody-Structure, properties and functions, types of	**Nil**

		C. Theories of antibody productio g D. Mechanism of antigen–antibody reaction–Lattice hypothesis. E. Types of antigen antibody reaction-Agglutination & Precipitation. F. Immune Response: Primary and secondary immune responses **DSC03 MIC49 Microbiology lab 4** 1.Preparation of media: Phenylalanine deamination media, Christensens urea agar, Egg-Yolk agar. 1.Biochemical tests: (i) Phenylalanine deamination test (ii) urease test (iii) Lecithinase test 2.Isolation and identification of pathogenic microorganisms from clinical sample. (a)*Salmonella* species	C. Theories of antibody production. D. Mechanism of antigen–antibody reaction–Lattice hypothesis. E. Types of antigen antibody reaction-Agglutination & Precipitation. F. Immune Response: Primary and secondary immune responses **DSC03 MIC49 Microbiology lab 4** 1.Preparation of media: Phenylalanine deamination media, Christensens urea agar, Egg-Yolk agar. 1.Biochemical tests: (iv) Phenylalanine deamination test (v) urease test (vi) Lecithinase test 2.Isolation and identification of pathogenic microorganisms from clinical sample. (a)*Salmonella* species	

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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
2.	Theory	**B. Sc. III** DSC-XIII Microbial Biochemistry **UNIT I** 1. Enzymes a. Definition, properties, structure, specificity, classification and mechanism of action (Lock &Key, Induced fithypothesis) b.Allosteric enzymes Definition, properties, models explaining mechanism of action. c. Ribozymes –concept, significance. d. Isozymes- definition, properties, example. e. Factors affecting catalytic efficiency of enzymes i. Proximity and orientation ii. Strain and distortion. iii. Acid base catalysis iv. Covalent catalysis f. Enzyme kinetics-Derivation of Michaelis Menten equation, Lineweaver Burk Plot, Significance of Km & Vmax. g. Regulation of enzyme synthesis. i. Positive control - Ara operon ii. Negative control -Lac operon iii. Catabolite repression	**B. Sc. III** DSC-XIII Microbial Biochemistry **UNIT I** 1. Enzymes a. Definition, properties, structure, specificity, classification and mechanism of action (Lock &Key, Induced fithypothesis) b.Allosteric enzymes Definition, properties, models explaining mechanism of action. c. Ribozymes –concept, significance. d. Isozymes- definition, properties, example. e. Factors affecting catalytic efficiency of enzymes i. Proximity and orientation ii. Strain and distortion. iii. Acid base catalysis iv. Covalent catalysis f. Enzyme kinetics-Derivation of Michaelis Menten equation, Lineweaver Burk Plot, Significance of Km & Vmax. g. Regulation of enzyme synthesis. i. Positive control -Ara operon ii. Negative control -Lac operon iii. Catabolite repression	Nil

		1.Extraction &purification of enzymes. a. Methods of extraction of intracellular and extracellular enzymes. i. Choice of source and biomass development ii. Methods of homogenization- cell disruption methods iii. Purification of enzymes on the basis of- •Molecular size • Solubilitydifference • Electricalcharge • Adsorption characteristic differences 2. Assay of enzymes-Based on substrate and product estimation. 3. Immobilization of enzymes-Methods & applications 4. Confirmation of purified enzymes **UNIT III** 1. Basic concepts of a. Glyoxylate bypass b. Phosphoketolase pathway c. Bioluminescence–Occurrence, mechanism & applications. 2. Assimilation of a.Carbon b.NitrogenwithrespecttoN2andNH3(GOGAT) c.Sulphur **UNIT IV** 1. Prokaryotic Biosynthesis of a.RNA b.DNA c.Proteins d. Peptidoglycan	1.Extraction &purification of enzymes. a. Methods of extraction of intracellular and extracellular enzymes. i. Choice of source and biomass development ii. Methods of homogenization- cell disruption methods iii. Purification of enzymes on the basis of- •Molecular size • Solubilitydifference • Electricalcharge • Adsorption characteristic differences 2. Assay of enzymes-Based on substrate and product estimation. 3. Immobilization of enzymes-Methods & applications 4. Confirmation of purified enzymes **UNIT III** 1. Basic concepts of a. Glyoxylate bypass b. Phosphoketolase pathway c. Bioluminescence–Occurrence, mechanism & applications. 2. Assimilation of a.Carbon b.NitrogenwithrespecttoN2andNH3(GOGAT) c.Sulphur **UNIT IV** 1. Prokaryotic Biosynthesis of a.RNA b.DNA c.Proteins d. Peptidoglycan	

