

Syllabus

Revised 10/30/2015

MSL 394: Field Techniques in Marine Science

Class meeting times: Fairbanks 9:00-5:00 + field trip
Location: TBD

Prerequisites: MSL 212, MSL 213
3 credits

Instructors:

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Course Description: Introduction to principles and application of Marine Science field techniques. The course is a combination of lectures, labs, and a 4-day field trip to the Kasitsna Bay Marine Laboratory. Students work in teams to plan field activities, to collect and process samples, and to interpret the generated data. Final presentations are given in Fairbanks in poster format. Special fees apply.
Prerequisites: MSL 212 and MSL 213. (1.5 + 4.5)

Course Goals: The goal of the course is to provide hands-on introduction to marine field research by taking advantage of the rich and diverse environment of Kachemak Bay, and to raise awareness of the ocean's intrinsic role in the biogeochemical cycling of elements and in the climate system. Additional goals include development of skills necessary in: 1) executing successful field campaigns; 2) critical thinking for data interpretation; and 3) science communication.

Learning Objectives:

1. Become familiar with the physical, geological, chemical, and biological oceanography of the Gulf of Alaska and in particular Kachemak Bay.
2. Become familiar with equipment and instrumentation currently used in ocean sciences for marine sample collection and data acquisition.
3. Become familiar with oceanographic data visualization software and with approaches to data interpretation.
4. Develop an understanding and appreciation for interdisciplinary oceanographic research.

Expected preparation for the course: A background that includes introductory courses in marine science (e.g. MSL 211, 212, and 213) is necessary. Introductory general science courses in physics, chemistry and/or biology are helpful. Other necessary skills include: Competence in working with spread sheets, ability to work productively in a group setting.

Instructional Methods: MSL 394 is a comprehensive MAYmester course in which students have the opportunity to plan and conduct field work. Various instructional methods will be used during the course, including lectures, class discussion, demonstrations, hands-on practice in the lab and in the field, and student presentations. E-mail communication will be used to distribute class information, updates and changes.

Evaluation: Lecture participation	20 pts	5 %
Lab/Field participation	160 pts	40 %
Bookkeeping of generated data	100 pts	25 %
Poster Presentation	100 pts	25 %
Team Evaluation	20 pts	5 %

91-100%	=	A
81-90%	=	B
71-80%	=	C
61-70%	=	D
< 60%	=	F

Active participation during lectures (20 pts), including on-time arrival accounts for 5% of the final grade. Active participation in the organization and execution of laboratory and field activities (160 pts), including the ability to work well in a team accounts for 40% of the final grade. A well-organized lab book that includes protocols, raw lab data, and field-relevant documentation (100 pts) accounts for 25% of the final grade. Poster presentations will be evaluated on visual and oral communication of results (100 pts) for 25% of the final grade. The following criteria will be used to evaluate participation.

% of possible pts	Lecture, Lab/Field participation	CRITERIA
100%	20 pts, 160 pts	Actively engaged, asking questions, contributing to prep work, conducts work with care, critically thinks about data obtained.
75%	15 pts, 120pts	Some engagement, speaks only when addressed, some prep work contribution, some care during work, some critical thinking of data
50%	10 pts, 80 pts	Not engaged, mostly silent, little contribution to prep work, little care about quality of lab/field work, little understanding of data
25%	5 pts, 40 pts	Not engaged, does not contribute to prep work, does not care about quality of lab/field work, does not think about the generated data
0 %		Absent

Team members will have the opportunity to evaluate each other's contributions (20 pts) to the outcome of laboratory and field efforts for 5% of the final grade. Contributions to specific activities can receive a maximum of 4 points. The total points obtained by each student will be averaged by the number of team evaluations.

ACTIVITY	0 pts	1 pts	2 pts	3 pts	4 pts
Organization of lab activities	Absent	Little help	Some help	Significant help	Essential work
Execution of lab activities	Absent	Little care	Some care	Significant care	Key participant
Organization of field activities	Absent	Little help	Some help	Significant help	Essential work
Execution of field activities	Absent	Little care	Some care	Significant care	Key participant
Data interpretation	Absent	Little effort	Some effort	Significant effort	Essential input

Readings: Instrument manuals, methods sections of published peer-reviewed research in marine science journals. Assigned readings will be posted in Blackboard

Course Policies: Attendance and active **participation** in activities prior to, during, and after the field trip are required. If you must be absent due to illness, or other important reasons, please notify the instructor in advance to make arrangements. Due to the short duration of the course more than one absence will result in being dropped from the course.

