

**VIDHYADEEP UNIVERSITY (Anita)**  
**Discipline Core Subject (DSC)**

<b>Institute Name: Vidhyadeep Institute of Science</b>			<b>Department Name: Microbiology</b>			
<b>Recommended Programs :B.Sc.Microbiology Sem III</b>						
<b>Course Name</b>	<b>Agricultural Microbiology</b>		<b>Course Code</b>	<b>004302301</b>		
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>	<b>3</b>
		3				
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)					
<b>Effective From</b>	June 2024					
<b>Prerequisites (if any)</b>	Basic Science					
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ To learn the methods to study microbial ecology.</li> <li>✓ To gain an understanding of biogeochemical cycling and effect of global climate change.</li> <li>✓ To develop insight about microbial interactions.</li> <li>✓ To gain knowledge of application of microorganisms in agriculture.</li> </ul>					
<b>Course Content</b>	<b>Unit I: BIOGEOCHEMICAL CYCLING AND GLOBAL CLIMATE CHANGE</b> Biogeochemical cycling Carbon cycle Nitrogen cycle Phosphorus cycle Sulfur cycle Global climate change: Biogeochemical cycling out of balance					11 hours
	<b>Unit II: Microbial Interactions</b> Mutualism Cooperation Commensalism Predation Parasitism Amensalism Competition					12 hours
	<b>Unit III: Microorganisms and Ecosystems</b> Microorganisms in terrestrial environments Soils as an important microbial habitat Microbe plant interactions					11 hours
	<b>Unit IV: AGRICULTURAL MICROBIAL PRODUCTS</b> Biofertilizers Bioinsecticides Biocontrol agents Bioherbicides Inoculant formulation					11 hours
<b>Teaching Methodology</b>	Classwork, Discussion, Self-Study, Seminars and/or Assignment.					
<b>References</b>	✓ Sherwood L., Willey, J. M. (2013). Prescott, Harley and Klein's Microbiology,					

	10 <sup>th</sup> Ed., MacGraw Hill. ✓ Ronald M. Atlas & Richard B. (2005) Microbial Ecology: Fundamentals and Applications, 4 <sup>th</sup> Ed., Pearson Education. ✓ Dubey, R. C. (2010). Textbook of Biotechnology, 1 <sup>st</sup> Ed., S. Chand, Multicolor.
<b>Course Outcomes</b>	Give an understanding of biogeochemical cycling. Students shall gain knowledge of microbial interactions and its significance. Gain knowledge of distribution and role of microorganisms in different habits and ecosystems. Students shall gain insight of usage of microorganisms as protein source, food supplements, soil supplements and bioinoculants.

**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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1		Y							Y								K <sub>1</sub>
CO2		Y			Y								Y				K <sub>2</sub>
CO3							Y								Y	Y	K <sub>3</sub> , K <sub>4</sub>
CO4	Y			Y							Y						K <sub>5</sub> , K <sub>6</sub>