	Practical	**PRACTICALS BASED ON BIOCHEMISTRY** Major: 1. Assay of amylase by DNSA method(graphical estimation) 2. Immobilization of enzymes by sodium alginate method. 3. Bio-assay of Vitamin B12 4. Bio-assay of Penicillin. 5. Protein purification by using ammonium sulfate precipitation. Minor : 1.Seperation and detection of amino acid by TLC 2. Effect of activator on enzyme activity 3. Effect of inhibitor on enzyme activity. 4. Effect of pH on enzyme activity. 5. Effect of temperature on enzyme activity	**PRACTICALS BASED ON BIOCHEMISTRY** Major: 1. Assay of amylase by DNSA method(graphical estimation) 2. Immobilization of enzymes by sodium alginate method. 3. Bio-assay of Vitamin B12 4. Bio-assay of Penicillin. 5. Protein purification by using ammonium sulfate precipitation. Minor : 1.Seperation and detection of amino acid by TLC 2. Effect of activator on enzyme activity 3. Effect of inhibitor on enzyme activity. 4. Effect of pH on enzyme activity. 5. Effect of temperature on enzyme activity	**Nil**

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I/C Head
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Syllabus completion report

Name of Teacher: Ms. P. P. Patil

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B.Sc. I** **Paper I Introduction Microbiology** **Unit 3: Bacterial Cell Organization** 1. Cell size, shape and arrangement. 2. Reserve food materias- a) Nitrogenous b) Non- nitrogenous **Unit 4: Cytology of Bacteria** 3. Structure and Function of- a) Cell-wall b) Cell membrane c) Capsule and slime layer. d)Flagella and Pili e) Ribosomes f) Mesosomes g) Inclusion bodies h) Nucleoid, chromosome and plasmids i) Endospore	**B.Sc. I** **Paper I Introduction Microbiology** **Unit 3: Bacterial Cell Organization** 3. Cell size, shape and arrangement. 4. Reserve food materias- c) Nitrogenous d) Non- nitrogenous **Unit 4: Cytology of Bacteria** 3. Structure and Function of- a) Cell-wall b) Cell membrane c) Capsule and slime layer. d)Flagella and Pili e) Ribosomes f) Mesosomes g) Inclusion bodies h) Nucleoid, chromosome and plasmids i) Endospore	Nil

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Name of Teacher: Ms. P. P. Patil

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1.	Practical	2DSC MICRO PR-I MICROBIOLOGY LAB-I 6) Preparation of liquid and solid culture media-. a) Agar plates b) Slants c) Peptone water d) Nutrient broth e) Nutrient agar f) Sabourauds agar g) Potato Dextrose agar h) Glucose yeast extract agar; i) MacConkey's agar. Microscopic observation of bacteria: Gram's Staining Detection of enzyme production ability of bacteria- i)Catalase ii) Caseinase.	2DSC MICRO PR-I MICROBIOLOGY LAB-I 6) Preparation of liquid and solid culture media-. a) Agar plates b) Slants c) Peptone water d) Nutrient broth e) Nutrient agar f) Sabourauds agar g) Potato Dextrose agar h) Glucose yeast extract agar; i) MacConkey's agar. Microscopic observation of bacteria: Gram's Staining Detection of enzyme production ability of bacteria- i) Catalase ii) Caseinase.	Nil

