

SARDAR PATEL UNIVERSITY
B. Sc.- Microbiology
Semester - IV
US04CMIC 21- Environmental Microbiology
(04 Credits; 4 Hrs/week)
(Effective from June 2019)

Unit : 1

Microorganisms and their Habitats:

- Structure and function of ecosystems Terrestrial Environment:
- Soil profile and soil microflora
- Aquatic Environment: Microflora of fresh water and marine habitats
- Atmosphere: Aeromicroflora and dispersal of microbes
- Extremophiles: Microbes thriving at high & low temperatures, pH, Osmotic pressure & salinity.

Unit : 2

Soil Microbiology

Microbial Interactions :

- Microbe interactions: Mutualism, synergism, commensalism, competition, amensalism, parasitism.

Biogeochemical Cycling :

- Carbon cycle: Microbial degradation of cellulose, hemicelluloses, lignin and chitin
- Nitrogen cycle: Nitrogen fixation, Ammonification, Nitrification, Denitrification and Nitrate reduction.
- Sulphur cycle: Microbes involved in sulphur cycle

Unit : 3

Water Microbiology :

- Types of natural Waters
- Nuisance microbes in water
- Bacteriological Examination of Domestic water : presumptive test/MPN test, confirmed and completed tests for faecal coliforms , IMViC Test, Membrane filter technique.
- Purification of Water : Sedimentation, Filtration & Disinfection.
- Water borne Diseases.

Unit : 4

Waste Water Microbiology :

- Liquid waste management: Composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment.
- Solid Waste management: Sources and types of solid waste, Methods of solid waste disposal (composting and sanitary landfill)

Reference Books :

1. Microbiology - Pelczar, Chan, & Krieg , 5th edition
2. General Microbiology - Vol – II - Powar & Dagainawala

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B. Sc.- Microbiology
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US04CMIC 22- Elements of Microbiology- II
(04 Credits; 4 Hrs/week)
(Effective from June 2019)

Unit : 1

Eucaryotic Microbes :

- (a) Fungi : General characteristics & Significance.
- (b) Algae : General characteristics & Significance.
- (c) Protozoa : General characteristics & Significance
- (d) Introduction to Lichens, Slime molds and their significance.

Unit : 2

Viruses:

- (a) General characteristics, Cultivation and Enumeration of viruses.
- (b) Bacteriophages: Introduction, Morphological groups and Introduction to Lytic cycle and Lysogeny.
- (c) Animal Viruses : Introduction and general life cycle of Animal Viruses.
- (d) Plant Viruses : TMV.
- (e) Introduction to Prions & Viroids.

Unit : 3

Microbiology of Food :

- Food as a substrate for Microorganisms.
- Microbial flora of food
- Factors affecting kinds and numbers of microorganisms : intrinsic and extrinsic
- Microbial Spoilage of food & Food Poisoning , Role of *Clostridium botulinum* & *Salmonella* spp.
- Preservation of food and Milk
 - A. General principles
 - B. Methods of preservation:
 - i. Use of aseptic handling
 - ii. High temperature: Sterilization, canning
 - iii. Low temperature: Refrigeration and freezing
 - iv. Dehydration
 - v. Osmotic pressure
 - vi. Preservatives
 - vii. Radiations: Ionizing and non-ionizing radiation
- Indian fermented food products : Pickles & Idli.
- Microbes as food: Mushrooms & Spirulina.

Unit : 4

Microbiology of milk and milk products:

- Sources of microorganism in milk
- Types of microorganisms in milk
- Milk borne diseases
- Microbiological examination of milk:
- Pasteurization of milk, Phosphatase test, MBRT & Resazurin test
- Some dairy milk products: Butter, Cheese.
- Introduction to probiotics, prebiotics, Synbiotics.

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B. Sc.- Microbiology

Semester - IV

US04CMIC 23- Environmental Microbiology (Practicals)

(02 Credits; 4 Hrs/week)

(Effective from June 2019)

1. Bacteriological analysis of Air.
2. Bacteriological Quantitative analysis of Soil.
3. Qualitative analysis of water: presumptive test , confirmed and completed tests.
4. Quantitative analysis of Water : SPC
5. Detection of Coliforms in water by MPN test .
6. Determination of Potability ratio of water.
7. Determination of Dissolved Oxygen by Winkler's Method.
8. Study of Nitrogen fixing Bacteria : Rhizobium & Azotobacter.

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B. Sc.- Microbiology

Semester - IV

Elements of Microbiology- II (Practicals)

(02 Credits; 4 Hrs/week)

(Effective from June 2019)

1. Microbiological analysis of food - Standard plate count
2. Microbiological analysis of milk - Standard plate count
3. Determination of microbial load by use of MBRT.
4. Detection of Acid fast bacteria in milk.
5. Detection of Bacteriophage
6. Isolation of Yeast.
7. Study of Fungi - Wet mounting of Aspergillus, Penicillium, Rhizopus & Mucor.