**High-3**

**K<sub>1</sub> =>Remember K<sub>2</sub> =>Understand**

**Medium-2**

**Low-1**

**K<sub>3</sub> =>Apply**

**K<sub>4</sub> =>Analyze**

**K<sub>5</sub> =>Evaluate**

**K<sub>6</sub> =>Create**

**VIDHYADEEP UNIVERSITY (Anita)**  
**Discipline Core Subject (DSC)**

<b>Institute Name: Vidhyadeep Institute of Science</b>		<b>Department Name: Microbiology</b>			
<b>Recommended Programs :B.Sc.Microbiology Sem III</b>					
<b>Course Name</b>	<b>Environmental Microbiology</b>		<b>Course Code</b>	<b>004302303</b>	
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>
		2			3
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)				
<b>Effective From</b>	June 2024				
<b>Prerequisites (if any)</b>	Basic Science				
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ To develop an understanding of the basic principles and concepts of air microbiology.</li> <li>✓ To learn the process for purification of drinking water and treatment process for waste water.</li> <li>✓ To explore various biodegradation and bioremediation processes.</li> <li>✓ To acquire knowledge of extreme environment and response of microorganisms to adapt the environment.</li> </ul>				
<b>Course Content</b>	<b>Unit I: MICROBIOLOGY OF AIR</b> Microorganisms found in air Number of microorganisms in air Bio aerosols: Sampling and analysis Methods of collection Sampler type Culture methods and microscopy Air sanitation				11 hours
	<b>Unit II: MICROBIOLOGY OF DOMESTIC AND WASTE WATER</b> Purification and Sanitary Analysis of waste Water Waste water Treatment Solid processing				11 hours
	<b>Unit III: BIODEGRADATION AND BIOREMEDIATION</b> Biodegradation Processes Bioremediation Bioremediation of hydrocarbons Bioremediation of marine oil spills				11 hours
	<b>Unit IV: MICROBIOLOGY OF EXTREME ENVIRONMENT</b> Physiology, molecular adaptations of Hyperthermophiles, Acidophiles, Psychrophiles, Barophiles, Halophiles, Alkalophiles Biotechnology of extremophiles				12 hours
<b>Teaching Methodology</b>	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
<b>References</b>	<ul style="list-style-type: none"> <li>✓ Wiley, J. M., Sherwood, L., Woolverton, C. J. (2017). Prescott's Microbiology. 10th Ed. Singapore: McGraw-Hill Education.</li> <li>✓ Schaechter, M. (2004). The desk encyclopaedia of microbiology, 2nd Ed., Elsevier Academic Press.</li> <li>✓ Schmidt, T. M. and Schaechter, M. (2011). Topics in ecological and environmental microbiology, 1st Ed., Elsevier Academic Press.</li> </ul>				

	<ul style="list-style-type: none"> <li>✓ Salle, A. J. (1974). Fundamental principles of microbiology, 7<sup>th</sup> Ed., Tata McGraw-Hill.</li> <li>✓ Pelczar, M. J. &amp; Chan, E. C. S. (1998). Microbiology, 5<sup>th</sup> Ed., McGraw Hill.</li> <li>✓ Hurst, C. J., Crawford, R. L., Garland J. L. (2007). Manual of Environmental Microbiology, 3<sup>rd</sup> Ed., American Society for Microbiology.</li> <li>✓ Atlas, R. M. (1997). Principles of Microbiology 2<sup>nd</sup> Ed., Brown Publishers.</li> <li>✓ Purohit, S. S. (2008). Microbiology Fundamentals and Applications, 7<sup>th</sup> Ed., Agrobios.</li> </ul>
<b>Course Outcomes</b>	<p>Students shall understand the presence of varied microorganism present in air, sampling and analysis of air flora and sanitization of air.</p> <p>Students shall gain knowledge of different methods for drinking water purification and various steps for treating the waste water and finally the solid waste remains to dispose it.</p> <p>Students shall become acquainted with various biodegradation and bioremediation process of various pollutants in environment.</p> <p>Students shall become well versed with the adaptation and changes in the structure and metabolic pathway to survive in extreme environment as well as use of microbial enzymes of such organism in biotechnology.</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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1					Y			Y			Y		Y				K <sub>1</sub>
CO2						Y									Y		K <sub>2</sub>
CO3			Y							Y						Y	K <sub>3</sub> , K <sub>4</sub>
CO4	Y						Y					Y					K <sub>5</sub> , K <sub>6</sub>

