Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: ENVT
Course and Section #: 1270-01
Course Title: Environmental Microbiology
Credits: 3

Course Description

Provides an understanding of general microbiology tailored to the needs of earth scientists, environmental scientists, water managers, public health workers, and environmental managers. Discusses the role microorganisms in global biogeochemical cycles, nutrient and energy resources, and the impacts of microbial activities on the lithosphere, atmosphere, hydrosphere, and biosphere. Links impacts of microbial activities to water quality, wastewater treatment, agriculture, environmental change, and others.

Course Attributes

This course has the following attributes:

☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☒ Elective Core Requirements in Program
☐ Open Elective

Other: *Click here to enter text.*

Instructor Information

Instructor Name: Tara Bishop

Student Learning Outcomes

1	Describe the types of micro-organisms found in soil, air, and water and their roles in biogeochemical cycling, sediment formation, biomineralization, and trophic dynamics.
2	Apply scientific methods in environmental microbiology for combating pathogens and contaminating micro-organisms. e.g. collection, isolation, sterilization and disinfection procedures, and investigation of microbial flora from various environments.
3	Test the microbial function in the context of changing environmental characteristics.
4	Investigate the basic principles of environmental microbiology in solving problems related to the impacts of microbes on their environments such as water and air quality, soils contamination, and bioremediation.

5	Review current peer-reviewed research in environmental microbiology and contextualize the research through written communication.

Course Materials and Texts

Microbiology for Earth Scientists by Matthew F. Kirk (Kansas State University).
This is an Open Educational Resource and is free of charge as a PDF.
Download the PDF here: https://newprairiepress.org/ebooks/53/

Course Requirements

Course Assignments, Assessments, and Grading Policy

- Chapter readings with included concept check questions for students to formatively check for understanding
- Formative assessments on reading assignments
- Lab analysis write ups to answer summative questions about each in-class lab activity
- Summative assessments in the form of midterm and final exam

Final marks will be earned based on the percentage total (calculated from the total below) converted to a letter grade according to a straight scale. **Do not expect grades to be curved or rounded up.** I do not give grades, you earn your grade. It would be unethical of me to give you a grade that you did not earn, and it would be unethical for you to ask for a grade that you did not earn. Your grade is your responsibility; therefore, please keep track of your grade in Canvas and contact me if any issues need to be addressed prior to the end of the course.

A	93 – 100%	Demonstrates a ***mastery!*** of the learning objectives
A-	90 – 92%	
B+	86 – 89%	
B	83 – 85%	Demonstrates a ***functional level*** of the learning objectives
B-	80 – 82%	
C+	76 – 79%	
C	73 – 75%	Demonstrates ***basic achievement*** of learning objectives
C-	70 – 72%	
D	60 – 69%	Met some learning objectives but has ***significant deficits***
E	0-59%	***Failure to demonstrate an understanding*** of learning objectives

Required or Recommended Reading Assignments
You will be assigned to read most chapters within the required textbook

General Description of the Subject Matter of Each Lecture or Discussion

1. Introduction to Environmental Microbiology and Classification
    a. Earth's microbiome
    b. Classification and Phylogenies
2. Properties of Microbes
    a. Basic Morphology
    b. General classifications of major microbial groups
    c. LAB: Contact Slide Assay of Soil Microbes

3. Redox and Metabolism
    a. Homework: Balancing and solving redox equations
4. Biogeochemical Cycles
    a. Nitrogen
    b. Carbon
    c. Biological Soil Crusts
    d. Iron
    e. Sulfur
    f. Phosphorus
5. Basic Environmental Controls of Microbes
6. Simple Thermodynamics and Energy Resources
    a. Enzymatic activity
    b. Gibbs free energy
7. Impacts of Microbial Activities
    a. Mechanisms of Microbial Activity on the Environment
    b. Impacts on Hydrosphere
        i. LAB: Water Quality
    c. Impacts on Lithosphere
        i. LAB: Soil Quality
    d. Impacts on Atmosphere
        i. LAB: Lichen Lab

Required Course Syllabus Statements

Generative AI

Artificial Intelligence (AI) programs are not a replacement for your human creativity, originality, and critical thinking. Writing, thinking, and researching are crafts that you must develop over time to develop your own individual voice. At the same time, you should learn how to use AI and in what instances AI can be helpful to you.

The use of generative AI tools (e.g. ChatGPT, Google Bard, etc.) is permitted in this course for the following activities:

- Brainstorming and refining your ideas;
- Fine tuning your research questions;
- Finding information on your topic;
- Drafting an outline to organize your thoughts; and
- Checking grammar and style of drafts. This does not mean that it rewrites your work for you. An AI detector shouldn't be able to flag your work.

The use of generative AI tools is NOT permitted in this course for the following activities:

- Impersonating you in classroom contexts, such as by using the tool to compose discussion board prompts/responses assigned to you or content that you put into a Teams/Canvas chat.
- Completing group work that your group has assigned to you, unless it is mutually agreed upon that you may utilize the tool.
- Writing a draft of a writing assignment.
- Writing or re-writing entire sentences, paragraphs or papers to complete class assignments.

You are responsible for the information you submit based on an AI query (for instance, that it does not violate intellectual property laws, or contain misinformation or unethical content). Your use of AI tools

must be properly documented and cited in order to stay within university policies on academic honesty. All assignments will be automatically checked through the University's AI and Plagiarism checker. Any student work submitted using AI tools should clearly indicate what work is the student's work and what part is generated by the AI. In such cases, no more than 25% of the student work should be found to be generated by AI. If any part of this is co**nfusing or uncertain, please reach out to me for a conversation before submitting your work.**

Using Remote Testing Software

☒ This course does not use remote testing software.

☐ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities

Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity

At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and

writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation
UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.