

ESM 220: Introduction to Environmental Systems, Winter 2025

Online Asynchronous Course Delivery

Course Instructor: Dr. Patrick Edwards

Virtual Office hours: TR 9:00-10:30 or by appointment

Email: patrick.edwards@pdx.edu

TA for the lab sections:

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Course Overview

Course Description: Introduction to the structure and function of terrestrial, aquatic, and atmospheric systems, including the human actions that affect them. Includes a lab that introduces basic quantitative techniques for collecting and analyzing data from environmental systems.

Course Objectives:

1. *Concepts and Content*
 - Factors that influence distribution and abundance of populations
 - Identification of environmental stressors and their effects on ecosystems
 - Energy and matter
 - Ecosystem services and conservation
 - Environmental Justice and Equity
2. *Information and Data Literacy*
 - Environmental science and experimentation
 - Reading and understanding scientific literature
 - Literature search and review
 - Basic ecological statistics
3. *Ecological Inquiry and Experimental Design*
 - Problem identification, hypotheses and experimental design
 - Data collection
 - Variable selection and control
4. *Communication*
 - Writing scientifically
 - Oral presentation

Required Text: *Environmental Science*, 2019 16th edition by Miller and Spoolman

This text will be used for both this ESM 220 course and the second course in the sequence (ESM 221). We will not be using the course supplementary material (Mindtap). The textbook is available on reserve at the PSU library.

Course Information

Course format:

Main section: The main lecture section for the course will be delivered asynchronous online. All lectures, quizzes and exams for the main section will be delivered online. There are no set meeting times for the main section.

Lab Section: The lab section for this course will be delivered asynchronous online. All lectures for lab will be delivered through online videos. All assignments will be completed online. There are no set meeting times for the lab section.

Assumptions that guide this course: The learning that takes place in this class is largely accomplished through student-led inquiry and research. In this class you will work collaboratively on projects that stress the application of concepts through inquiry-based activities and projects. While the inquiry-based approach of the course is a more engaging way to learn, it also places more responsibility on the student to guide one's own learning and intellectual development. Therefore, the learning you achieve in this class is largely a product of your participation in all aspects of the course.

Opportunities for help: We recognize that inquiry-based courses are challenging in the online setting, and we want to help you be successful. If you are having problems understanding the material or completing the assignments, please don't hesitate to contact the course professor or the lab TA to schedule a Zoom meeting. We know that it can be difficult to communicate complex topics and ideas through email, so a quick zoom session can really help your grade and relieve any stress you may be feeling about the course material.

There are multiple opportunities for getting help in the class. The in-person lab sessions are a great time to get help on the assignments and ask questions about the curriculum. The lab TAs are also available for office hours during lab times when we are not meeting in person. The course professor is also available most anytime to meet via zoom and will frequently attend the in-person lab sessions.

Course Structure

Main Lecture Section

Lectures and Skills. Course content will be delivered through textbook readings, supplementary readings, and video lectures. There are several skills that are needed to complete the final project. These skills will be taught and practiced in the lab section.

Quizzes and Exams: There are two exams and several quizzes in this class. All exams and quizzes are taken online. The quizzes are intended as practice for the exams. The quizzes can be taken as many times as necessary to achieve full credit. The quizzes must be taken before the

corresponding exam is due. The midterm and final exams will cover all readings, videos, lectures, skills, and lab sections. **The midterm and final exams cannot be taken late and cannot be made up.** See the quiz and exam study guide for more information.

Lab Section

Format: The lab for this class is asynchronous and online. All lectures and assignments for the lab are online and can be completed and submitted online.

Lab Assignments: Each lab will have an associated assignment that will require you to use the skills you learned from the lecture and lab materials. Lab assignments must be turned in at 11:59 pm on the Friday of each week unless otherwise specified. Late assignments will be penalized 15%.

Final project: The final project for this course is to conduct one of several stream ecology experiments that will be described in class. The experiment can be conducted in-field or virtually. The final project consists of an experimental proposal, field or virtual data collection, data analysis, written scientific report and presentation. The final project will be conducted as group in the lab section and consist of a proposal and three drafts: the peer review draft, a first draft and the final draft. To facilitate the peer review activity, **the peer review draft must be complete and submitted on time. Late peer review drafts will not be accepted.** Peer reviews will be conducted individually.

Groups and Group Work: The final project for this class is conducted in groups within the lab sections. Groups are self-formed and there will be opportunity to meet lab mates during the term. Several group discussions will be scheduled for you to meet your group members and discuss the final project.

Grading

Grading Information: We believe that correcting and resubmitting work is a valuable learning experience. All projects and quizzes in the course and lab may be corrected and resubmitted for full credit if turned in on time. However, to maintain the integrity of the class schedule and to be equitable to all students in class, the exams and the peer review project cannot be resubmitted or turned in late. Late assignments cannot be e-mailed and must be turned into in the proper Canvas assignment folder. Incompletes are only given for verified medical reasons. All late work and resubmitted work must be turned in by week 10 of the course, no exceptions.

Grading scale:

A: “superior”, high level integration and conceptual development with factual accuracy

B: “above average”, accurate with significant integration and conceptual development

C: “basic quality”, mostly accurate and simply factual, modest concept development

A 94 – 100

B+ 87 – 89

C+ 77 – 79

D+ 67 – 69

A- 90 – 93

B 83 – 86

C 73 – 76

D 63 – 66

B- 80 – 82

C- 70 – 72

D- 60 – 62

Statement on Academic Honesty: Plagiarism or academic dishonesty of any form will not be permitted in this class and will result in a failing grade for the assignment and failing grade for class participation. For more information, please see Portland State University's policy on academic honesty.