Ms. P. P. Patil

PPPatil

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Dr. T. C. Gaupale

I/C Head

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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Practicals	2 DSC 03 MIC 39 Microbiology Lab - 3 1. Effect of Temperature on the growth of microorganisms 2. Effect of pH on the growth of microorganisms 3. Screening of amylase producing microorganism. 4. Determination f growth phases of *E.coli* by Optical density. 5. Biostatistics – Measures of central tendency: Mean. Median and Mode 6. Nucleus staining (Giemsa's method) using yeast cells.	2 DSC 03 MIC 39 Microbiology Lab - 3 7. Effect of Temperature on the growth of microorganisms 8. Effect of pH on the growth of microorganisms 9. Screening of amylase producing microorganism. 10. Determination f growth phases of *E.coli* by Optical density. 11. Biostatistics – Measures of central tendency: Mean, Median and Mode 12. Nucleus staining (Giemsa's method) using yeast cells.	Nil

		2VSC 03 MIC 39 Analytical Microbiology 1. Preparation of Molar and Normal Solution of HCLand NaOH 2. Preparation of Phosphate buffer 3. Demonstration of analytical instruments-Spectrophotometer. 4. Estimation of protein by Biuret method 5. Estimation of carbohydrates by Molish methods. 6. Estimation of RNA by Orcinol method 7. Estimation of DNA by diphenyl amine method 8. Estimation of amino acids by Ninhydrine method 9. Calibration of colorimeter (Verification of Beer's law) 10. Determination of absorption maxima. 11. Determination of Molar extinction coefficient.	2VSC 03 MIC 39 Analytical Microbiology 1. Preparation of Molar and Normal Solution of HCLand NaOH 2. Preparation of Phosphate buffer 3. Demonstration of analytical instruments-Spectrophotometer. 4. Estimation of protein by Biuret method 5. Estimation of carbohydrates by Molish methods. 6. Estimation of RNA by Orcinol method 7. Estimation of DNA by diphenyl amine method 8. Estimation of amino acids by Ninhydrine method 9. Calibration of colorimeter (Verification of Beer's law) 10. Determination of absorption maxima. 11. Determination of Molar extinction coefficient.	

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Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Theory	**B.Sc. III** **Paper X VIROLOGY** **Unit I The Structural properties of viruses:** Capsids, Nucleic acidsand envelope. b. Structure of T4 bacteriophage, TMV and HIV, Viroids&prions. c. One step growth experiment	**B.Sc. III** **Paper X VIROLOGY** **Unit I The Structural properties of viruses:** Capsids, Nucleic acidsand envelope. b. Structure of T4 bacteriophage, TMV and HIV, Viroids&prions. c. One step growth experiment	Nil
		Unit IIIsolation, cultivation and Purification of viruses a.Isolation and cultivation of viruses - i.Animal virus - Tissue culture, chick embryo and live animals. ii. Plant virus – Protoplasts culture technique, Insect tissueculture iii. Bacteriophages - Plaque method. b.Purification of viruses using physico-chemical properties	**Unit IIIsolation, cultivation and Purification of viruses** a.Isolation and cultivation of viruses - i.Animal virus - Tissue culture, chick embryo and live animals. ii. Plant virus – Protoplasts culture technique, Insect tissueculture iii. Bacteriophages - Plaque method. b.Purification of viruses using physico-chemical	Nil

		i.Density gradient centrifugati ii. Precipitation **Methods of Enumeration of viruses** i. Latex droplet method (Direct microscopic count) ii . Plaque and pock method	properties i.Density gradient centrifugation ii. Precipitation **Methods of Enumeration of viruses** i. Latex droplet method (Direct microscopic count) ii . Plaque and pock method	
	Practicals	**DSC-PR-VDSC03MIC59** 1. Isolation of Coliphages from sewage. 2. Demonstration of viruses inoculation by chick embryo technique	**DSC-PR-VDSC03MIC59** 1. Isolation of Coliphages from sewage. 2. Demonstration of viruses inoculation by chick embryo technique	**Nil**

