

VIDHYADEEP UNIVERSITY (Anita)

Discipline Core Subject (DSC)

Institute Name: Vidhyadeep Institute of Science		Department Name: Microbiology			
Recommended Programs : B.Sc. Microbiology Sem IV					
Course Name	Microbes In Agriculture		Course Code	004302401	
Credit Hours	L	T	P	N	Total Credits
		3			
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)				
Effective From	June 2024				
Prerequisites (if any)	Basic Science				
Course Objectives	<ul style="list-style-type: none"> ✓ Understand about microbes in Agriculture. ✓ Understanding about Biofertilizers, Bioinsecticides, G. M. crops. ✓ To gain knowledge on several beneficial and harmful micro-organisms ✓ To have detailed idea about their cell structure, reproduction and mechanism of action ✓ To introduce micro-organism in agricultural system for building a pathway for sustainable agriculture. 				
Course Content	Unit I: Soil Microbiology: (10 Lect.) Soil as Microbial Habitat, Soil Profile and properties. Soil formation. Diversity and distribution of microorganisms in soil.				5 hours
	Unit II: Microbial Control of Soil Borne Plant Pathogens: Biocontrol mechanisms and ways, Microorganisms used as biocontrol agents against Microbial plant pathogens, Insects, Weeds				5 hours
	Unit III: Biofertilization, Phyto stimulation, Bioinsecticides Plant growth promoting bacteria, biofertilizers symbiotic (Bradyrhizobium, Rhizobium, Frankia), NonSymbiotic (Azospirillum, Azotobacter, Mycorrhizae, MHBs, Phosphate solubilizers, algae), Novel combination of microbes as biofertilizers, PGPRs.				7 hours
	Unit IV: Secondary Agriculture Biotechnology Biotechfeed, Silage, Biomanure, biogas, biofuels—advantages and processing parameters. Advantages, social and environmental aspects, Bt crops, golden rice, transgenic animals.				
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
References	<ul style="list-style-type: none"> ✓ Agrios. Plant Pathology. Academic Press. San Diego. ✓ R. S. Singh. Plant Disease Management. Oxford Press. ✓ Atlas and Bartha. Microbial Ecology: Fundamentals and Application. Cummins Science Publication. ✓ Maier, Pepper, Gerba. Environmental Microbiology. Academic Press. Coryne. Soil Microbiology. Delmor Thomson. Altman. Agriculture Biotechnology. Marcel Decker. ✓ Mahendra Rai. Handbook of Microbial Biofertilizer. Haworth Press. New York. ✓ Reddy. Bioinoculants for Sustainable Agriculture and Forestry. Scientific Publication. 				

Course Outcomes	<p>On completion of this course a student should be able to understand</p> <p>They will be able to learn about uses of microbiology in various sectors.</p> <p>They will be able to learn about use of microbiology in agriculture, industry etc.</p> <p>Develop oral and written communication skills.</p> <p>Undertake any responsibility as an individual. Knowledge and understanding of related norms and ethics.</p> <p>Demonstrate knowledge of project and finance management.</p>
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Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1																	K1
CO2			Y			Y	Y					Y			Y		K2
CO3		Y		Y				Y		Y			Y				K3, K4
CO4	Y					Y									Y	Y	K5, K6

High-3 Medium-2 Low-1
K₁ =>Remember K₂ =>Understand K₃ =>Apply K₄ =>Analyze K₅ =>Evaluate K₆ =>Create

VIDHYADEEP UNIVERSITY (Anita)

Discipline Core Subject (DSC)

