

FISH 414
Field Methods in Marine Ecology & Fisheries
Maymester 2021

COURSE SYLLABUS

Scope of the Course:

Hands-on introduction to ecological methods in fisheries and the marine environment. Class will consist of a series of group field exercises and sampling methods conducted in local marine habitats as well as instruction on experimental designs for testing hypotheses and statistical interpretation of results.

3 credits (2 lecture credits = 1600 minutes and 1 lab credit = 2400 minutes)

Course prerequisite:

BIOL F371 or MSL F320 or instructor approval

Location & Course type:

This course is taught in person at the UAF Juneau Center of the College of Fisheries and Ocean Sciences. Lectures are held in Lena 101. Labs are mostly held outside, with some activities in Lena 105. Field activities will occur at various sites accessible from the Juneau road system.

Meeting time:

May 3 - 14, 2021

Exact meeting times vary day-to-day depending on the schedule (see p. 6-7).

Instructor:

Ginny L. Eckert

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Office hours: by appointment

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Teaching Assistant:

Courtney Hart

Office: 217 Lena

Office hours: by appointment

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Required Reading:

Krebs, Charles J. Ecological Methodology. 3rd edition in revision.

Chapters available online : <http://www.zoology.ubc.ca/~krebs/books.html>

Additional Reading Materials:

Will be made available through Blackboard <https://classes.alaska.edu/> and the UAF library (electronic access).

Supplies & Technical Materials:

All sampling supplies will be provided. Students are expected to dress for the weather during field activities, including waterproof footwear. Contact the Instructor to loan gear.

Students will have an opportunity to use their personal computer or can use computers available at the UAF Juneau Center of the College of Fisheries and Ocean Sciences.

Instructional Methods:

The course will consist of lectures, discussions, and labs. Participation in all class sessions is mandatory.

Course Goal:

To introduce students to the methods used to survey populations and study ecological patterns and processes in the marine environment.

Learning Outcomes:

1. Develop knowledge of the basic principles and practical skills of sampling biotic and abiotic factors in the marine environment, including:
 - a. Population estimation
 - i. Mark & recapture
 - ii. Quadrat & transect sampling
 - iii. Active vs. passive sampling
 - iv. Spatial pattern & indices of dispersion
 - b. Field care and handling of fish and shellfish
 - c. Abiotic factors to include water quality, temperature, salinity
 - d. Age and growth analysis
 - e. Condition and health indices
 - f. Lower trophic level sampling
 - g. Understand the proper care and use of laboratory equipment and field sampling gears used in marine ecosystems
2. Develop knowledge and learn practical skills in experimental design and statistical interpretation pertaining to marine ecology and fisheries, including
 - a. Sampling protocols required for collecting representative, non-biased fisheries and marine ecology data.
 - i. Replication, variability and power
 - ii. Data management
 - iii. Experimental Design
 - iv. Statistical interpretation
3. Develop critical thinking, written and oral communication, and professional skills relevant to marine ecology & fisheries, including
 - a. Communication of scientific results
 - b. Critical analysis & discussion of published scientific papers
 - c. Science ethics
 - d. Animal care use protocols

Evaluation:

Student progress will be recorded in the Blackboard Gradebook <https://classes.alaska.edu/>

Table 1. Distribution of points for grade calculation.

	Points
DISCUSSION PARTICIPATION	50
LAB & CLASS PARTICIPATION	100
LAB NOTEBOOK	100

ASSIGNMENTS Assignments 1-2: 25 points each Assignments 3 and 5: 50 points each Assignment 4: 100 points	250
EXAM	100
TOTAL	500

Grades will follow the following schedule of points earned (out of 500 total):

≥90%A
≥80% and <90%B
≥70% and <80%C
≥60% and <60%D
<59.9%F

Table 2. Criteria used for evaluating participation. Arriving late or leaving early (without prior approval) will result in deduction of points.

