

MANGALORE UNIVERSITY
DEPARTMENT OF BIOSCIENCES
M.Sc. ENVIRONMENTAL SCIENCE
ESS405 ENVIRONMENTAL MICROBIOLOGY

Course Outcomes:

- CO1 Discuss about the role microorganisms in environment.
- CO2 Describe the role of microorganisms in the degradation of wastes.
- CO3 Study the microbial diversity found in the water.
- CO4 Understand the role of microorganisms in soil.
- CO5 Study air-borne diseases and prevention.

UNIT I (13 hours)

Introduction to microbiology, historical perspectives, branches and scope of microbiology. Microbial growth, population and growth curves, sterilization and culturing techniques, factors affecting growth and death of microorganisms: temperature, pH, water activity, O-R potential, salinity, hydrostatic pressure, disinfectants, antiseptics and chemotherapeutic agents.

UNIT II (13 hours)

Microbial Ecology: Microbial symbiosis, mutualism, plant-microbe interactions (e.g. mycorrhizas), animal-microbe interactions (human, ruminants and non-ruminants). Microbes in hydrothermal vents and coral reefs. Aquatic Microbiology: Microbes in water and methods of their estimation (e.g. MPN), drinking water standards, water-borne diseases and prevention.

UNIT III (13 hours)

Soil Microbiology: Soil microflora and methods of their estimation, role of soil microorganisms in bioconversion and decomposition. Biological nitrogen fixation (symbiotic and non-symbiotic), microbial phosphorus solubilization and their importance in soil fertility and agriculture. Air Microbiology: Microflora of air and methods of their estimation, air-borne diseases and prevention.

References:

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2. Pelczar, J. and Chan, E.C.S., Element of Microbiology, Mac Graw Hill New York.
3. Schlegel, H.G., General Microbiology, Cambridge Univ. Press.
4. Rosenberg, E. and Cohen I.R., Microbial Biology, Saunders Coll. Publ.
5. Stanier, R.Y. *et al.*, The Microbial World, Prentice Hall, New Delhi.
6. Atlas, R.M. and Bartha R. Benjamin, Microbial Ecology, Cummings Sci. Press, USA.
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8. Doelle, H.W., Bacterial Metabolism. Academic Press, London.
9. Nickilin *et al.*, Instant Notes in Microbiology, Via Books Pvt. Ltd., New Delhi.
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13. Casida, L.E., Industrial Microbiology, Wiley Eastern Ltd., New Delhi.
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15. Subba Rao, N.S., Advances in Agricultural Microbiology, Oxford and IBH Publ., New Delhi.
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