Institute Name: Vidhyadeep Institute of Science		Department Name: Microbiology			
Recommended Programs : B.Sc. Microbiology Sem IV					
Course Name	Veterinary Microbiology		Course Code	004302403	
Credit Hours	L	T	P	N	Total Credits
		3			
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)				
Effective From	June 2024				
Prerequisites (if any)	Basic Science				
Course Objectives	<ul style="list-style-type: none"> ✓ Understanding the world of the veterinary microbiology ✓ Understanding various modes of their nutrition, transmission and applications of microorganisms ✓ Important in veterinary sciences. ✓ Veterinary Microbiology course is basically for those students who want to enhance them ✓ Understanding of the role of microbes in animal health and diseases. ✓ It provides insight into mechanisms of host-microbe interactions, diagnosis of diseases, and ✓ Development of vaccines that are essential for disease control. ✓ Courses provide students with skills in microbiological research, applied in the diagnosis, prevention, and treatment of diseases. 				
Course Content	Unit I: History & Scope: Introduction, History, and Scope of Veterinary Microbiology. Pathogen – concept and mechanism of pathogenesis. Disease – Concept of infection in general. National and international institutes of veterinary microbiology.				5 hours
	Unit II: Veterinary Animal: Types of Veterinary Animals: Bovines, Canines, Lapines, Equines, Felis, Reptiles, Rodents, Fishes etc. Common diseases in veterinary: Endemic, Exotic and Zoonotic disease.				5 hours
	Unit III: Bacterial, Fungal & Viral Disease: Bacterial diseases; Causes, Symptoms, treatment and prevention: Mastitis, Salmonellosis, Black quarter, Enterotoxaemia, Anthrax, Haemorrhagic septicemia. Viral and fungal diseases; Causes, Symptoms, treatment and prevention: Rabies, Ranikhet, Rinder pest, Avian influenza, Swine fever, FMD diseases.				7 hours
	Unit IV: Vaccination in Veterinary: History and development of veterinary vaccine. Conventional and advanced vaccines. Vaccines for bacterial diseases and Viral diseases. Recent developments in veterinary vaccine technology.				
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
References	<ul style="list-style-type: none"> ✓ Veterinary Microbiology 4th Edition By D. Scott McVey, Melissa Kennedy, M. M. 				

	<p>Chengappa and Rebecca Wilkes Veterinary Microbiology 4th Edition.</p> <ul style="list-style-type: none"> ✓ Animal Microbiology By HU Jianhe, XU Yanzhao, WANG Lei and WANG Qing ✓ General Microbiology- Powar and Daginawala (Vol. I and Vol. II) ✓ Text Book of Microbiology- Dubey and Maheswari
Course Outcomes	<p>On completion of this course a student should be able to understand</p> <p>CO1: Students will have sound knowledge of microbiology as an independent subject.</p> <p>CO2: They will be able to get job in different sectors like pharmacy, dairy, food processing etc wheremicrobiology is used.</p> <p>CO3: They will be able to open their own industry.</p> <p>CO4: They will be able to do better in agriculture.</p> <p>CO5: Overall the student of microbiology can work in different sectors in industry.</p>

Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1	Y																K ₁
CO2		Y	Y			Y	Y					Y			Y		K ₂
CO3				Y				Y		Y			Y				K ₃ , K ₄
CO4					Y	Y									Y	Y	K ₅ , K ₆

High-3

Medium-2

Low-1

K₁=>Remember K₂=>Understand K₃=>Apply K₄=>Analyze K₅=>Evaluate K₆=>Create

VIDHYADEEP UNIVERSITY (Anita)

Discipline Core Subject (DSC)

Institute Name: Vidhyadeep Institute of Science		Department Name: Microbiology			
Recommended Programs : B.Sc. Sem IV					
Course Name	Virology		Course Code	004302405	
Credit Hours	L	T	P	N	Total Credits
		3			
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)				
Effective From	June 2024				
Prerequisites (if any)	Basic Science				
Course Objectives	<ul style="list-style-type: none"> ✓ To give an overview of medically important virus families. ✓ To describe the structure, classification and cultivation of viruses. ✓ To understand the replication strategies of viruses. ✓ To study virus like infectious particles. ✓ To study the role of virus and virus host. 				
Course Content	Unit I: Basics of Viral Structure Origin of Virus Viron Structure is defined by Capsid Symmetry or presence and absence Of Envelope Host Range and Specificity of Virus				5 hours
	Unit II: Viral Taxonomy and Cultivation Classification of Viruses Emerging Viruses Cultivation of Viruses in Laboratory				5 hours
	Unit III: Replication of Viruses General Characteristics of Replication Replication of T – even phages (Lytic cycle) Lysogeny Replication of Animal Viruses				7 hours
	Unit IV: Viruses and Viral Infectious Particles Latent Virus infection Viruses and Tertotogenesis Viruses like Agents Viruses and Cancer, Human Cancer Viruses Plant Viruses				
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
References	<ul style="list-style-type: none"> ✓ Black J. G., (2012. Microbiology: Principles and explorations. Hoboken, NJ: Wiley. ✓ Sherwood, L., Willey, J. M., Woolverton, C. J. (2008). Prescott's Microbiology. Singapore: MacGraw Hill Higher Ed. 7th Ed. And 10th Ed. 2017. 				
Course Outcomes	Students will gain knowledge of the structure of viruses and its origin. Students shall learn about classification of viruses and knowledge of emerging viruses threatening the world. Enable students to understand virus replication. Students shall understand the role of viruses in cancer.				

Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1		Y			Y										Y		K ₁
CO2		Y					Y							Y			K ₂
CO3										Y			Y				K ₃ , K ₄
CO4				Y							Y					Y	K ₅ , K ₆

High-3

Medium-2

Low-1

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K₃ =>Apply

K₄ =>Analyze

K₅ =>Evaluate

K₆ =>Create

VIDHYADEEP UNIVERSITY (Anita)
Discipline Core Subject (DSC)

Institute Name: Vidhyadeep Institute of Science		Department Name: Microbiology			
Recommended Programs :B.Sc.Microbiology Sem IV					
Course Name	Microbiology Practical		Course Code	004302402	
Credit Hours	L	T	P	N	Total Credits
			6		
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)				
Effective From	June 2024				
Prerequisites (if any)	Basic Science				
Course Objectives	<ul style="list-style-type: none"> ✓ To study the structure and function of important fungi ✓ To study regarding bacteriophage. ✓ To learn the isolation of different organisms from soil samples. ✓ To know various vaterinary related diseases. 				
Course Content	<ol style="list-style-type: none"> 1. Cultivation and identification of economical important fungi 2. Study of permanent slides of Algae 3. Study of permanent slides of Cyanobacteria 4. Study of permanent slides of Protozoa 5. Demonstration of lysis of bacteria by bacteriophage 6. Study of various animals of economic and research values (virtual and field visit) 7. Study of Black quarter disease in bovines (virtual and Field visit). 8. Study of Enterotoxemia in bovines (virtual and field visit) 9. Study of Haemorrhagic septicaemia in cattles (virtul and field visit) 10. Study of viral disease in poultry (virtual and field visit). 11. Isolation of clinically important microbes from animal samples. (Milk, Swab, body fluid etc.) 12. Study of Mastitis in milking animals 				90 hours
Teaching Methodology	Lab work, Recordbook, Journal, Discussion, Self-Study.				
References	<ul style="list-style-type: none"> ✓ Aneja K. R., (2003) Experiments in Microbiology, Plant Pathology, Tissue Culture and Mushroom Production Technology, 4th Ed. ✓ Cappuccino, J. G., (2016). Microbiology: A Laboratory Manual, 11th Ed. ✓ Patel R. J., & Patel, K. R., (2011). Experimental Microbiology, Vol. 2, 8th Ed., Aditya. ✓ Patel R. J., & Patel, K. R., (2015). Experimental Microbiology, Vol. 1, 9th Ed., Aditya. ✓ Veterinary Microbiology 4th Edition By D. Scott McVey, Melissa Kennedy, M. M. ✓ General Microbiology- Powar and Dagainawala (Vol. I and Vol. II) 				
Course Outcomes	<p>To understand the structure of fungi, algae and protozoa.</p> <p>To learn about bacteriophage.</p> <p>To learn the isolation of different organisms from soil samples.</p>				

To know various vaterinary related diseases.

Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1		Y			Y										Y		K ₁
CO2		Y					Y							Y			K ₂
CO3										Y			Y				K ₃ , K ₄
CO4				Y							Y					Y	K ₅ , K ₆

High-3

Medium-2

Low-1

K₁ =>Remember K₂ =>Understand

K₃ =>Apply

K₄ =>Analyze

K₅ =>Evaluate

K₆ =>Create

VIDHYADEEP UNIVERSITY (Anita)
Minor Subject (MS)

Institute Name: Vidhyadeep Institute of Science			Department Name: Microbiology			
Recommended Programs : B.Sc. Microbiology Sem IV						
Course Name	Plant Physiology, Ecology, Anatomy and Medicinal Plant		Course Code	004391401		
Credit Hours	L	T	P	N	Total Credits	3
		3				
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)					
Effective From	June 2024					
Prerequisites (if any)	Basic Science					
Course Objectives	<ul style="list-style-type: none"> ✓ Understand about Plant physiology. ✓ Understanding about Plant ecology. ✓ To have detailed idea about Plant anatomy. ✓ To gain knowledge on several beneficial medicinal plants. 					
Course Content	Unit I: Plant Physiology Water potential and Root Absorption: Method, Path and Types of Root Absorption, Factors affecting root absorption Ascent of sap: Introduction, Ascent of sap by xylem, Root pressure theory, Dixon's theory of cohesion Transpiration: Introduction, Types and Structure of Stomata; Mechanism of Stomatal Transpiration, Significance of transpiration, Factor affecting transpiration					11 hours
	Unit II: Plant Ecology Minor forest product of Gujarat Cultivation of the following crops in relation to their origin, Distribution, climate, soil, propagation method of cultivation and uses. Wheat, ladies finger, chilly and Rose					11 hours
	Unit III: Plant Anatomy Primary tissue structure in root: Monocot, Dicot Primary tissue structure in stem: Monocot stem, Dicot stem Primary tissue structure in leaf: Monocot leaf and, Dicot leaf					11 hours
	Unit IV: Medicinal Plant Scientific name, family, parts, uses and medicinal uses of the following plants: Tylophraindica (Damvel), Hemidesmus indicus (Annatmool), Achyranthes aespica (Aghedo), Mucuna pruriens (Kavach), Aloe barbedense (Kuarpathu), Terminalia bellarica (Behda), Embelica officinalis (Ambla), Centella asiatica (Bhrami), Helicteris sora (Mardasingh), Santalum album (Chandan) Rubber and its products: Chemical properties, tapping, grading, packing, marketing and uses					12 hours
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment.					

References	<ul style="list-style-type: none"> ✓ E.P. Odum And Barrett, G.W. (2005) Fundamentals Of Ecology 5th Edition Cengage Learning New Delhi 598p ✓ P.D. Sharma Ecology And Environment 10th Revised Edition, Rastogi Publication Merrutindia 600p ✓ P.L. Kochar (1981) Economic Botany ✓ Fahn (1968) Plant Anatomy. ✓ B.P. Pandey (1978) Plant Anatomy. ✓ Economic Botany S.D.Sabnis And M Daniel(1990) A Phytochemicalapproch
Course Outcomes	<p>On completion of this course a student should be able to understand They will be able to learn about Plnat Anatomy, Plant Ecology, Plant Physiology and various medicinal plants. They will be able to learn about Develop oral and written communication skills. Undertake any responsibility as an individual.Knowledge and understanding of related norms and ethics.</p>

Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1		Y															
CO2		Y															
CO3																	
CO4											Y						

High-3

Medium-2

Low-1

K₁ =>Remember K₂ =>Understand

K₃ =>Apply

K₄ =>Analyze

K₅ =>Evaluate

K₆ =>Create

VIDHYADEEP UNIVERSITY (Anita)

Minor Subject (MS)