Score	Criteria
100%	Actively engaged, provides insightful and thoughtful input, is well prepared, leads others in laboratory/field exercises, conducts exercises with care and attention to detail
90%	Engaged, speaks during discussion in a beneficial manner, is well prepared, conducts laboratory exercises with care and attention to detail
80%	Somewhat engaged, speaks a limited amount or provides comments that do not convey mastery of subject matter or that detract from the topic, adequately prepared, conducts laboratory exercises with moderate care and attention to detail
70%	Not so engaged, cannot address questions when called upon during discussion, not well prepared, conducts laboratory exercises with minimal care and attention to detail.
60%	Not engaged, silent during discussion, cannot address questions when called during discussion, conducts laboratory exercises only under duress
<60%	Non-participatory
0%	absent

Policies:

- Attendance: Students are expected to attend all scheduled activities and to fully participate in individual and group assignments. Tardiness, leaving and re-entering during class, and exiting early are all disruptive for students and faculty alike. Make every effort to be prompt, to take care of personal business outside of class time, and to fully participate in all aspects of the class. Given the format of this course, absences are not acceptable except in extreme circumstances.
- Classroom behavior: Students are expected to behave professionally at all times. Any type of behavior that is disruptive, distracting, or disrespectful to your fellow students, the instructor, or any guests will not be tolerated and will result in dismissal from the classroom and the student

will be marked tardy. A second offense may result in a faculty-initiated withdrawal from the class.

- Cell phones: Cell phones are permitted in the class, as they are increasingly becoming useful field tools. However, cell phones should not distract from lectures, lab, and field activities.
- Plagiarism and cheating: Plagiarism is the overt or covert use of other people's work or ideas without acknowledgement of the source. This includes using ideas or data from a classmate or colleague without permission and acknowledgement, using sentences from journal articles in your writing without citing the author, or copying parts of a website into your written work. Plagiarism and cheating are serious offenses that violate the student code of conduct. They may result in an F grade in the course and/or referral to the University disciplinary committee.
- Late assignments: All assignments must be completed and handed in on the required date. Late assignments will be docked 10% by each day your work is late. Exceptions can be made only if discussed and approved well in advance of absence.
- Incomplete grades will follow the University of Alaska Fairbanks Incomplete Grade Policy: "The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference are not acceptable reasons for an "I" grade."

Student Protections and Services Statement:

UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: <https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: <https://alaska.edu/nondiscrimination>.

Disabilities:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. The Course Instructors will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities. Contact an Instructor or the Office of Disability Services for these services.

Emergency notification plan:

Students will receive emergency notifications via phone or email. Please check your UAOnline account to confirm your emergency notification settings. For more information, please refer to

the Student Handbook. In cases where you do not have access to your devices, as your instructor, I will take responsibility to relay any emergency notifications.

COVID-19 statement:

Students should keep up to date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf/uaf-students?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

Required Readings (all posted on Blackboard course web site as pdf)

- Barange, M. (2003). Ecosystem science and the sustainable management of marine resources: from Rio to Johannesburg. *Frontiers in Ecology and the Environment*, 1(4), 190-196.
- Borer, E. T., Seabloom, E. W., Jones, M. B., & Schildhauer, M. (2009). Some simple guidelines for effective data management. *Bulletin of the Ecological Society of America*, 90(2), 205-214. doi: 10.1890/0012-9623-90.2.205
- Clark, J. E., S. Hinkley and T. Koeneman, 2002. Restratification of red king crab stock assessment areas in Southeast Alaska [in] Crabs in cold water regions: Biology, management, and economics. Alaska Sea Grant College Program AK-SG-02-01. pp 457-473.
- Dew, C. B., & Austring, R. G. (2007). Alaska red king crab: A relatively intractable target in a multispecies trawl survey of the eastern Bering Sea. *Fisheries Research*, 85(1-2), 165-173. doi: Doi 10.1016/J.Fishres.2007.02.001
- Lauth, R.R. (2011) Results of the 2010 Eastern and Northern Bering Sea Continental Shelf Bottom Trawl Survey of Groundfish and Invertebrate Fauna. NOAA Technical Memorandum NMFS-AFSC-227.
- Mueter, F. J., Broms, C., Drinkwater, K. F., Friedland, K. D., Hare, J. A., Hunt, G. L., . . . Taylor, M. (2009). Ecosystem responses to recent oceanographic variability in high-latitude Northern Hemisphere ecosystems. *Progress in Oceanography*, 81(1-4), 93-110. doi: Doi 10.1016/J.Pocean.2009.04.018
- Straley, J. M., Quinn, T. J., & Gabriele, C. M. (2009). Assessment of mark-recapture models to estimate the abundance of a humpback whale feeding aggregation in Southeast Alaska. *Journal of Biogeography*, 36(3), 427-438. doi:10.1111/J.1365-2699.2008.01906.X