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I/C Head
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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
1.	Theory	**B.Sc. III (Sem VI)** **Paper XIV: Medical Microbiology** **Unit 1: Morphology, cultural and biochemical characteristics, antigenic structure, modes of transmission and pathogenesis, symptoms, laboratory diagnosis, prevention and control of diseases caused by** – *a. Mycobacterium leprae* *b. Clostridium perfringens,* *c. Treponema pallidum* **Unit 2: Morphology, cultural and biochemical characteristics, antigenic structure, modes of transmission and pathogenesis, symptoms, laboratory diagnosis, prevention and control of diseases caused by** – *a. Pseudomonas aeruginosa* *b. Vibrio cholera* *c .Streptococcus mutans* *d. Helicobacter pylori.*	**B.Sc. III (Sem VI)** **Paper XIV: Medical Microbiology** **Unit 1: Morphology, cultural and biochemical characteristics, antigenic structure, modes of transmission and pathogenesis, symptoms, laboratory diagnosis, prevention and control of diseases caused by** – *a. Mycobacterium leprae* *b. Clostridium perfringens,* *c. Treponema pallidum* **Unit 2: Morphology, cultural and biochemical characteristics, antigenic structure, modes of transmission and pathogenesis, symptoms, laboratory diagnosis, prevention and control of diseases caused by** – *a. Pseudomonas aeruginosa* *b. Vibrio cholera* *c .Streptococcus mutans* *d. Helicobacter pylori.*	**Nil**

		Unit 3: Morphology, cultural and biochemical characteristics, antigenic structure, modes of transmission and pathogenesis, symptoms, laboratory diagnosis, prevention and control of diseases caused by – a. Protozoa: Plasmodium falciparum (malaria) b. Viruses: i) Hepatitis A & B virus ii) Rabies virus iii) Dengue virus c. Fungi: Candida albicans **Unit 4: 1. Chemotherapy** a. General principles of chemotherapy b.Mode of action of Penicillin, Streptomycin, Bacitracin, sulphonamide and Quinolones on microorganisms. c. Antiviral drug: AZT d. Antifungal drugs: Ketoconazole e. Antiprotozoal drugs: Metronidazole f. Mechanism of drug resistance g. Chemoprophylaxis **2. Gene therapy** – Concept, advantages & disadvantages. **3. Immunoprophylaxis** – Vaccines and Immune Sera a. Vaccines - live attenuated, heat killed, subunit, conjugate and DNA vaccines b. Immune Sera – examples with applications	**Unit 3: Morphology, cultural and biochemical characteristics, antigenic structure, modes of transmission and pathogenesis, symptoms, laboratory diagnosis, prevention and control of diseases caused by** – a. Protozoa: Plasmodium falciparum (malaria) b. Viruses: i) Hepatitis A & B virus ii) Rabies virus iii) Dengue virus c. Fungi: Candida albicans **Unit 4: 1. Chemotherapy** a. General principles of chemotherapy b.Mode of action of Penicillin, Streptomycin, Bacitracin, sulphonamide and Quinolones on microorganisms. c. Antiviral drug: AZT d. Antifungal drugs: Ketoconazole e. Antiprotozoal drugs: Metronidazole f. Mechanism of drug resistance g. Chemoprophylaxis **2. Gene therapy** – Concept, advantages & disadvantages. **3. Immunoprophylaxis** – Vaccines and Immune Sera a. Vaccines - live attenuated, heat killed, subunit, conjugate and DNA vaccines b. Immune Sera – examples with applications	

