

Course outcomes:

After successful completion of the course, students will be able to:

- CO 1. Develop theoretical knowledge about origin and evolution of microorganisms,
- CO 2. Learn comparative morphology, structure and reproduction in bacteria, Cyanobacteria, yeast, fungi and viruses
- CO 3. Acquire knowledge on interactions of microorganisms with plants and animals, various diseases caused by microorganisms in humans and the role of antibiotics in controlling the diseases
- CO 4. Learn about the role of microorganisms in spoilage of food and various methods of food preservation.

UNIT I (13 hrs)

Historical perspectives, origin and evolution of microorganisms, principles of classifications, numerical and molecular taxonomy, Comparative morphology, structure and reproduction in archaeobacteria, eubacteria, cyanobacteria, yeast and fungi. Microbial nutrition, **nutritional grouping of microorganism**; Growth kinetics, factors affecting growth and death; methods of isolation, enumeration, cultivation and preservation of microorganisms.

UNIT II (13 hrs)

Microbial metabolism: Microbial respiration, aerobic and anaerobic respiration, fermentation, Bacterial photosynthesis. General account of symbiosis, mutualism, antagonism, parasitism and commensalism in microorganisms.

UNIT III (13 hrs)

Classification, morphology, ultrastructure and life cycle of plant viruses, animal viruses and bacteriophages. DNA viruses: Herpes virus, Adenovirus, WTV; RNA viruses: Polio, Influenza, Corona, Retroviruses (HIV); Bacteriophages: lambda phage, bacteriophage MU, M13, T3, T4.

UNIT IV (13 hrs)

Plant microbe interactions: Rhizosphere, mycorrhizas, rhizobia, diazotrophs and endophytes. Plant pathogen interactions: *Phytophthora*, *Agrobacterium* and TMV. Animal microbe interactions: Tuberculosis, dermatophytes, Rabies, Mycoplasma and Rickettsia, typhoid, leprosy, cholera; Antibiotics: types, mode of action and drug resistance (Cholera, *Salmonella* and *Staphylococcus*), antimicrobial therapy. Principles of microbial spoilage of food, Methods of food preservation by physical (freezing, canning, pasteurization and irradiation) and chemical (preservatives, lactic antagonism) methods. Microbial food poisoning (botulism, mycotoxins, algal toxins, cholera and salmonellosis).

References

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