Lecture/Discussion/Lab Schedule (times are approximate and subject to change)

Date	Lecture	Discussion	Field sampling	Lab exercises	Reading	Assignments	Low Tide
Mon May 3	0900-1200 Course overview, lab tour, Planning for sampling, Ethics, IACUC			1300-1700 Planning for sampling, knot tying, boat trailing & skills practice	Krebs Ch 1		13:16 1.10 ft
Tue May 4	0900-1200 Alaska fishery surveys, Sampling design	Discussion 1 Alaska Fishery Surveys (Lauth 2011)		1300-1700 Computer lab – spreadsheets, graphing & data management tools	Lauth 2011, p. 1-30	#1 Analytical Skills DUE 11pm	14:34 1.88 ft
Wed May 5	0900-1200 Sampling inefficiencies Marking and tagging 1300-1400 Review Assignment #1	Discussion 2 Sampling Inefficiencies (Dew & Austring 2007)		1400-1700 ADFG Age determination lab	Dew & Austring 2007		15:47 2.03 ft
Thu May 6	0900-1200 Aging & growth methods	Discussion 3 Mark and Recapture (Straley et al. 2009)		1300-1700 Age and growth analysis	Krebs Ch 2, Straley et al. 2009		16:46 1.89 ft
Fri May 7	0900-1200 Pelagic sampling methods		1300-1700 Pelagic sampling			#2 IACUC DUE 11pm	17:32 1.74 ft
Sat May 8	0900-1200 Data management	Discussion 4 Best practices for data management (Borer et al. 2009)		1300-1600 Pelagic sample processing	Borer et al. 2009	#3 Growth and aging DUE 11pm	18:12 1.69 ft

Date	Lecture	Discussion	Field sampling	Lab exercises	Reading	Assignments	Low Tide
Sun May 9	OFF	TODAY	GO	HAVE	FUN	HURRAY	06:43 -0.07 ft
Mon May 10	1100-1230 Sampling methods I		0600 – 1000 Intertidal transect/quadrat Point Louisa	1230-1330 Computer lab – data analysis & graphing	Krebs Ch 1, 4		07:17 -0.85 ft
Tue May 11	1100-1230 Sampling methods II		0630 – 1000 Intertidal transect/quadrat Sunshine Cove	1230-1400 Computer lab – data analysis & graphing	Krebs Ch 1, 4		07:49 -1.33 ft
Wed May 12	1200-1330 Statistical power		0700 – 1100 Intertidal transect/quadrat Point Bridget	1330-1530 Computer lab – data analysis & graphing	Krebs Ch 7		08:20 -1.51 ft
Thu May 13	1200-1330 Ecosystem based sampling	Discussion 5 Ecosystem Based Indicators (Peterson et al. 2014)	0800 – 1100 Beach seining	Computer lab – open for assignments	Peterson et al. 2014		08:51 -1.41 ft
Fri May 14	0900 – 1100 Final exam, course evaluation		1100-1200 Skills practical			#4 and #5 Field methods and Lab notebooks DUE 11pm	09:23 -1.06 ft