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1.	Practicals	**B.Sc III (Sem VI)** **DSC-PR-VI DSC03MIC69** **Section III – Medical Microbiology** **Major:** **1. Isolation of following pathogens from clinical samples (wherever possible) and identification of the same by morphological, cultural and biochemical characteristics.** *a. Pseudomonas aeruginosa* *b Klebsiella pneumonia* *c. Candida albicans* yeast cells.	**B.Sc III (Sem VI)** **DSC-PR-VI DSC03MIC69** **Section III – Medical Microbiology** **Major:** **1. Isolation of following pathogens from clinical samples (wherever possible) and identification of the same by morphological, cultural and biochemical characteristics.** *a. Pseudomonas aeruginosa* *b Klebsiella pneumonia* *c. Candida albicans* yeast cells.	**Nil**

		Minor: **1. Serological tests :** a. Widal test - Quantitative b. Demonstration of Enzyme Linked Immunosorbent Assay (ELISA) **2. Urine analysis** a. Physical and chemical examination of urine. b. Test for protein (Acetic acid test) c. Test for ketone bodies (Rothra's test) d. Test for bile salt.	**Minor:** **1. Serological tests :** a. Widal test - Quantitative b. Demonstration of Enzyme Linked Immunosorbent Assay (ELISA) **2. Urine analysis** a. Physical and chemical examination of urine. b. Test for protein (Acetic acid test) c. Test for ketone bodies (Rothra's test) d. Test for bile salt.	

Ms. P. P. Patil

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I/C Head
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1.	Practical	**B.Sc II (Sem IV)** **2 VSC 03 MIC 39 Water and Milk Microbiology** 1. Enumeration of bacteria from milk by SPC method 2. Direct Microscopic Count (DMC) of Milk 3. Detection of presence of Coliform in milk. 4. Detection of presence of Yeast and Mold in milk. 5. MBRT test. 6. MPN 7. Qualitative test of water: 8. IMViC **2 DSC 03 MIC 49 Microbiology Lab – 4** 1. Preparation of media: Gelatin agar, Amino acid decarboxylation media, Amino acid deamination media, Arginine broth, Mannitol salt agar. 2. Biochemical tests : (i) Gelatin hydrolysis test. (ii) Amino acid decarboxylation test (iii) Amino acid deamination test (iv) Arginine hydrolysis test	**B.Sc II (Sem IV)** **2 VSC 03 MIC 39 Water and Milk Microbiology** 1. Enumeration of bacteria from milk by SPC method 2. Direct Microscopic Count (DMC) of Milk 3. Detection of presence of Coliform in milk. 4. Detection of presence of Yeast and Mold in milk. 5. MBRT test. 6. MPN 7. Qualitative test of water: 8. IMViC **2 DSC 03 MIC 49 Microbiology Lab – 4** 1. Preparation of media: Gelatin agar, Amino acid decarboxylation media, Amino acid deamination media, Arginine broth, Mannitol salt agar. 2. Biochemical tests : (i) Gelatin hydrolysis test. (ii) Amino acid decarboxylation test (iii) Amino acid deamination test (iv) Arginine hydrolysis test	**Nil**

		3. Isolation and identification of pathogenic microorganisms from clinical sample: *S. aureus*	3. Isolation and identification of pathogenic microorganisms from clinical sample: *S. aureus*	

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Ms. P. P. Patil

VIVEKANAND COLLEGE KOLHAPUR (Empowered Autonomous) ESTD JUNE 1964

Gaupale

Dr. T. C. Gaupale
I/C Head
Department of Microbiology
Vivekanand College, Kolhapur
(Empowered Autonomous)

"Dissemination of Education for Knowledge, Science and Culture"

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Microbiology (UG)

Academic Year 2025-26

Syllabus completion report

Name of Teacher: Ms. A. T. Patil

Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Theory	**B.Sc II** **Paper VI Microbial Physiology** **Unit 3 : Microbial Metabolism** 1. Catabolism of Glucose A. EMP, B. HMP, C. ED and D. TCA Cycle	**B.Sc II** **Paper VI Microbial Physiology** **Unit 3 : Microbial Metabolism** 2. Catabolism of Glucose A. EMP, B. HMP, C. ED and D. TCA Cycle	

