



## Oceanographic Field Methods

XAS NS 225 (4 credits)

### Course Catalog Description (max. 40 words):

Exposure to basic oceanographic sampling methods. Participate in shipboard laboratory operations to gain experience with deployment of modern oceanographic equipment and collection of scientific data at sea. Emphasis on practicing consistent methods and ensuring data fidelity.

**Instructor(s):** Sea Education Association Oceanography Faculty

**Location:** At sea aboard SEA sailing school vessel.

**Prerequisites:** Admission to the SEA Semester.

### Course Philosophy and Approach:

*Oceanographic Field Methods* is an at-sea practical skills course that provides an introduction to standard operating procedures for safe deployment/retrieval of modern oceanographic sampling equipment and accurate recording of metadata associated with each sampling station. Real-time observation with state-of-the-art scientific equipment requires careful monitoring to ensure high quality data. During the research cruise, students gradually assume greater responsibility for deployment and data management.

This course consists of 10 class lecture/discussion sessions (1.5 hours each), 1 practical exam (2 hours), and a minimum of 45 hours of supervised laboratory watch participation (active learning/laboratory) across ~30 underway days at sea.

### Learning Outcomes:

1. Familiarity with safe operation of standard oceanographic equipment: hydrographic winch, Conductivity Temperature and Depth (CTD) probes, 12-Niskin bottle rosette water sampler, *in situ* Seapoint fluorometers to measure chlorophyll-*a* concentration in seawater, RD Instruments OceanSurveyor 75 KHz hull-mounted Acoustic Doppler Current Profiler (ADCP) to measure upper-ocean currents, Knudsen 326 full ocean depth profiler for acoustic seafloor mapping, surface and subsurface nets for zooplankton sampling.
2. Recognize the importance of and practice accurate data recording.
3. Participate and contribute as an essential member of a working research laboratory.

### Evaluation:

Daily Report	20%
Deployment Descriptions	30%
Practical Exam	20%



On-Watch Evaluation

30%

### **Assignments:**

Daily Report: Each underway day at sea, the student team assigned to laboratory watch from 0300-0700 will prepare an oral report to be presented at class time. The report will summarize deployment activity and oceanographic trends during the past 24 hours. The report will also include a description of a topical oceanographic concept, recently collected organism, or instrument function.

Deployment Descriptions: In order to demonstrate proficiency, each student will complete a detailed description of deployment procedures for two pieces of oceanographic equipment.

Practical Exam: One practical exam, during the second week of the research cruise, will review deployment and analytical methods, materials, equipment, daily class content and the oceanography experienced on our cruise track.

On-Watch Evaluation: Much of your learning will occur at all hours of the day and night as you carry out all scientific operations. The Assistant Scientists are best able to evaluate your overall progress, including performance in and knowledge of lab routines as well as the *attitude* you bring to each and every watch; all three Assistant Scientists will contribute to your individual assessment for this course.

### **Expectations and Requirements:**

- Punctual attendance is required at every class meeting.
- Active participation on watch and in class discussion is expected.
- Late assignment submissions are not accepted.
- The policy on academic accuracy, quoted below, will be strictly followed in this class.

The papers that you submit in this course are expected to be ***your original work***. You must take care to distinguish your own ideas and knowledge from wording or substantive information that you derive from one of your sources. The term “sources” includes not only published primary and secondary material, but also information and opinions gained directly from other people and text that you cut and paste from any site on the Internet.

***The responsibility for learning the proper forms of citation lies with you.***

Quotations must be placed properly within quotation marks and must be cited fully. In addition, all paraphrased material must be acknowledged completely. Whenever ideas or facts are derived from your reading and research, the sources must be indicated. (Harvard *Handbook for Students*, 305)

**Course Calendar:**

Topic	Readings/Assignments Due
<b><i>Weeks 1 and 2 (21 hours) – at sea</i></b>	
<p>Phase I:</p> <ul style="list-style-type: none"> <li>• Introduction to the Shipboard Laboratory</li> <li>• Oceanographic Equipment Capabilities</li> <li>• Safe Deployment of Oceanographic Equipment</li> </ul> <p>Class Topics:</p> <ul style="list-style-type: none"> <li>• Hydrowire Deployment Demonstration</li> <li>• Neuston Tow Deployment Demonstration</li> <li>• Light Attenuation – Secchi Disk</li> <li>• Deep Sea Biology</li> </ul>	<p><b><i>Daily Reports</i></b> <b><i>Deployment Descriptions</i></b> <b><i>On-Watch Evaluation</i></b></p>
<b><i>Weeks 3 and 4 (20 hours) – at sea</i></b>	
<p>Phase II:</p> <ul style="list-style-type: none"> <li>• Increased Responsibility for Lab Routines</li> <li>• Practice Deployments</li> </ul> <p><b><i>Practical Exam</i></b></p> <p>Class Topics:</p> <ul style="list-style-type: none"> <li>• Nutrient Availability – Nitrogen Fixing Algae</li> <li>• Seabirds</li> </ul>	<p><b><i>Daily Reports</i></b> <b><i>On-Watch Evaluation</i></b></p>
<b><i>Weeks 5 and 6 (21 hours) – at sea</i></b>	
<p>Phase III:</p> <ul style="list-style-type: none"> <li>• Apprentice Lab Manager</li> </ul> <p>Class Topics:</p> <ul style="list-style-type: none"> <li>• Argo Float Program Summary and Deployment</li> <li>• Diel Vertical Migration</li> <li>• Coral Reefs</li> <li>• Regional Geology – Island Formation</li> </ul>	<p><b><i>Daily Reports</i></b> <b><i>On-Watch Evaluation</i></b></p>