



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

Environmental Field Methods

3 credits

MEES

698V

Fall Semester

Course Objectives / Overview

This course will prepare students to apply field methods to understand and address the environmental challenges Maryland ecosystems are facing in the 21st century. Students will gain practical field skills with three field trips to the Appalachian Mountains of Western Maryland, suburban/urban areas of central Maryland, and coastal habitats of the Chesapeake Bay, Eastern Shore, Maryland Coastal Bays and Assateague Island. Students will plan and implement environmental field work, including analysis and communication of resulting data.

The goal is to provide students with practical field skills to complement the *Masters of Environmental Management* curriculum, which is a joint program between UMCES and Frostburg State University, and the *Marine Estuarine and Environmental Science* graduate program.

Course description:

Students develop the ability to measure important biological and physical parameters used to conceptualize terrestrial and aquatic environments within a socio-environmental context. Weekly lectures, discussion sessions and immersive experiences complement three multi-day field trips to learn measurement techniques, field campaign planning, sampling strategies, and field safety necessary for developing and testing questions about environmental conditions. Course exercises explore the diverse environments of Maryland, from the Appalachian Plateau to the Chesapeake Bay and coastal ocean. The course meets weekly for 3 hours on Fridays plus two weekend field trips (Friday - Sunday) and one-day field trip (Friday or Saturday depending on student availability).

Expected Learning Outcomes

1. Explore the diverse environments of Maryland from its mountains to the Chesapeake Bay and coastal ocean.
2. Generate socio-environmental questions that include environmental history, environmental justice, and economic drivers to comprehensively understand environmental challenges.
3. Communicate with community stakeholders and environmental managers to learn how the environment is monitored and how challenges are addressed in the field.
4. Develop a knowledge and hands-on experience of common field methods.
5. Experience collaborative team science.

INSTRUCTOR DETAILS:

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CLASS MEETING DETAILS:

Dates: Fall Semester

Times: Friday 1-4 PM + Field Trips

Originating Site:

ZOOM Meeting ID: (857 9842 6121)

Passcode (445210)

Room: Appalachian Lab blue room

COURSE TYPE:

Check all that apply

- ☐ Foundation
- ☐ Professional Development
- ☐ Issue Study Group
- ☐ Seminar
- ☒ Elective

Prerequisites

Admission to either the *Master of Environmental Management* program or the *Marine Estuarine and Environmental Science* graduate program.

Teaching Assistant

TBD

6. Explore how data are analyzed, synthesized and communicated to make a difference.

CURRICULUM FULFILLMENT:

This course fulfills a requirement for the *Masters of Environmental Management* program.

This course is an elective within the *Marine Estuarine and Environmental Science Program*

Course Assessment / Grading

- Field notebook ((25%)
- Fact Sheet; brochure/Resource Brief (25%)
- Data report synthesis; Field Trip comparison (25%)
- Participation(25%)

Weekly Course Schedule

Week 1 Introduction

A holistic look at Maryland from the Mountains to the Sea including physiographic setting, environmental history, settlement and development patterns, and characteristic environmental issues. Students will learn about an environmental justice index and will explore the diversity of management agencies and organizations that work within Maryland and the Chesapeake Bay watershed.

Week 2 Forest measurement techniques

An overview of forest management issues and how managers address them with skills and tools unique to forestry. Learn about forest management plans and how to monitor forest health and regeneration, including plot establishment, stem counts, biomass sampling, tree coring, and soil sampling. Learn about orienteering.

Week 3 Biological diversity

An overview of sampling biological diversity to assess richness and abundance of species, threatened and endangered species, species of interest, and nuisance species. Learn about survey techniques for various terrestrial and aquatic.

Week 4 Airscape field methods

An overview of sampling physical and chemical aspects of air that are important for human health. Learn about sampling and assessing air quality, soundscape, light pollution and viewshed. Plan the field trip to the mountains including learning about a field investigation report and field safety.

Week 5 Mountains Field Trip (Friday 1PM to Sunday 1PM)

Overview of field assessment techniques, data recording, and data curation following field work. Field notebook methods. Visit a state forest and streams impacted by acid mine drainage. Learn how to mist net and band birds, go on a bird walk, and set up an acoustic monitoring station. Visit a power plant and learn how it monitors air quality. Design a comparative field investigation and collect data.

Week 6 Estuarine water quality and long-term monitoring

Field trip debrief. Learn about water quality parameters and environmental thresholds for ecosystem health assessments.

Week 7 Tributaries and the coastal bays and ocean.

Learn about shoreline survey techniques, salt marsh delineation and aquatic grasses. Learn about citizen science programs. Plan the Chesapeake & coastal ocean field trip.

Week 8 Chesapeake & Coastal Ocean Field Trip.

Characterize the Choptank River marsh; plankton and water quality sampling and analyses, Maryland Coastal Bays and barrier island survey at Assateague Island National Seashore.

Week 9 Hydrology and streams

Chesapeake & Coastal Ocean field trip debrief. Learn about water quantity and discuss analysis approaches.

Week 10 Urban/Suburban field trip to Ellicott City and Baltimore

Water flow and water quality

Week 11 Introduction to Science communication, data visualization options

Urban/suburban field trip debrief. Learn about graphs, figures, tables, conceptual diagrams, photos, videos for science communication. Learn about Resource Management Interviews and develop questions, interview and preparation skills, and components of stakeholder engagement

Week 12 Data communication

Learn about data embedding, explanatory text, colors, symbols, size, and communication products

Week 13 Field method briefs and feedback

Finish the analysis, interpretation, and synthesis of data from field trips. Receive feedback for the layout and design of the field methods brief. See <https://www.nps.gov/im/arcn/briefs.htm> for examples.

Week 14 Course debrief and review.

Present data synthesis report for the field trip comparison. Field note books are due.

Required textbooks, reading and/or software or computer needs

Reading will be assigned as needed.

Course Communication

TBD

Resources

Access to a laptop or desktop computer. Field gear will be provided.

Campus Policies

The University of Maryland Center for Environmental Science has drafted and approved of various academic and research-related policies by which all students and faculty must abide.

Please visit <http://www.umces.edu/consolidated-usm-and-umces-policies-and-procedures> for a full list of campus-wide academic policies.

Course-Specific Policies and Expectations

The course includes three required field trips. Students who are not able to participate in the field trips should not sign up for this course.