

COURSE CODE: ENE-212
COURSE NAME: Environmental Microbiology
CREDIT HOURS: Theory = 02 Practical = 01 Total = 03
CONTACT HOURS: Theory = 32 Practical = 48 Total = 80
PREREQUISITE: None
MODE OF TEACHING: Instruction: 2 hours of Lecture per week (67%)
 Lab Demonstration: 3 hours of Lab work per week (33%)

Course Description:

This course will provide an awareness and understanding to the students about the role of microorganisms in the environment. After completion of this course, students will be able to understand the significance, role and applications of microorganisms in the environment.

TOPICS COVERED:

Week	Topic
1	Introduction and history of environmental microbiology
2	Groups of microorganisms: protozoans, algae, fungi, bacteria and viruses (general characteristics)
3	Groups of microorganisms: protozoans, algae, fungi, bacteria and viruses (general characteristics)
4	Bacterial cell structure and metabolism
5	Eubacteria and archea
6	Eubacteria and archea
7	Characterization of bacterial colonies and cells
8	Characterization of bacterial colonies and cells
9	Mid Semester Exam
10	Environmental factors affecting the microbial growth
11	Environmental factors affecting the microbial growth

12	Microbial genetics (Conjugation, transformation and transduction)
13	Microbial genetics (Conjugation, transformation and transduction)
14	Microbial interactions
15	Role of microbes in environment/industry: biogeochemical cycles, biodegradation and bioremediation, food and health, biological warfare agents.
16	Role of microbes in environment/industry: biogeochemical cycles, biodegradation and bioremediation, food and health, biological warfare agents.
17	Role of microbes in environment/industry: biogeochemical cycles, biodegradation and bioremediation, food and health, biological warfare agents.
18	End Semester Exam

Lab/Practical:

Week	Practical
1	Introduction to basic techniques for sterilization/disinfection, isolation, purification and characterizations
2	Introduction to basic techniques for sterilization/disinfection, isolation, purification and characterizations
3	Introduction to basic techniques for sterilization/disinfection, isolation, purification and characterizations
4	Dilution plate technique
5	Dilution plate technique
6	Dilution plate technique
7	Mean plate count
8	Mean plate count
9	Mid Semester Exam
10	Microscopy
11	Microscopy
12	Measurement of bacterial growth
13	Measurement of bacterial growth

14	Measurement of bacterial growth
15-16	Measurement of bacterial growth
17	
18	End Semester Exam

Text and Material:

1. Environmental Microbiology, Maier, F.M., Pepper, I.L. and Gerba, C.P. 2nd Edition, Academic Press, London, UK, 2009.
2. Microbiology, Prescott, L.M., Harley, J.P. and Klein, D.A. McGraw-Hill Inc., USA.
3. Modern Soil Microbiology 2nd Edition by Jan Dirk van Elsas (Editor), Jack T. Trevors (Editor), Janet K. Jansson
4. Frontiers in Soil and Environmental Microbiology By Suraja Kumar Nayak, Bibhuti Bhusan Mishra, 2020

ASSESSMENT SYSTEM:

Theoretical/Instruction	100%
Assignments	10%
Quizzes	15%
Mid Semester Exam	25%
End Semester Exam	50%
Practical Work	100%
Lab Work	70%
Lab Exam/Projects	30%