MANGALORE UNIVERSITY

Department of Biosciences

MSc Environmental Science

ESH403 ENVIRONMENTAL MICROBIOLOGY

Course Outcomes:

CO1 Discuss about the role microorganisms in metal extraction and how it is different from chemical extraction.
CO2 Describe the role of microorganisms in the degradation of wastes.
CO3Study the microbial diversity found in the environment.
CO4 Understand the role of microorganisms in the biodegradation and bioremediation of different types of waste.

UNIT I (13 hours)

Introduction**,** concepts and scope of environmental microorganisms as components of ecosystem, classification and characteristics of Microorganisms, microbial interactions. Microorganisms as bio-indicators in the environment, role of microorganisms in CNS cycles.

UNIT II (13 hours)

Microbial diversity of environment: Microbes in air, water, wastewater and soil. Distribution, sampling techniques and identification of microbes. Microbes of extreme environment. Mechanisms of adaptation by microorganisms to environmental extremes.

UNIT III (13 hours)

Microbes in the degradation of wastes, Bioremediation - its role in Environmental management, advantages and disadvantages. Control of pests and diseases by microorganisms. Treatment of solid and liquid industrial wastes. Microbial degradation of pesticides.

UNIT IV (13 hours)

Microbes in metal extraction, mineral leaching and mining, copper extraction by leaching and microbes in petroleum product formation. Microbial influenced corrosion and remedies. Indicator organisms in waters. Ecological implications of genetically modified microorganisms.

References:

1. Arora, D.R. and Aora, B. Text Book of Microbiology, CBS Publ. & Dist. Pvt. Ltd., New Delhi (2012)
2. Brock, T.B. and Madigon, M.T. Biology of microorganisms, Prentice Hall.
3. Cambell, R. Microbial Ecology. Blackwell Scientific Publ., London.
4. Kanika Sharma. Manual of Microbology-Tools snd Techniques, Ane Books Pvt. Ltd.
5. Maria, Csuros and Csaba Csuros. Microbiological examination of Water and Wastewater.
6. Maier, R.M., Pepper, I.L. and Gerba, C.P. Environmental Microbiology.
7. Patrick, K. Jemba. Environmental Microbiology -Principles and Applications.
8. Pelzar. Text book of Microbiology
9. Rao, A.S. Introduction to Microbiology.
10. Sharma, P.D. Environmental Microbiology
11. Singh S.N. and Tripathi R.D. Environmental bioremediation technologies.

11. Text book of Environmental Microbiology, Mohapatra - Technology and Engineering