Lack of academic integrity including plagiarism is not acceptable and will result in a failing grade.

Field trip: The field trip will be based at the Kasitsna Bay Laboratory facility. Students will make their own arrangements to get to and from Homer, AK. Transportation between Homer and Kasitsna Bay Lab, lodging, and food during the field trip will be covered by the course fees. Students will live in shared dormitory rooms at the Lab, and prepare meals in a shared kitchen. Students must supply their own

personal gear and clothing appropriate for field work in this area. Warm layers, rubber boots, and foul-weather gear are essential, and hip- or chest-waders may be desirable.

A typical field day will include a lecture, work in the field gathering samples and data, and time in the lab processing the samples and the field data. Some instrumentation will be available in the Kasitsna labs for sample analysis, but other instrumentation will be available at the Fairbanks labs, and analysis will take place upon return. The extensive field work during MSL 394 takes advantage of the diverse environment of Kachemak Bay to expose students to marine science. Activities include:

- Measuring beach profiles and distribution of sediment grain sizes
- Sampling physical parameters in the water column using a YSI sonde
- Collecting seawater and measuring the distribution of chemical parameters
- Obtaining phytoplankton levels using chlorophyll fluorescence
- Determining zooplankton abundance and composition from net tows
- Investigating the abundance and community structure of benthic organisms in a variety of settings
- Observing marine bird and mammal populations

Final Presentations. Teams will present their findings in a poster format in the afternoon the last day of the course.

Support and Disability Services: At UAF, the Office of Disability Services (203 WHIT; 474-5655; TTY 474-1827; fydso@uaf.edu) ensures that students with physical or learning disabilities have equal access to the campus and course materials. If you have specialized needs, please contact this office or the instructor to make arrangements.

Date (2017)	Lecture Topic	Lab/Field Activities	Times
Mon 5/8	Introduction and logistics Review of oceanography and its subdisciplines The oceanography of the Gulf of Alaska and Kachemak Bay	Ocean Data View lab	09:00-12:00 lecture 13:00-17:00 lab
Tue 5/9	Sampling methodology: Water samplers, in-situ sensors, remote sensing On-line oceanographic data sources	Sampling instrumentation lab On-line training and permitting lab	09:00-11:00 lecture 11:00-12:00 lab 13:00-17:00 lab
Wed 5/10	Marine organisms of Kachemak Bay Sampling methods in marine biology	Field preparation: Instrument calibration , pack gear and supplies	09:00-12:00 lecture 13:00-17:00 lab
Thurs 5/11	Planning field campaigns: Using marine charts Using tide predictions	Obtain tidal ranges and plan 5/13 and 5/16 activities Develop a station and transect plan for 5/14, 5/15 activities	09:00-11:00 lecture 11:00-12:00 lab 13:00-17:00 lab
Fri 5/12	Travel day	Make own arrangements to Homer (late evening arrival) Orientation and tour of facilities	
Sat 5/13	Beach morphology Sediment Benthic environments: Soft substrate communities	Soft Substrate: Obtain beach profiles, determine sediment, grain size ranges, relate grain size to beach slope Identify and enumerate benthic organisms Obtain water column measurements and samples	07:00-14:00 field 15:00-17:00 lecture 19:00- 20:00 lab
Sun 5/14	The pelagic environment Influence of glaciers on coasts	North Kachemak Bay Transects: Water column observations Bird and marine mammal observations Water processing and analysis Sediment processing Physical data processing	06:30-13:30 field 14:00-16:00 lecture 18:00-20:00 lab
Mon 5/15	Aquaculture	South Kachemak Bay Transects: Water column observations Bird and marine mammal observations Water processing and analysis Sediment processing Physical data processing Aquaculture farm visit Poster outline and layout	06:30-13:30 field 14:00-16:00 lecture 18:00-20:00 lab
Tues 5/16	Benthic environment: Rocky substrate communities	Intertidal environment Obtain beach profiles, determine sediment grain size ranges, relate grain size to beach slope Transect sampling benthic organisms across intertidal zone Pack up gear/ clean dormitory	07:00-14:00 field 15:00-17:00 lecture 19:00- 20:00 lab
Wed 5/17	Travel day	Make own arrangements to Fairbanks (night arrival)	
Thurs 5/18	Data interpretation	Finalize sample analysis Data visualization and discussion	13:00-17:00 lab
Fri 5/19	Student presentations	Finalize poster, present findings	9:00-13:00 lab 14:00-16:00 posters