		Unit 4 : Fermentation A. Fermentation :- Homolactic and Heterolactic Fermentation B. Bacterial electron transport chain – Components , flow of electrons and mechanism of ATP generation C. Chemiosmotic Hypothesis	**Unit 4 : Fermentati** A. Fermentation :- Homolactic and Heterolactic Fermentation B. Bacterial electron transport chain – Components , flow of electrons and mechanism of ATP generation C. Chemiosmotic Hypothesis	
	Practicals	**2 DSC 03 MIC 39 Microbiology Lab - 3** 1. Effect of salt on the growth of microorganisms 2. Effect of heavy metals on the growth of microorganisms 3. Effect of antibiotics on growth of microorganisms 4. Screening of antibiotic producing microorganism from soil. 5. Study of diauxic growth 6. Biostatistics – Measures of central tendency: Mean, Medianand Mode 7. Micrometry 8. Nucleus staining (Giemsa's method) using	**2 DSC 03 MIC 39 Microbiology Lab - 3** 1. Effect of salt on the growth of microorganisms 2. Effect of heavy metals on the growth of microorganisms 3. Effect of antibiotics on growth of microorganisms 4. Screening of antibiotic producing microorganism from soil. 5. Study of diauxic growth 6. Biostatistics – Measures of central tendency: Mean, Median and Mode 7. Micrometry 8. Nucleus staining (Giemsa's method) using yeast cells.	**Nil**

		yeast cells. 9. Spore staining (Dorner's Method) 10. Flagella staining (Baileys's method) **2VSC 03 MIC 39 Analytical Microbiology** 1. Preparation of Molar and Normal Solution of HCL and NaOH 2. Preparation of Phosphate buffer 3. Estimation of protein by Biuret method 4. Estimation of carbohydrates by Molish methods. 5. Estimation of RNA by Orcinol method 6. Estimation of DNA by diphenyl amine method 7. Estimation of amino acids by Ninhydrine method. 8. Determination of absorption maxima. 9. Determination of Molar extinction coefficient.	9. Spore staining (Dorner's Method) 10. Flagella staining (Baileys's method) **2VSC 03 MIC 39 Analytical Microbiology** 1. Preparation of Molar and Normal Solution of HCL and NaOH 2. Preparation of Phosphate buffer 3. Estimation of protein by Biuret method 4. Estimation of carbohydrates by Molish methods. 5. Estimation of RNA by Orcinol method 6. Estimation of DNA by diphenyl amine method 7. Estimation of amino acids by Ninhydrine method. 8. Determination of absorption maxima. 9. Determination of Molar extinction coefficient.	

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	Theory	**B.Sc. III** **Paper X VIROLOGY** **Unit III** 1. **Lysogeny**- Definition of lysogeny and temperate phage, types, lysogeny by lambda phage - adsorption & penetration, genetic map for lysogenic interaction, expression of λ genes, establishment of repression, maintenance of repression, integration of λ genome in host chromosome 2. Reproduction of animal viruses - Adenovirus. 3. Reproduction of plant viruses – TMV. 4. Reproduction of T4 phage	**B.Sc. III** **Paper X VIROLOGY** **Unit III** 1. **Lysogeny**- Definition of lysogeny and temperate phage, types, lysogeny by lambda phage - adsorption & penetration, genetic map for lysogenic interaction, expression of λ genes, establishment of repression, maintenance of repression, integration of λ genome in host chromosome 2. Reproduction of animal viruses - Adenovirus. 3. Reproduction of plant viruses – TMV. 4. Reproduction of T4 phage	Nil

