ES 223: Microbial Ecology

Credits: 3

Coordinator: Meenakshi Dua, SES/JNU

Course Description:

An overview of microbial life and its importance in the environment, Microbial cell structure and function with special emphasis on *Bacteria* and *Archaea,* Microbial nutrition and growth, Bioenergetics and metabolism with emphasis on microbial metabolic and functional diversity, Environmental factors affecting microbial growth and microbial adaptations to extreme environments (like arctic regions, hot springs and deep sea), Microbial evolution and phylogeny including the species concept, Methods in microbial ecology, Microbial ecosystems (terrestrial and aquatic), Natural microbial communities with emphasis on mats and biofilms, Introduction to geomicrobiology, Microbial biogeochemical processes of nutrient cycling and biodegradation, Microbiology of the built environment, Microbial interactions (symbioses): microbe-microbe interactions, plants as microbial habitats, animals as microbial habitats and the healthy human microbiome

Course Presentation:

The lectures will provide an elaborate teaching of the course contents. Students may supplement with suggested readings. The course shall begin with textbook teaching of basic microbial ecology with the aim of familiarizing the students with the various processes carried out by the microbes naturally in the environment, culminating into how these have been utilized by us for environmental, industrial and biotechnological applications. In addition to the semester exams, assessment will be done based on: **presentation**, in-class **quizzes** and/or **written assignment.** The presentation and the assignment will be graded for clarity and organization (30%), substantiation of facts (30%), use of time (20%) and answering queries (20%).

Grading/Evaluation:

The final grade in the course will be based on marks assigned as follows:

Presentation	10%
In-class quizzes/Assignment	20%
Midterm exams	30%
Final exams	40%

Suggested Text:

1. Madigan, Bender, Stahl. Brock Biology of Microorganisms. Pearson.
2. Maier, Pepper, Gerba. Environmental Microbiology. Academic Press.
3. Kurt Konhauser. Introduction to Geomicrobiology. Blackwell Publishing.
4. Atlas, RM and Bartha, R. Microbial Ecology: Fundamentals and Applications. Pearson.
5. Schmidt and Schaechter. Topics in Ecological and Environmental Microbiology. Academic Press.