**High-3**

**Medium-2**

**Low-1**

**K<sub>1</sub> =>Remember K<sub>2</sub> =>Understand**

**K<sub>3</sub> =>Apply**

**K<sub>4</sub> =>Analyze**

**K<sub>5</sub> =>Evaluate**

**K<sub>6</sub> =>Create**

**VIDHYADEEP UNIVERSITY (Anita)**  
**Discipline Core Subject (DSC)**

<b>Institute Name: Vidhyadeep Institute of Science</b>			<b>Department Name: Microbiology</b>			
<b>Recommended Programs :B.Sc.Microbiology Sem III</b>						
<b>Course Name</b>	<b>Microbial Physiology</b>		<b>Course Code</b>	<b>004302305</b>		
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>	<b>3</b>
		2				
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)					
<b>Effective From</b>	June 2024					
<b>Prerequisites (if any)</b>	Basic Science					
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ To develop an understanding of the basic principles and concepts of microbial metabolism.</li> <li>✓ To learn the chemolithotrophic and phototrophic metabolic processes occurring in bacteria.</li> <li>✓ To explore various metabolic processes leading to respiratory and fermentative metabolism of sugars in chemoorganotrophs.</li> <li>✓ To acquire knowledge of electron transport chain and ATP synthesis in chemoorganotrophs.</li> <li>✓ To get acquainted with metabolic processes used for catabolism of proteins, lipids and carbohydrates other than glucose.</li> </ul>					
<b>Course Content</b>	<b>Unit I: INTRODUCTION TO METABOLISM</b> Metabolism: Important principles and concepts ATP the major energy currency of cells Redox reactions Components of Electron transport chain					11 hours
	<b>Unit II: CHEMOLITHOTROPHIC AND PHOTOTROPHIC METABOLISM</b> Chemolithotrophy Phototrophy					11 hours
	<b>Unit III: CHEMOORGANOTROPHIC METABOLISM-I</b> Aerobic respiration Glucose to pyruvate: EMP Pyruvate to CO <sub>2</sub> : TCA cycle and Glyoxylate Bypass Electron Transport Chain Oxidative Phosphorylation Anaerobic Respiration Fermentation					12 hours
	<b>Unit IV: CHEMOORGANOTROPHIC METABOLISM-II</b> Catabolism of Carbohydrates other than glucose Protein and Amino acid catabolism Lipid Catabolism Principles governing Biosynthesis CO <sub>2</sub> fixation					11 hours
<b>Teaching Methodology</b>	Classwork, Discussion, Self-Study, Seminars and/or Assignment.					
<b>References</b>	<ul style="list-style-type: none"> <li>✓ Wiley, J. M., Sherwood, L., Woolverton, C. J. (2017). Prescott's Microbiology. 10<sup>th</sup> Ed. Singapore: McGraw-Hill Education.</li> </ul>					

	<ul style="list-style-type: none"> <li>✓ Rastogi, S., Pathak, N. (2009) Genetic Engineering, 4th Ed., Oxford University Press.</li> <li>✓ Madigan, M. T. and Martinko, J. M. (2014). Brock Biology of Microorganisms. 14th Ed., Prentice Hall International Inc.</li> <li>✓ Stanier, R.Y., Ingrahm, J. I., Wheelis, M. L. and Painter, P. R. (1987). General Microbiology. 5th Ed., McMillan Press.</li> <li>✓ Atlas, R. M. (1997). Principles of Microbiology 2<sup>nd</sup> Ed., Brown Publishers.</li> </ul>
<b>Course Outcomes</b>	<p>Students shall understand the basic principles and concepts of microbial metabolism.</p> <p>Students shall gain knowledge of the energy generating mechanisms in chemolithotrophs and phototrophs.</p> <p>Students shall become acquainted with various metabolic processes used by chemoorganotrophs for energy generation from glucose.</p> <p>Students shall become well versed with the catabolic pathways used for utilization of proteins, lipids and carbohydrates other than glucose.</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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1					Y			Y			Y		Y				K <sub>1</sub>
CO2						Y									Y		K <sub>2</sub>
CO3			Y							Y						Y	K <sub>3</sub> , K <sub>4</sub>
CO4	Y						Y					Y					K <sub>5</sub> , K <sub>6</sub>