		Unit IV **Oncogenesis-** a. Definition of oncogenesis b. Types of cancer c. Characteristics of cancer cells. d. Tumor suppressor genes and protooncogenes e. Hypothesis about cancer. I. Somatic mutation hypothesis II. Viral gene hypothesis i. Role of DNA viruses with special emphasis on Papova viruses ii. Role of RNA tumor viruses iii. Provirus theory, Protovirus theory, Oncogene theory. III. Defective immunity hypothesis.	**Unit IV** **Oncogenesis-** a. Definition of oncogenesis b. Types of cancer c. Characteristics of cancer cells. d. Tumor suppressor genes and protooncogenes e. Hypothesis about cancer. I. Somatic mutation hypothesis II. Viral gene hypothesis i. Role of DNA viruses with special emphasis on Papova viruses ii. Role of RNA tumor viruses iii. Provirus theory, Protovirus theory, Oncogene theory. III. Defective immunity hypothesis.	**Nil**
	Practicals	1. One Step Growth Experiment	1. One Step Growth Experiment	**Nil**

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Head
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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Practical	**B.Sc I Sem II** **DSC Micro PR-I Microbiology Lab -II** Isolation of pure culture of Bacteria by four quadrant streaking method and studies of colony characteristics , Gram staining and motility of – 1.*Escherichia coli*	**B.Sc I Sem II** Isolation of pure culture of Bacteria by four quadrant streaking method and studies of colony characteristics , Gram staining and motility of – 1.*Escherichia coli*	Nil

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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Practicals	**B.Sc II Sem IV** **DSC PR – II : 2 DSC 03MIC 49Microbiology Lab-4** 1. **Preparation of media –** Triple sugar iron agar, Gelatin agar, Arginine Broth, Mannitol salt agar 2. **Biochemical Tests-** a. Gelatin hydrolysis test b. Arginine hydrolysis test c. Coagulase test 3. **Isolation and identification of pathogenic microorganisms from clinical sample-** a) *Staphylococcus aureus* b) *Preoteus species*	**B.Sc II Sem IV** **DSC PR – II : 2 DSC 03MIC 49Microbiology Lab-4** 1. **Preparation of media –** Triple sugar iron agar, Gelatin agar, Arginine Broth, Mannitol salt agar 2. **Biochemical Tests-** a. Gelatin hydrolysis test b. Arginine hydrolysis test c. Coagulase test 3. **Isolation and identification of pathogenic microorganisms from clinical sample-** a)*Staphylococcus aureus* b)*Preoteus species*	Nil

		2 VSC 03 MIC 39 : Water and Milk Microbiology 1. Enumeration of bacteria from milk by SPC method 2. Direct Microscopic Count (DMC) of Milk 3. Detection of presence of Coliform in milk. 4. Detection of presence of Yeast and Mold in milk. 5. MBRT test. 6. Phosphatase test. 7. Resazurin Reduction Time Test 8. Enumeration of bacteria from water by SPC method 9. MPN 10. Qualitative test of water: IMViC	**2 VSC 03 MIC 39 : Water and Milk Microbiology** 1. Enumeration of bacteria from milk by SPC method 2. Direct Microscopic Count (DMC) of Milk 3. Detection of presence of Coliform in milk. 4. Detection of presence of Yeast and Mold in milk. 5. MBRT test. 6. Phosphatase test. 7. Resazurin Reduction Time Test 8. Enumeration of bacteria from water by SPC method 9. MPN 10. Qualitative test of water: IMViC	**Nil**

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Sr. No.	Theory/ Practical	Syllabus Allotted	Syllabus completed	Remaining syllabus
	Theory	**B.Sc. III Sem VI** **DSC 03 MIC 61: Paper XII : Microbial Genetics** **Unit I** 1. One cistron - one polypeptide hypothesis. 2. Molecular mechanism of gene expression- a .Concept of operon b. Pribnow box c. Genetic regulation in tryptophan operon	**B.Sc. III Sem VI** **DSC 03 MIC 61: Paper XII : Microbial Genetics** **Unit I** 3. One cistron - one polypeptide hypothesis. 4. Molecular mechanism of gene expression- a .Concept of operon b. Pribnow box c. Genetic regulation in tryptophan operon	Nil
		Unit II **1. Mutations** a. Expression of mutations – i. Time course of phenotypic expression.	**Unit II** **1. Mutations** a. Expression of mutations – i. Time course of phenotypic expression.	Nil