Canvas: This class will use Canvas to share information, project and the class schedule. Any changes to the schedule will be posted to Canvas as soon as possible. Your grades will also be posted on Canvas. All files submitted on Canvas must be a Word document (.docx) or a PDF (.pdf). Files from other programs cannot always be opened on your instructor's computer. If your file cannot be opened, it will not be graded.

Course Grade Breakdown and Grading Weights

Main Lecture Component (35%): Based on readings, lectures, and lab.

- Quizzes (5%): Unlimited attempts
- Midterm (10%): Two attempts
- Final (20%): Two attempts

Lab Component (65%):

- Lab assignments (15%): Individual work, due weekly
- Research Proposal (5%): Group work
- Peer Review (5%): Group and Individual work, peer grading of the final project paper
- Final Research Project Paper (35%): Group work, multiple drafts
- Presentation (5%): Group work, presentation of final project

Equity, Inclusion and Accommodation

Equity and Accommodations

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC is located in 116 Smith Memorial Student Union, 503-725-4150, drc@pdx.edu, <https://www.pdx.edu/drc>.

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.

- Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test.
- Please be aware that the accessible tables or chairs in the room should remain available for students who find that standard classroom seating is not useable.
- For information about emergency preparedness, please go to the Fire and Life Safety webpage (<https://www.pdx.edu/environmental-health-safety/fire-and-life-safety>) for information.

COVID-19 statement

We acknowledge during the COVID-19 pandemic, learning is likely more difficult as the lines between work, life and school are not well separated. We are here to be supportive and flexible to facilitate your academic success. As a student, you need to be communicative about your circumstances so we can accommodate them as best as possible. For more information about Covid policies, please see the [PSU Covid response page](#).

Title IX Reporting

As an instructor, one of my responsibilities is to help create a safe learning environment for my students and for the campus as a whole. We expect a culture of professionalism and mutual respect in our department and class. You may report any incident of discrimination or discriminatory harassment, including sexual harassment, to either the Office of Equity and Compliance or the Office of the Dean of Student Life.

Please be aware that as a faculty member, I have the responsibility to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination. If you would rather share information about sexual harassment or sexual violence to a confidential employee who does not have this reporting responsibility, including an Interpersonal Violence Advocate at the Women's Resource Center or the Queer Resource Center. You may contact a confidential advocate by calling 503-725-5672. This Sexual Misconduct Website provides a complete of those confidential employees and off campus resources.

For more information about Title IX please complete the required student module Creating a Safe Campus in your Canvas.

Land Acknowledgement

Portland State is located on the traditional homelands of the Multnomah, Kathlamet, Clackamas, Tumwater, Watlala bands of the Chinook, the Tualatin Kalapuya, and many other indigenous nations of the Columbia River. We acknowledge the ancestors of this place and understand that we are here because of the sacrifices forced upon them. By recognizing these communities, we honor their legacy, their lives, and their descendants.

ESM 220 Schedule, Winter 2025 (subject to revision)

Week/Date	Main Lecture	Lab Section
Week 1 Jan 6	Course introduction Unit 1: The Environment and sustainability, Environmental stressors. Reading: Ch 1 in text. Supplementary Reading: Black Elk Speaks, Natives Define the Natural Community. Syllabus Quiz 1	Lab 1: Histograms Skill 1: Histograms in Excel Skill 2: Histograms in R
Week 2 Jan 13	Unit 2: Matter and energy in ecosystems. Reading: Chs 2 and 3 in text. Supplementary video: RiverWebs.	Lab 2: Dispersion Skill 3: Boxplots in Excel Skill 4: Boxplots in R Skill 5: Bar charts in R
Week 3 Jan 20	Unit 3: Biodiversity and evolution. Reading: Ch 4 in text. Supplementary Reading: Species Diversity, EO Wilson. Quiz 2	Lab 3: Diversity and functional diversity Skill 5: calculating diversity in Excel Skill 6: calculating diversity in R
Week 4 Jan 27	Unit 4: Species interactions, disturbance, and succession. Reading: Ch 5 in text. Quiz 3	Lab 4: Bioassessment Skill 8: calculating Oregon Index of Biotic Integrity
Week 5 Feb 3	Midterm exam Unit 5: Introduction to Environmental Science. Supplementary reading: Braiding Sweetgrass, Robin Wall Kimmerer.	Lab 5: Environmental data analysis Skill 9: t test and p-value in Excel Skill 10: t test and p-value in R Skill 11: Scatterplots, linear models, R2 in Excel Skill 12: Scatterplots, linear models, R2 in R
Week 6 Feb 10	Unit 6: Introduce Final Project.	Lab 6: Final project and experiments Experiment proposal Reading Edwards 2016 and Edwards 2021
Week 7 Feb 17	Unit 7: Scientific Literature and the peer review process. Quiz 4	Lab 7: Scientific Writing Skill 13: Grammar and the SVO formula
Week 8 Feb 24	Unit 8: Climate and biodiversity. Reading: Ch 7 in text. Supplementary Video: Biodiversity is collapsing.	Work on final project
Week 9 March 3	Unit 9: Water resources and water pollution Reading: Ch 11 in text. Supplementary reading: The Poisoned River. Supplementary Videos: Elwha Dam Removal, Klamath Dam Removal, Carli Creek Restoration.	Peer review draft and peer review activity.
Week 10 March 10	Unit 10: Energy resources. Unit 11: Environmental politics and world views. Reading: Chs 13 and 17 in text. Supplementary Video: Indigenous Resource Management. Quiz 5	Final Project First Draft Work on final project Presentations
March 17	Final Exam	Final Project Second Draft