VIDHYADEEP UNIVERSITY

B.Sc. MICROBIOLOGY

Teaching & Evaluation Scheme

Semester – I & II

Course name: Bachelor of Science (Microbiology)			**Semester I**						
Grade System:									
Subject			Teaching Scheme		Examination Scheme		Passing Scheme		Total Marks
Code	Paper No.	Paper Title	Hours/week	Credit	Theory		Passing Head		
			Theory	Theory	Internal	External	Internal	External	
11111031101	MB 101	Introduction to Microbiology	2	2	20	50	9	17	70
11111031102	MB 102	Bacterial Morphology & Biological stains	2	2	20	50	9	17	70
11111031103	MBP 103	Practicals	4	2	20	40	9	14	60

Course name: Bachelor of Science (Microbiology)			**Semester II**						
Grade System:									
Subject			Teaching Scheme		Examination Scheme		Passing Scheme		Total Marks
Code	Paper No.	Paper Title	Hours/ week	Credit	Theory		Passing Head		
			Theory	Theory	Internal	External	Internal	External	
1111203201	MB 201	Bacterial Growth & Nutrition	2	2	20	50	9	17	70
1111203202	MB 202	Introduction to Biochemistry	2	2	20	50	9	17	70
1111203203	MBP 203	Practicals	4	2	20	40	9	14	60

VIDHYADEEP UNIVERSITY
VIDHYADEEP INSTITUTE OF SCIENCE, ANITA(KIM)
DEPARTMENT OF MICROBIOLOGY

F.Y.B.Sc (Microbiology)

SEM-1

MB - 101: INTRODUCTION TO MICROBIOLOGY

❖ Unit-1 History Of Microbiology

1.1 Contribution of Pioneers
1.2 Spontaneous Generation
1.3 Introduction to Major Gropus of Microorganisms: Bacteria, Fungi, Algae, Protozoa, Viruses.
1.4 Applied Areas of Microbiology

❖ Unit-2 Taxonomy & Classification Of Microbiology

2.1 Bacterial Nomenclature
2.2 Whitteker's Classification System of Prokaryotes
2.3 Introduction to Bergey's Manual of Determinative & Systematic Classification

❖ Unit-3 Basics Of Microscopy-I

3.1 Definitions
3.2 Bright field Microscopy
3.3 Dark field Microscopy
3.4 Phase Contrast Microscopy
3.5 Fluorescence Microscopy

❖ Unit – 4 Basics Of Microscopy-II

4.1 Differential Interface Microscopy
4.2 Confocal Microscopy
4.3 Scanning Eleotron Microscopy
4.4 Transmission Electron Microscopy

❖ References

- Prescott- 9TH Edition
- Microbiology, Authors– Pelczar, Chan & Kreig
- Biology Of Microorganisms, Brock & Madigan..
- Elementary Microbiology- H.A. Modi.

MB-102: BACTERIAL MORPHOLOGY & STAINS

- **Unit – 1 Bacterial Morphology**

1.1 Size, Shape & Arrangement of Bacterial Cells
1.2 The Cell Wall of Bacteria: Structure & Chemical Composition of Gram Positive & Gram Negative Bacterial Cell Wall
1.3 Bacterial Spores : Types of Spore, Structure & Formation of Endospores
1.4 Cyst formation

- **Unit - 2 External Structures**

2.1 Capsule
2.2 Flagella
2.3 Pili
2.4 Prostheca Sheath & Stalk

- **Unit – 3 Internal Structures**

3.1 Cell Membrane
3.2 Protoplast & Spheroplast
3.3 Intracellular Membrane System
3.4 Cytoplasm & Cytoplasmic Inclusions
3.5 Nuclear Material

- **Unit - 4 Dyes & Stains**

4.1 Dyes-Acidic & Basic Dyes Chromophore, Classification of Biological Stains
4.2 Staining Solution: Intensifier, Mordants
4.3 Theories of Staining
4.4 Staining of Bacteria

- **References**
  - Microbiology, Authors– Pelczar, Chan & Kreig
  - Fundamental Principles of Bacteriology- A.J. Salle.
  - Elementary Microbiology- H.A. Modi.
  - Prescott- 9^{TH} Edition

MB 103: PRACTICALS

1. Introduction To Microbiology Laboratory Instruments/ Equipments: Autoclave, Incubator, Hot Air Oven, Centrifuge, Colorimeter, Laminar Air Flow, pH Meter, Colony Counter, Magnetic Stirrer, Anaerobic Jar, Filtration Unit.
2. Introduction to Microscope Components and Its Use.
3. Gram Staining by Hucker's modification method.
4. Capsuie Staining by Manevals method.
5. Flageller Staining by Leifson's method.
6. Cytoplasmic Membrane Staining by Victoria blue stain.
7. Endospore Staining by Dorner's method
8. Prepretion of Standard Solutions.
   - Precent Solutions
   - Part Solutions
   - Molar Solutions
   - Normal Solutions
   - Molal Solutions
   - ppm And ppb Solutions
9. Monochrome Stalning by acidic and basic dye.
10. Bacterial Motility by Hanging Drop Technique.
11. Hay Infusion by Wet Mount Technique.