**High-3**

**K<sub>1</sub> =>Remember K<sub>2</sub> =>Understand**

**Medium-2**

**Low-1**

**K<sub>3</sub> =>Apply**

**K<sub>4</sub> =>Analyze**

**K<sub>5</sub> =>Evaluate**

**K<sub>6</sub> =>Create**

**VIDHYADEEP UNIVERSITY (Anita)**  
**Discipline Core Subject (DSC)**

<b>Institute Name: Vidhyadeep Institute of Science</b>		<b>Department Name: Microbiology</b>			
<b>Recommended Programs :B.Sc.Microbiology Sem III</b>					
<b>Course Name</b>	<b>Microbiology Practical</b>		<b>Course Code</b>	<b>004302302</b>	
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>
			6		
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)				
<b>Effective From</b>	June 2024				
<b>Prerequisites (if any)</b>	Basic Science				
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ To study the qualitative analysis of protein and carbohydrates</li> <li>✓ To understand the intracellular and extracellular enzyme activity.</li> <li>✓ To understand the purity of culture</li> <li>✓ To study different parameters that effect on growth of the bacteria</li> </ul>				
<b>Course Content</b>	<ol style="list-style-type: none"> <li>1. Enumeration of bacteria by Heterotrophic plate count method (HPC)</li> <li>2. Isolation of nonsymbiotic nitrogen fixing aerobic bacteria – <i>Azotobacter</i> spp.</li> <li>3. Isolation of <i>Rhizobium</i> spp. from root nodules of legume plants</li> <li>4. Isolation and identification of Actinomycetes from soil</li> <li>5. Effect of hand sanitizer on skin flora</li> <li>6. Pure culture study of <i>Escherichia coli</i> and <i>Klebsiellamobilis</i></li> <li>7. Pure culture study of <i>Proteus vulgaris</i>, <i>Serratia marcescens</i> and <i>Pseudomonas aeruginosa</i></li> <li>8. Pure culture study of <i>Bacillus megaterium</i>, <i>Bacillus subtilis</i> and <i>Bacillus cereus</i></li> <li>9. Qualitative analysis of carbohydrate</li> <li>10. Qualitative analysis of proteins</li> <li>11. Study of extracellular enzymatic activity: Amylase, Caseinase, Gelatinase, Lipase</li> <li>12. Study of intracellular enzymatic activity: Deaminase, Decarboxylase, Catalase, Dehydrogenase, Oxidase</li> </ol>				90 hours
<b>Teaching Methodology</b>	Lab work, Recordbook, Journal, Discussion, Self-Study.				
<b>References</b>	<ul style="list-style-type: none"> <li>✓ Aneja K. R., (2003) Experiments in Microbiology, Plant Pathology, Tissue Culture and Mushroom Production Technology, 4<sup>th</sup> Ed.</li> <li>✓ Cappuccino, J. G., (2016). Microbiology: A Laboratory Manual, 11<sup>th</sup> Ed.</li> <li>✓ Patel R. J., &amp; Patel, K. R., (2011). Experimental Microbiology, Vol. 2, 8<sup>th</sup> Ed., Aditya.</li> <li>✓ Patel R. J., &amp; Patel, K. R., (2015). Experimental Microbiology, Vol. 1, 9<sup>th</sup> Ed., Aditya.</li> </ul>				
<b>Course Outcomes</b>	Students will understand the characteristics of different microorganisms To learn the isolation of different organisms from natural samples.				

	To understand the germicidal effect on bacteria To learn about various pure culture of microorganisms. To understand the presence of biomolecules such as protein and carbohydrates To know the activity of intracellular and extracellular enzymes.
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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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1		Y			Y			Y			Y		Y				K1
CO2						Y			Y						Y		K2
CO3			Y							Y						Y	K3, K4
CO4	Y			Y			Y					Y		Y			K5, K6

**High-3**

K<sub>1</sub> => Remember K<sub>2</sub> => Understand

**Medium-2**

**Low-1**

K<sub>3</sub> => Apply

K<sub>4</sub> => Analyze

K<sub>5</sub> => Evaluate

K<sub>6</sub> => Create



**VIDHYADEEP UNIVERSITY (Anita)**  
**Multidisciplinary Subject (MD)**

<b>Institute Name: Vidhyadeep Institute of Science</b>		<b>Department Name: Microbiology</b>			
<b>Recommended Programs :B.Sc.Microbiology Sem III</b>					
<b>Course Name</b>	<b>Developmental Biology</b>		<b>Course Code</b>	<b>004396302</b>	
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>
		3			
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)				
<b>Effective From</b>	June 2024				
<b>Prerequisites (if any)</b>	Basic Science				
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ Explain the molecular, biochemical and cellular events that regulate the development of specialised cells, tissues and organs during embryonic development.</li> <li>✓ Identify model organisms used to investigate developmental biology and compare the developmental programmes of different organisms.</li> <li>✓ Focuses on understanding the structures and behaviors of cells, the interaction between cells, and the mechanisms controlling the assembly of groups of cells functioning in organisms.</li> </ul>				
<b>Course Content</b>	<b>Unit I: Development of frog</b> Ovulation and spawning cleavage and blastula the fate-map gastrulation neurulation metamorphosis				11 hours
	<b>Unit II: Development of chick</b> Gametes and fertilization Cleavage and blastulation Gastrulation Differentiation of mesoderm and coelom Neurulation Development of chick according to incubation Extra embryonic membranes of Chick				12 hours
	<b>Unit III: Concept of organic evolution</b> Origin of earth Origin of life Evidences of organic evolution Theories of organic evolution [Darwinism, Lamarkism, de vries]				11 hours
	<b>Unit IV: Isolation, Evaluation &amp; Selection</b> Colouration Speciation Tempo of evolution. Artificial selection Sexual selection				11 hours
<b>Teaching</b>	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				