Institute Name: Vidhyadeep Institute of Science			Department Name: Microbiology			
Recommended Programs :B.Sc.Microbiology Sem IV						
Course Name	Plant Physiology, Ecology, Anatomy and Medicinal Plant Practical		Course Code	004391402		
Credit Hours	L	T	P	N	Total Credits	1
			2			
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)					
Effective From	June 2024					
Prerequisites (if any)	Basic Science					
Course Objectives	<ul style="list-style-type: none"> ✓ To study the Plnat Ecology ✓ To study regarding Plant Antomy ✓ To learn about various medicinal plants. 					
Course Content	<ol style="list-style-type: none"> 1. To study the stages on whaet leaf (Uredospore and Teleuto spore) 2. To study Botanical name, family, origin and distribution offollowing. (Wheat, Lady's finger, Chilly and Rose) 3. Tostudy following minor forest products. (Gum (Acacia gum), Bidee wrappers (Diospyrossp.), Fiber (jute), Match box, Paper, Dye (Bixaorellana)Baj 4. To study ecological peculiarities of Orchid Root and Leaf. 5. To study ecological peculiarities of Avicenna Root and Leaf. 6. To study permanent slides of Anatomy. (Sunflower root T.S, Maize root T.S, Sunflower stem T.S, Maize stem T.S, Sunflower leaf T.S, Maize leaf T.S, Bignonia old stem T.S, Boerhaavia old stem T.S, Nyctanthus old stem T.S and Butea monosperma) 					15 hours
Teaching Methodology	Lab work, Recordbook, Journal, Discussion, Self-Study.					
References	<ul style="list-style-type: none"> ✓ Botany For Degree Student P.C. Vashishta 1st Edition ✓ Morden Practical Botany Vol. B.P. Pandey 1995 S. Chand& Company, New Delhi 					
Course Outcomes	On completion of this course a student should be able to understand They will be able to learn about practical knowledge regarding Plnat Anatomy, Plant Ecology, Plant Physiology and various medicinal plants.					

Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1		Y			Y												K ₁
CO2		Y					Y							Y			K ₂
CO3										Y							K ₃ , K ₄
CO4				Y							Y						K ₅ , K ₆

High-3

Medium-2

Low-1

K₁ =>Remember K₂ =>Understand

K₃ =>Apply

K₄ =>Analyze

K₅ =>Evaluate

K₆ =>Create

VIDHYADEEP UNIVERSITY (Anita)
Ability Enhancement Course (AEC)

Institute Name: Vidhyadeep Institute of Science		Department Name: Microbiology			
Recommended Programs : B.Sc. Microbiology Sem IV					
Course Name	Communication Skill - II		Course Code	004396403	
Credit Hours	L	T	P	N	Total Credits
		2			
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)				
Effective From	June 2024				
Prerequisites (if any)	Basic Science				
Course Objectives	<ul style="list-style-type: none"> ✓ The course provides good introduction and understanding about the following: ✓ The concept and understanding of different types of Communication ✓ Introduce different tools of communication that are useful in various techniques of problems solving. ✓ The Grammatical knowledge of Language Learning with the enhancement of word power. ✓ To introduce the tricks and methods of official and Technical writing 				
Course Content	Unit I: Advance Communication (PPP and Exercises on handouts) Why communication? Art of communication, V3 communication, Key elements of IP communication, Quizzes, exercises and cases / incidents for practice.				5 hours
	Unit II: Group Discussions:(PPP) Definitions, importance, process, points to be borne in mind while participating, Dos and Don'ts. Practice if time permits or to be covered in PDP.				5 hours
	Unit III: Interview (PPP) Types of, Points to be borne in mind as an interviewer or an Interviewee, commonly asked questions, Dos and Don'ts. Practice if time permits or to be covered in PDP.				7 hours
	Unit IV: Written Communication: Report writing, documentation, business correspondence, preparation of manuals and project reports.				
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
References	<ul style="list-style-type: none"> ✓ OB by Fred Luthans ✓ OB by Stiphen P. Robbins ✓ Masterson, Johan & et. al (1989), "Invitation to Effective Speech Communication, Scott, Foreman and Co. ✓ Chturvedi, P.D. and Chaturvedi Mukesh (2004), "Business Communication" Pearson Education, Singapore Pvt. Ltd ✓ Business Communication by ICMR, Feb 2001. ✓ Toropov Brandon (2000), "Last Minute Interview Tips", Jaico Publishing House, Mumbai. ✓ Heller Robert (1998), "Essential DK Managers: Communication Clearly", Dorling Kindersley, London. ✓ Decker Bert () "The Art of Communication", ✓ Bone Diane (), "The Business of Listening", a Fifty-Minute Series Book Crisp Publications, Inc, California. 				

