

OCES 4201 - Environmental Microbiology

3 Credits

Course objectives:

The course aims to introduce the students to (i) the fundamental features of microorganisms that live in the natural environment, (ii) the roles of microorganisms in natural processes that shape our ecosystem, and (iii) the use of microorganisms in environmental technology. Key concepts are illustrated using real-life examples and case studies.

Intended Learning outcomes:

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

- Appreciate the vast diversity of microorganisms living in the natural environment.
- Understand the key ecological processes driven by environmental microorganisms.
- Understand the principal of the methods in detecting and analyzing the diversity and functions of microbial communities in the environment.
- Explain the microbiological principles underlying several environmental technologies.

Course Assessment:

- TBA

Major References:

Environmental microbiology: fundamentals and applications

<https://lbdiscover.ust.hk/bib/991008133149703412>

Microbial ecology

<https://lbdiscover.ust.hk/bib/991012623430303412>

Course Assessment:

Continuous assessment - 8 Quizzes (80 %)

Class presentation (10 %) + written report (10 %)

All submission will be scanned using anti-plagiarism software. Suspected and confirmed cases of misconduct will be handled in accordance with departmental and university policy.

Course Schedule:

Lecture Topic
Introduction to Environmental Microbiology
Microbial diversity in the environment (1)
Microbial diversity in the environment (2)
Microbial structures and their functions in the environment (1) Quiz on Canvas
Lab (CYT UG002)
Lab (CYT UG002)
Microbial structures and their functions in the environment (2)
Microbial nutrition, metabolism and physiology (1) Quiz on Canvas
Microbial nutrition, metabolism and physiology (2)
Quorum sensing: bacterial communication (1) Quiz on Canvas
Quorum sensing: bacterial communication (2)
Biofilms: bacterial multicellularity (1) Quiz on Canvas
Public holiday
Biofilms: bacterial multicellularity (2)
Antibiotics: bacterial competition (1) Quiz on Canvas
Antibiotics: bacterial competition (2)
Environmental microorganisms and human diseases (1)
Environmental microorganisms and human diseases (2) Quiz on Canvas
Monitoring of microbiological quality of water resources (1)
Monitoring of microbiological quality of water resources (2) Quiz on Canvas
Biogeochemical cycling (1)
Lab (CYT UG002)
Lab (CYT UG002)
Biogeochemical cycling (2)
Microbes and climate change Quiz on Canvas
Class presentation