



蘇州大學  
Soochow University

## **BIO 337 Applied Environmental Microbiology**

**Summer 2024**

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

### **COURSE OBJECTIVES**

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This course is a comprehensive course designed to explore the critical role of microorganisms in ecosystems. This course will delve into the diverse functions and impacts of microbial communities on environmental health, nutrient cycling, and biogeochemical processes. Students will gain an understanding of how microbes interact with their surroundings in various ecosystems, including wetlands and lakes, aquifers and deep subsurface environments, as well as extreme habitats like polar ice and desert surfaces.

Upon completion of this course, students will be able to:

1. Understand the fundamental principles of microbial ecology.
2. Comprehend the structure and function of microbial communities in different ecosystems.
3. Analyze the biogeochemical cycles influenced by microbial activity.
4. Evaluate the impact of environmental stressors on microbial populations and ecosystem health.
5. Apply molecular techniques for the study of environmental microorganisms.
6. Foster an appreciation for the importance of microbial biodiversity and its conservation.
7. Analyze and discuss primary literature articles in the field of environmental microbiology to improve critical thinking and evaluation skills.

### **PREREQUISITES**

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BIO 220 Introductory Ecology

### **GRADING**

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Grades will be determined by accumulating points, with 100 points being the



maximum, as follows:

ITEM	POINTS
Class Participation	10 Points
Assignments	20 Points
Quiz	15 Points
Presentation	10 Points
Midterm Exam	25 Points
Final Paper	20 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$ .

We reserve the right to make adjustments to the overall grading policy.

## COURSE MATERIALS

### Required Texts:

1. Ian L. Pepper, Charles P. Gerba, and Terry J. Gentry, *Environmental Microbiology*(3rd ed), 2014, Academic Press Inc.
2. Ronald M. Atlas, Richard Bartha, *Microbial Ecology: Fundamentals and Applications*(4th ed), Pearson.

### Recommended (Optional) Texts or Other Materials:

None

## COURSE TOPICS

MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: Microbial Diversity in Ecosystems Topic 2: Microbial Roles in Wetland Environments Topic 3: Lake Microbiology and Ecological Functions Topic 4: Microorganisms in Aquatic Ecosystems <b>Assessments:</b> Assignment # 1



Module 2	<b>Topics:</b> Topic 5: Microbial Communities in Subsurface Environments Topic 6: Microbiology of Polar Ice and Extreme Cold Environments Topic 7: Microbial Adaptations on Desert Surfaces Topic 8: Microbial Involvement in Biogeochemical Cycling <b>Assessments:</b> Quiz
Module 3	<b>Topics:</b> Topic 9: Redox Processes Mediated by Microorganisms Topic 10: Biodegradation of Environmental Contaminants Topic 11: Microbes in Atmospheric Processes Topic 12: Microbial Symbiosis and Mutualism <b>Assessments:</b> Midterm Exam
Module 4	<b>Topics:</b> Topic 13: Microorganisms in Urban Environments Topic 14: Microbial Communities in Agricultural Systems Topic 15: Microbial Ecology of Forest Ecosystems Topic 16: Microbial Responses to Climate Change <b>Assessments:</b> Assignment # 2
Module 5	<b>Topics:</b> Topic 17: Microbial Influences on Ecosystem Topic 18: Microbial Monitoring of Environmental Quality Topic 19: Environmental Policy and Microbiology Topic 20: Microbial Interactions with Anthropogenic Activities <b>Assessments:</b> Presentation Final Paper

## ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately



prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.

### **LEARNING REQUIREMENTS**

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- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

### **TECHNOLOGY POLICY**

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The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (e.g., note taking, reading course documents).

### **ACADEMIC INTEGRITY POLICY**

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Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

### **DISABILITY ACCOMMODATION**

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Soochow University is committed to maintaining a barrier-free environment so that



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students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material.