Course Outcomes	<p>At the end of the course the students will be able to:</p> <p>Correct usage of English grammar in writing and speaking.</p> <p>Analyze and improve their speaking ability in English both in terms of fluency and comprehensibility.</p> <p>Evaluate themselves by giving oral presentations and will receive feedback on their performances.</p> <p>Develop their reading speed and comprehension of academic articles.</p> <p>Compare their reading fluency skills.</p>
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Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1		Y			Y												K1
CO2		Y					Y							Y			K2
CO3										Y							K3, K4
CO4				Y							Y						K5, K6

High-3

Medium-2

Low-1

K₁ =>Remember K₂ =>Understand

K₃ =>Apply

K₄ =>Analyze

K₅ =>Evaluate

K₆ =>Create

VIDHYADEEP UNIVERSITY (Anita)
Skill Enhancement Course (SEC)

Institute Name: Vidhyadeep Institute of Science		Department Name: Microbiology			
Recommended Programs :B.Sc.Microbiology Sem IV					
Course Name	Herbal cosmetics		Course Code	004396404	
Credit Hours	L	T	P	N	Total Credits
		2			2
Minimum weeks per Semester	15 (Including Classwork, examination, preparation, holidays etc.)				
Effective From	June 2024				
Prerequisites (if any)	Basic Science				
Course Objectives	<ul style="list-style-type: none"> ✓ To understand the fundamental concepts behind various molecular genetics of bacterial cells. ✓ To study the regulation and control of genes, genetic codes and its passage to new cells. ✓ To know molecular processes involved in genetic replication, translation, transcription ✓ To be familiar with various extra chromosomal genes. 				
Course Content	Unit-I Introduction to herbal cosmetics, their advantages, Types of herbal cosmetics, Study of common drugs used in cosmetics. Indian cosmetic industry and scope of herbal cosmetic in market.				5 hours
	Unit -II Types of raw materials used in cosmetics: i) Water, ii) preservatives, iii) humectants, iv) surfactant, v) oil, fat and waxes, vi) perfumes, vii) colours. Facial cosmetics: cleansing creams, Emollients, Moisturizers (cold cream, moisturizing cream, night cream), Bleaches, Sunscreen and anti-sunburn preparations.				5 hours
	Unit -III Make-up preparations: Face powder, Lipstic, Rouge (red powder for cheeks), Eye makeup (mascara, eye shadow, eye liner, eye brow pencil), Nail Preparations. Hair care product: Hair dressings, hair cleanser, hair dying agent, antidandruff agent, hair tonic/hair nourisher, hair tonic, hair conditioners, hair oil. Hair colorants (Chemicals and Botanicals used as colorants). Common herbs used in hair cosmetics.				7 hours
	Unit -IV Oral hygiene product: Tooth paste, tooth powder, mouth wash, gargles, dentifrice. Other types of cosmetics: Deodorant, Bath & Shower Products (Soaps, Shampoo), Antiperspirants.				7 hours
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
References	<ul style="list-style-type: none"> ✓ Handbook of Cosmetic Science and Technology –edited by Andre O. Barel et al., Publisher: Informa Healthcare. ✓ The Chemistry and Manufacture of Cosmetics-edited by Mitchell L. Schlossman, Allured Publishing Corporation ✓ Harry's Cosmeticology: edited by Meyer R. Rosen 				
Course Outcomes	<p>Student shall learn about the chemical structural properties of DNA and protein. Along with, students shall grasp knowledge of bacterial replication and its molecular aspects.</p> <p>Students shall gain knowledge of structural aspects of bacterial genes. Students shall get in-depth information about molecular mechanisms of passing the genetic information through transcription and translation in bacterial system.</p>				

Students shall understand the process involve in gene regulation and its control in prokaryotes.
 Students shall be able to understand genetic inheritance and bacterial recombination..

Mapping of Course outcome with Program Outcomes, PSO's, and Knowledge Levels (As per Blooms Taxonomy)

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	Knowledge Levels (K ₁ , K ₂ , ..., K ₆)
CO1		Y								Y			Y				K ₁
CO2		Y						Y							Y		K ₂
CO3					Y												K ₃ , K ₄
CO4			Y						Y		Y				Y		K ₅ , K ₆

High-3

Medium-2

Low-1

K₁ =>Remember K₂ =>Understand

K₃ =>Apply

K₄ =>Analyze

K₅ =>Evaluate

K₆ =>Create