<b>Methodology</b>	
<b>References</b>	<ul style="list-style-type: none"> <li>✓ Introduction to embryology: A K Berry</li> <li>✓ Chordate embryology: Verma and Agrawal</li> <li>✓ Developmental biology: Sastry and Shukal</li> <li>✓ Organic evolution: M P Arora</li> </ul>
<b>Course Outcomes</b>	<p>Explain the molecular and genetic background of animal and plant development;  Describe evolutionary history of complex multicellular life forms;  Compare environmental influence on development and homeostasis of animals and plants;  Explain the molecular and genetic background of animal and plant development;  Describe evolutionary history of complex multicellular life forms;  Compare environmental influence on development and homeostasis of animals and plants;  Interpret, analyse and present experimental results and conclusions in a scientific manner.  Critically assess and present current scientific literature on topics related to ecological and evolutionary developmental biology.</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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1		Y			Y			Y			Y		Y				K <sub>1</sub>
CO2						Y			Y								K <sub>2</sub>
CO3										Y						Y	K <sub>3</sub> , K <sub>4</sub>
CO4	Y			Y								Y		Y			K <sub>5</sub> , K <sub>6</sub>

**High-3**

**Medium-2**

**Low-1**

**K<sub>1</sub> =>Remember K<sub>2</sub> =>Understand**

**K<sub>3</sub> =>Apply**

**K<sub>4</sub> =>Analyze**

**K<sub>5</sub> =>Evaluate**

**K<sub>6</sub> =>Create**

**VIDHYADEEP UNIVERSITY (Anita)**  
**Multidisciplinary Subject (MD)**

Institute Name: Vidhyadeep Institute of Science			Department Name: Microbiology			
Recommended Programs :B.Sc.Microbiology Sem III						
Course Name	Developmental Biology Practical		Course Code	004396303		
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"> <li>✓ Explain the molecular and genetic background of animal and plant development;</li> <li>✓ Describe evolutionary history of complex multicellular life forms;</li> <li>✓ Compare environmental influence on development and homeostasis of animals and plants;</li> <li>✓ Students able to identify &amp; classify the major groups of animals.</li> </ul>					
Course Content	<ol style="list-style-type: none"> <li>1. Frog: Egg, blastula and yolk plug stage.</li> <li>2. Chick: Egg, 24 hrs, 36 hrs, 48 hrs, 72 hrs and 96 hrs developmental stages.</li> <li>3. Placental types in Mammals.</li> <li>4. Animals of evolutionary importance</li> <li>5. Analogous and homologous organs.</li> <li>6. Fossils.</li> <li>7. Mimicry and coloration</li> </ol>					
Teaching Methodology	Lab work, Recordbook, Journal, Discussion, Self-Study.					
References	<ul style="list-style-type: none"> <li>✓ Introduction to embryology: A K Berry</li> <li>✓ Chordate embryology: Verma and Agrawal</li> <li>✓ Developmental biology: Sastry and Shukal</li> <li>✓ Organic evolution: M P Arora</li> </ul>					
Course Outcomes	<p>After successful completion of the course, students will be able to:</p> <p>Develop practical skills using model organisms in developmental biology.</p> <p>Gain the skills to isolate and mount the imaginal discs, sex comb, genital plate.</p> <p>Carry out practicals on developmental mutants in Drosophila and Arabidopsis.</p> <p>Carry out staining techniques for gametes and embryo.</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 (K1, K2, ..., K6)
CO1		Y			Y			Y			Y		Y				K1
CO2						Y			Y						Y		K2
CO3			Y							Y						Y	K3, K4
CO4	Y			Y			Y					Y		Y			K5, K6

