(Bachelor of Science) (Undergraduate)

B. Sc. (UG) Semester-I

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| Course Code | **US02MIMI02** | Title of the Course | **FUNDAMENTALS OF MICROBIOLOGY** |
| Total Credits of the Course | 02 | Hours per Week | 02 |

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| Course Objectives: | To make students familiar with:   * Concepts of biochemistry for a microbiologist * Nutritional requirements of bacteria * Bacteriological media * Physical conditions required for growth |

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| Course Content | | |
| Unit | Description | Weightage\*  (%) |
| 1. | **Introduction to bio molecules and enzymes**  a) **Introduction to Biomolecules**:  i) Nucleic acids  ii) Carbohydrates  iii) Lipids  iv) Proteins    b) **Introduction to Enzymes:**  i) Characteristics, chemical and physical properties of enzymes  ii) Nomenclature and classes of enzymes  iii) Mode of action of enzymes  iv) Factors affecting enzyme activity. | 50% |
| 2. | **Cultivation of Bacteria**:  a) Nutritional Requirements,  b) Nutritional Types of Bacteria: Phototrophs , Chemotrophs ,  Autotrophs and Heterotrophs and Obligate Parasites  c) Bacteriological Media, Types of Media,  Common ingredients of Media.  d) Physical Conditions Required for Growth :  Temperature, Gaseous Requirements, Acidity or Alkalinity  (pH) , Miscellaneous Physical Requirements , Choice of Media  and Conditions of Incubation | 50% |

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| Teaching-Learning Methodology | * The major teaching- learning consists of lectures and discussions (large group) in which conventional methods like use of classroom blackboard teaching as well as power point presentation to introduce the learning objectives related to the basic concepts of the subject. * These sessions incorporate space for interactive participation and involvement of students through questions. |

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| Evaluation Pattern | | |
| Sr. No. | Details of the Evaluation | Weightage |
| 1. | Internal continuous assessment in the form of class test/internal written test –quiz , active learning ,, home assignment%), class assignment , attendance( As per SPU Letter No. E-3/2748 dated 02/02.2024 & As per CBCS R.6.8.3)  Total 50 marks (50%) | 50% |
| 2. | External University Examination | 50% |

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| Course Outcomes: | |
| 1. | Understand History of Microbiology. |
| 2. | Use the knowledge of staining techniques and microscopes in microscopic examination |

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| Suggested Reference Books: | |
| Sr. No. | Reference Books |
| 1. | Microbiology - Michael J. Pelczar JR.; E.C.S.Chan; Noel R. Krieg. Fifth edition |
| 2. | Elementary Microbiology Vol : I – Dr. H.A. Modi |
| 3 | “Microbiology” Prescott L, Harley J P, and Klein D A, 6th edition. WmC.Brown - McGraw Hill, Dubuque, IA Ltd. |
| 4 | Microbiology an introduction- Gerard J.Tortora,Berdell R. Funke, Christine L. Cases |

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| On-line resources |
| On-line Resources : INFLIBNET, Google Web Google books, |

**(B. Sc.) (Microbiology) Semester- I Practicals**

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| Course Code | US02MIMI02 | Title of the Course | Microbiology Practicals: Based on Fundamentals of Microbiology |
| Total Credits of the Course | 2 | Hours per Week | 4 |

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| Course Objectives: | To demonstrate:  • Understanding of various laboratory equipment and use of microscope.  • Microbial handling techniques and disposal of laboratory waste.  • Basic skills like preparation of smear, culture media & reagents as well as illustrating staining techniques to visualize bacterial cell and their external and internal structures. |

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| Course Content: | | |
| Sr. No. | **Practicals: Based on theory course : Introduction to Microbiology** | Weightage (%) |
|  | **SECTION-1** |  |
| 1. | Preparation of media- nutrient broth and media |  |
| 2. | Demonstration of adjustment of pH | 100 % |
| 3 | Preparation of buffer: phosphate buffer |
| 4. | Qualitative analysis of proteins |
| 5. | Disposal of laboratory waste and media |
| 6. | Qualitative analysis of carbohydrates |
| 7 | Study of differential and selective media- EMB and Mac Conkeys agar |
| 8 | Study of enzyme production of bacteria – amylase, caseinase, catalase, gelatinase. |

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| Teaching-Learning Methodology | * By briefing them with the theoretical aspects as well as providing them with the protocol (Aim, Requirements and Procedure) of the experiment to be performed using chalk and duster as well as power point presentation. * Students are trained for microscopic observations and its handling. * Demonstrations of the practical are also carried out and care is taken for aseptic handling and skill development for microbiological work in the laboratory. * Possibility of various results and their interpretation is also discussed. |

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| Evaluation Pattern: | | |
| Sr. No. | Details of the Evaluation: | Weightage  % |
| 1. | During practical examination; student should have a certified journal duly signed by head of department and the teacher in charge at the time of examination. |  |

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| Course Outcomes: Having completed this course, the learner will be able to: | |
| 1. | Get acquainted with the use of microscope for viewing stained specimen. |
| 2. | Use common laboratory equipments. |
| 3. | Become proficient at safety procedures & microbial handling techniques. |
| 4. | Acquire requisite laboratory skills in preparing stained smear and identify the morphology and arrangement of bacteria. |

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| Suggested References: | |
| Sr. No. | References: |
| 1. | Experimental Microbiology - Rakesh J. Patel &Kiran R. Patel, Volume-I |
| 2. | Practical Microbiology- Dr. R.C. Dubey and Dr. D.K. Maheshwari (Revised edition), S. Chand publication |
| 3. | Microbiology : A Practical Approach – Dr Bhavesh Patel and Dr NandiniPhanse |

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| On-line resources to be used if available as reference material |

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