



University of Maryland  
CENTER FOR ENVIRONMENTAL SCIENCE

## Environmental Field Methods

3 credits

# MEES 698

Fall Semester

### Course Objectives / Overview

This course will prepare students to plan and implement environmental field work, including the analysis and interpretation 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 the socio-environmental context. Weekly lectures, discussion sessions and immersive experiences complement two 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. Meets weekly for 3 hours on Fridays plus two weekend field trips (Friday - Sunday).

### Expected Learning Outcomes

1. Develop hands-on field work planning, self-care and team science experience.
2. Explore the diverse environments of Maryland, from the Appalachian Plateau to the Chesapeake Bay and coastal ocean.
3. Construct a socio-environmental conceptual model of field sites, including environmental history, environmental justice, and economic drivers, used to generate environmental questions.
4. Conduct productive and safe environmental field work for site assessments, including data collection and analysis.
5. Develop collaborative working relationships for conducting team science field studies, meeting with key community stakeholders and environmental managers.
6. Analyze, interpret, synthesize and effectively communicate results of field studies.

### Course Assessment / Grading

#### INSTRUCTOR DETAILS:

**Katia Engelhardt**

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**Judy O'Neil**

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faculty phone number

#### CLASS MEETING DETAILS:

**Dates:** Fall Semester

**Times:** Friday 1-4 PM + Field Trips

**Originating Site:**

**IVN bridge number:** (\*\*\*\*\*)

**Phone call in number:** (\*\*\*)

**Room phone number:** (\*\*\*\*\*)

#### 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

#### CURRICULUM FULFILLMENT:

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

- Field notebook and report; Appalachian Trip (25%)
- Field notebook and report; Chesapeake Bay & Coastal ocean Trip (25%)
- Group Presentation (25%)
- Synthesis project/Fact Sheet/Resource Brief (25%)

## Tentative 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. Overview of field assessment techniques, data recording, data curation following field work. How to maintain a field notebook.

### Week 2 Forest measurement techniques

Vegetation surveys, plot establishment, stem counts, biomass sampling, tree coring, and soil sampling. Field notebook methods.

### Week 3 Freshwater aquatic measurement techniques

Biological sampling, riparian delineation and condition, stream cross section measurement, flow velocity, water sampling for nutrients and eDNA, in situ measurements, and field notebook skills check.

### Week 4 Field work planning and reporting

Explore the Appalachian socio-environmental context, field trip planning. Learn what goes into a field investigation report.

### Week 5 Appalachian Field Trip (Friday 1PM to Sunday 1PM)

Visit sites in the Savage River watershed, design a comparative field investigation and collect data. Field trip debrief.

### Week 6 Estuarine water quality

Water quality parameters, shoreline survey techniques, salt marsh delineation

### Week 7 Chesapeake and the coastal ocean

Plan the Chesapeake & coastal ocean field trip

### Week 8 Chesapeake & Coastal Ocean Field Trip.

Characterize Blackwater National Wildlife Refuge. Water quality in Maryland Coastal Bays and barrier island survey at Assateague Island National Seashore.

### Week 9 Chesapeake & Coastal Ocean field trip debrief

Data organization and curation; Discuss analysis approaches.

### Week 10 Introduction to data visualization and map making

Analyze, interpret, synthesize data from field trips.

### Week 11 Resource Management Interviews

Develop questions, interview and preparation skills, components of stakeholder engagement

Week 12 Presentation training

Fact sheet or resource brief layout and design principles.

See <https://www.nps.gov/im/arcn/briefs.htm> for examples.

Week 13 Presentation preparation

Draft fact sheet feedback.

Week 14 Final presentations

Course debrief and review.

## Required textbooks, reading and/or software or computer needs

Reading will be assigned as needed. Access to a laptop or desktop computer with one graphing program (e.g., R or Excel) and one mapping program (e.g., QGIS) installed.

Dennison, W. C., & Thomas, J. E. (2009). *Shifting sands: Environmental and cultural change in Maryland's coastal bays*. IAN Press.

Longstaff, B. J., Dennison, W. C., Lookingbill, T. R., Hawkey, J. M., Thomas, J. E., Wicks, E. C., Woerner, J., & Carruthers, T. J. B. (2010). *Integrating and applying science: A practical handbook for effective coastal ecosystem assessment*. IAN Press.

Schubel, J. R. (2021). *The future Chesapeake: Shaping the future*. Archway Publishing.

## Course Communication

The course will use Google Drive for course files and Slack for course communication.

## Resources

TBD

## 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 two required field trips. Assessment of field work performance and reporting represents 50% of the course grade. Students who are not able to participate in the two field trips should not sign up for this course.