**High-3**

**K1 =>Remember K2 =>Understand**

**Medium-2**

**Low-1**

**K3 =>Apply**

**K4 =>Analyze**

**K5 =>Evaluate**

**K6 =>Create**

**VIDHYADEEP UNIVERSITY (Anita)**  
**Ability Enhancement Course (AEC)**

<b>Institute Name: Vidhyadeep Institute of Science</b>		<b>Department Name: Microbiology</b>			
<b>Recommended Programs : B.Sc. Microbiology Sem III</b>					
<b>Course Name</b>	<b>Communication Skill - I</b>		<b>Course Code</b>	<b>004396303</b>	
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>
		2			
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)				
<b>Effective From</b>	June 2024				
<b>Prerequisites (if any)</b>	Basic Science				
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ The course provides good introduction and understanding about the following:</li> <li>✓ The concept and understanding of different types of Communication</li> <li>✓ Introduce different tools of communication that are useful in various techniques of problems solving.</li> <li>✓ The Grammatical knowledge of Language Learning with the enhancement of word power.</li> <li>✓ To introduce the tricks and methods of official and Technical writing</li> </ul>				
<b>Course Content</b>	<b>Unit I: Introduction:</b> Theory of Communication, Types and modes of Communication, Effective Communication, Barriers and Strategies.				5 hours
	<b>Unit II: Language of Communication:</b> Verbal and Non-verbal (Spoken and Written), Personal, Social and Business Communication, Intra-personal, Interpersonal, Group communication				5 hours
	<b>Unit III: Speaking Skills:</b> Dialogue, Group Discussion Interview, Public Speech, Role Play/Extempore Presentations				7 hours
	<b>Unit IV: Reading and Understanding &amp; Writing Skills</b> Close Reading, Comprehension, Analysis and Interpretation, Report Writing, Paraphrasing and Summary. Making notes Documenting Report Writing, Writing Letters - job applications, CV and Resume Academic Writing, Writing a Proposal				
<b>Teaching Methodology</b>	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
<b>References</b>	<ul style="list-style-type: none"> <li>✓ University Of Delhi ,Department Of English (2006) "Fluency in English - Part II", Oxford University Press,</li> <li>✓ Delhi University (2008) "Business English", Pearson,</li> <li>✓ Kumar S. P. (2013) "Language, Literature and Creativity", Orient Blackswan</li> <li>✓ John E , Warriner, (1973)."Warriner's English Grammar and Composition: Complete Course ",Harcourt, Brace, Jovanovich,</li> <li>✓ "Literary/Knowledge Texts (Poetry comprehension" – Our Casuarina Tree by Prose Comprehension – An Astrologer's Day by R.K</li> </ul>				
<b>Course Outcomes</b>	At the end of the course the students will be able to: Correct usage of English grammar in writing and speaking. Analyze and improve their speaking ability in English both in terms of fluency and comprehensibility.				

	<p>Evaluate them selves 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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1		Y									Y					Y	K <sub>1</sub>
CO2		Y		Y				Y					Y		Y		K <sub>2</sub>
CO3	Y					Y				Y							K <sub>3</sub> , K <sub>4</sub>
CO4		Y		Y							Y			Y			K <sub>5</sub> , K <sub>6</sub>