		ii. Conditional expression of mutation. b. Suppressor mutations (with examples) - Genetic and non-genetic. **2. Methods of isolation and detection of mutants based on -** a. Relative survival b. Relative growth c. Visual detection	ii. Conditional expression of mutation. b. Suppressor mutations (with examples) - Genetic and non-genetic. **2. Methods of isolation and detection of mutants based on -** a. Relative survival b. Relative growth c. Visual detection	
		Unit III- **1.Genetic complementation** - Cis-trans test **2.Extrachromosomal inheritance:** a. Kappa particles. b. Transposable elements - general properties and types. **3.Techniques in Molecular Biology –** a. DNA sequencing (Sanger's method) b. DNA Finger printing c. PCR	**Unit III-** **1.Genetic complementation** - Cis-trans test **2.Extrachromosomal inheritance:** a. Kappa particles. b. Transposable elements - general properties and types. **3.Techniques in Molecular Biology –** a. DNA sequencing (Sanger's method) b. DNA Finger printing c. PCR	**Nil**

		Unit IV- **Genetic engineering** **a. Introduction** **b. Tools of genetic engineering** i. Enzymes ii. Vectors-phage, plasmid and cosmid iii. DNA probe – methods of preparation and detection. iv. Linkers and adaptors v. Cloning organisms - (Bacteria and Yeasts) vi. Genomic library and cDNA library **c. Techniques –** i. Isolation of desired DNA segment- Shotgun Method, cDNA synthesis, Chemical synthesis ii. Construction of r-DNA using appropriate vector- Use of restriction enzymes, Linkers, Adaptors Homopolymer tails iii. Transfer to cloning organisms (Bacteria and Yeasts) iv. Selection of recombinant bacteria and yeasts – Blue and white screening, Colony hybridization technique. **d. Application of genetic engineering in –** i. Medicine- ii. Agriculture iii. Industry iv. Environment v. Understanding biology	**Unit IV-** **Genetic engineering** **a. Introduction** **b. Tools of genetic engineering** i. Enzymes ii. Vectors-phage, plasmid and cosmid iii. DNA probe – methods of preparation and detection. iv. Linkers and adaptors v. Cloning organisms - (Bacteria and Yeasts) vi. Genomic library and cDNA library **c. Techniques –** i. Isolation of desired DNA segment- Shotgun Method, cDNA synthesis, Chemical synthesis ii. Construction of r-DNA using appropriate vector- Use of restriction enzymes, Linkers, Adaptors Homopolymer tails iii. Transfer to cloning organisms (Bacteria and Yeasts) iv. Selection of recombinant bacteria and yeasts – Blue and white screening, Colony hybridization technique. **d. Application of genetic engineering in –** i. Medicine- ii. Agriculture iii. Industry iv. Environment v. Understanding biology	**Nil**

	Practical	**DSC-PR-VI DSC03MIC69: DSC Microbiology Lab-VI: Microbial Genetics** **Major:** 1. Effect of U.V. light on bacteria and graphical presentation of result. 2. Isolation of auxotrophic mutants by replica plate technique 3.Transfer of genetic material by transformation in *E. coli* 4.Isolation of chromosomal DNA from bacteria (J. Marmurs method) **Minor:** 1.Electrophoretic separation of DNA. 2. Isolation of streptomycin - resistant mutants (gradient plate technique) 3.Isolation of Lac negative mutants of *E. coli*	**DSC-PR-VI DSC03MIC69: DSC Microbiology Lab-VI: Microbial Genetics** **Major:** 1. Effect of U.V. light on bacteria and graphical presentation of result. 2. Isolation of auxotrophic mutants by replica plate technique 3.Transfer of genetic material by transformation in *E. coli* 4.Isolation of chromosomal DNA from bacteria (J. Marmurs method) **Minor:** 1.Electrophoretic separation of DNA. 2. Isolation of streptomycin - resistant mutants (gradient plate technique) 3.Isolation of Lac negative mutants of *E. coli*	**Nil**

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