❖ References:

➢ Patel R. J. And Patel R. K. (2016) Experimental Microbiology Volume 1, 9th Edition, Aditya.

F.Y. B.Sc (Microbiology)

SEMESTER -2

- **MB – 201 BACTERIAL GROWTH & NUTRITION**

  - **Unit - 1 Bacterial Nutrition**
    1.1 Nutritional Requirements Of Bacteria
    1.2 Nutrients: Carbon, Hydrogen, Oxygen & Electrons
    1.3 Nutrients: Nitrogen, Phosphorous & Sulphur
    1.4 Uptake Of Nutrients

  - **Unit – 2 Bacterial Growth:**
    2.1 Bacterial Reproduction : Binary Fission
    2.2 Cytokinesis
    2.3 Growth Curve
    2.4 Chemostat & Turbidostat

  - **Unit – 3 Bacterial Cultivation**
    3.1 Types of Media
    3.2 Isolation Techniques: Streak Plate Method, Spread Plate Method, Pour Plate Method
    3.3 Bacterial Preservation

  - **Unit – 4 Environmental Factors**
    4.1 Temperature
    4.2 pH
    4.3 Pressure
    4.4 Radiation
    4.5 Oxygen Concentration
    4.6 Solutes & Water Activity

  - **References:**

- Willey J.M., Sherwood L.M. & Woolverton C.J.(2017) Prescott's Microbiology, 10th Edition, Mcgraw Hill Education (Isbn : 978-981-3151-26-0) (2008).

- Prescott, Harley & Klein's Microbiology, 7th Edition Mcgraw-Hill, Education, (ISBN 978-007-1267274).
- Microbiology, Authors– Pelczar, Chan & Kreig

MB – 202: BIOCHEMISTRY

- **Unit – 1 Carbohydrates**
  - 1.1 Functions of Carbohydrate
  - 1.2 Classification of Carbohydrate
    - 1.2.1 Monasaccharides – Glucose
    - 1.2.2 Disaccharides
    - 1.2.3 Polysaccharides
  - 1.3 Glycoproteins

- **Unit – 2 Nucleic Acids**
  - 2.1 Functions & Components of Nucleic Acid
  - 2.2 Nucleotides
  - 2.3 Structure of DNA
  - 2.4 Organization of DNA In the Cells
  - 2.5 Structure & Types of RNA
  - 2.6 Catalytic RNA- Ribozymes

- **Unit – 3 Amino Acids & Proteins**
  - 3.1 Function & Elemental Composition of Protiens
  - 3.2 Amino Acids
  - 3.3 Structure of Proteins
  - 3.4 Properties of Proteins
  - 3.5 Classification of Proteins
  - 3.6 Biologically Important Peptides

- **Unit – 4 Lipids**
  - 4.1 Classification & Function of Lipids
  - 4.2 Fatty Acids: Essential Fatty Acids, Trans Vfatty Acids
  - 4.3 Structure & Properties of Triacylgycerol
  - 4.4 Phospholipids, Glycerophospholipids, Sphingomyelin & Functions of Phospholipids
  - 4.5 Glycolipids
  - 4.6 Lipoproteins

4.7 Steroids
4.8 Amphipathic Lipids, Soaps & Detergents

❖ **References:**

- U. Satyanarayana & U. Chakrapani (2017) Biochemistry 5th Edition

MB 203: PRACTICALS

1. Preperation of Nutrient Broth/Agar.
2. Acid Fast Staining by Ziehl nelson's method.
3. Spirochaete Staining by Fontana's method.
4. Cell Well Staining by Dyer' method.
5. Nucleus Staining by Feulgen's method
6. Bacterial Cultivation by Broth Culture, Slant Culture and Stab Culture Techniques.
7. Bacterial Isolation by Streak Plate, Pour Plate and Spread Plate Techniques.
8. Cultivation of Anaerobic Bacteria.
9. Maintenance & Preservation of Bacteria.
10. Effect of Environmental Factors: Temperature, pH and Osmotic Pressure

❖ **References:**

- Patel R. J. And Patel R. K. (2016) Experimental Microbiology Volume 1, 9th Edition, Aditya.