**High-3**

**Medium-2**

**Low-1**

K<sub>1</sub> => Remember K<sub>2</sub> => Understand

K<sub>3</sub> => Apply

K<sub>4</sub> => Analyze

K<sub>5</sub> => Evaluate

K<sub>6</sub> => Create

**VIDHYADEEP UNIVERSITY (Anita)**  
**Skill Enhancement Course (SEC)**

<b>Institute Name: Vidhyadeep Institute of Science</b>		<b>Department Name: Microbiology</b>			
<b>Recommended Programs :B.Sc.Microbiology Sem III</b>					
<b>Course Name</b>	<b>Wine Making</b>		<b>Course Code</b>	<b>004396304</b>	
<b>Credit Hours</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>N</b>	<b>Total Credits</b>
		2			
<b>Minimum weeks per Semester</b>	15 (Including Classwork, examination, preparation, holidays etc.)				
<b>Effective From</b>	June 2024				
<b>Prerequisites (if any)</b>	Basic Science				
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>✓ The primary objective of this course is to equip you with the knowledge and skills necessary to navigate the intricate realms of viticulture, brewing, and alcohol technology.</li> <li>✓ The goal of wine fermentation is to convert all of the available sugar to ethanol and carbon dioxide and to not leave residual sugar in the wine.</li> <li>✓ There are several factors that determine whether or not Saccharomyces will be able to completely utilize the available glucose and fructose.</li> </ul>				
<b>Course Content</b>	<b>Unit I: Introduction</b> Winemaking: Introduction to winemaking, definition and terminologies. Viticulture: Introduction to viticulture, definition and terminologies.				7 hours
	<b>Unit II: History of wine-making and viticulture</b> Wine-producing regions of the world and different practices of wine making & viticulture. Status of Indian viticulture and winemaking.				7 hours
	<b>Unit III: Wine-making</b> Classification of wine: Generic classification, varietal classification, Vinification classification and classification on the basis of chemical Constituents. Flow chart of white wine-production and recommended varieties. 3.3 Flow chart of Red wine-production and recommended varieties. Flow chart of Fortified wine-production and recommended varieties. Production of wine from fruits other than grapes.				7 hours
	<b>Unit IV: Commercial aspects of wine production</b> Comparison of wine with other beverages: Wine with vodka, Gin, Brandy, Whiskey, Rum, Beer, fruit wines fruit juice, carbonated drinks. Traditional and commercial wine-making: A comparison of traditional and new wine-making practices Raw materials and equipment use in wine production: crusher, press fermentor, filtration and additives used in wines Vintage and quality of wine: Vintage year in Southern and Northern Hemisphere and management of vintage Economic significance of grape growing and winemaking.				9 hours
<b>Teaching Methodology</b>	Classwork, Discussion, Self-Study, Seminars and/or Assignment.				
<b>References</b>	<ul style="list-style-type: none"> <li>✓ Casida L. E. (Jr) (1993) Industrial Microbiology, 5th Reprint</li> <li>✓ Frobisher M. (1974) Fundamentals of Microbiology, 9th Edition</li> </ul>				

	<ul style="list-style-type: none"> <li>✓ Salle A. J. (1985) Fundamental Principles of Bacteriology, 6th Reprint</li> <li>✓ Stanier R. Y. (1996) General Microbiology, 5th Edition</li> <li>✓ Prescott, Harley &amp; Klein (2005) Microbiology, McGraw-Hill .6th Edition</li> <li>✓ Dube R. C. &amp; Maheshwari D. K., A Textbook of Microbiology, S. Chand &amp; Co. Ltd.</li> <li>✓ Patel A. H. Industrial Microbiology.</li> <li>✓ Prescott S. C. and Dunn C.G. (1983) Industrial Microbiology, Reed, g. (Ed.) AVI Tech books.</li> <li>✓ Stanbury P. F., Whitaker A. and Hall S. J., (1997) Principles of Fermentation, 2nd edition</li> </ul>
<b>Course Outcomes</b>	<p>Upon successful completion of this subject, students should:</p> <ul style="list-style-type: none"> <li>be able to accurately describe the table wine production process;</li> <li>be able to discuss factors affecting wine composition and quality based on chemical analysis and sensory assessment;</li> <li>be able to critically assess winemaking approaches and techniques in terms of their contribution to wine quality and sensory attributes.</li> </ul>

**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 <sub>1</sub> , K <sub>2</sub> , ..., K <sub>6</sub> )
CO1		Y					Y							Y			K <sub>1</sub>
CO2	Y					Y				Y						Y	K <sub>2</sub>
CO3				Y				Y						Y			K <sub>3</sub> , K <sub>4</sub>
CO4		Y									Y		Y				K <sub>5</sub> , K <sub>6</sub>

**High-3**

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**K<sub>1</sub> => Remember K<sub>2</sub> => Understand**

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