FISH 414
Field Methods in Marine Ecology & Fisheries
Maymester 2019

COURSE SYLLABUS

Scope of the Course:
A hands-on introduction to the methods used to study ecological patterns and processes in the marine environment. Class will consist of a series of group field exercises conducted in local marine habitats. These exercises will emphasize a variety of sampling methods for documenting patterns of distribution and abundance, experimental designs for testing hypotheses and statistical interpretation of results. These skills are fundamental to most basic and applied research in marine ecology and fisheries. Thus this course provides an essential foundation for a professional career in these areas. 3 credits (2 lecture credits = 1600 minutes and 1 lab credit = 2400 minutes)

Course prerequisite:
FISH F101, BIOL F371, or instructor approval

Location:
This course is taught in Juneau at the UAF Juneau Center of the School of Fisheries and Ocean Sciences. Lectures in Lena 101. Lab in Lena 105. Field activities will occur at various sites accessible from the Juneau road system.

Meeting time:
May 6 - 17, 2019
Exact meeting times will vary day-to-day depending on field activities. A typical day may begin at 600 and run until 1700.

Instructor:
Wendel Raymond
Office: 217 Lena
Office hours: by appointment
Phone: 503-539-6073
E-mail: wraymond2@alaska.edu

Teaching Assistant:
Name Person
Nicole LaRoche
Office: Nicole LaRoche
Office hours: by appointment

Required Reading:
Krebs, Charles J. Ecological Methodology. 3rd edition in prep.
Chapters available online: http://www.zoology.ubc.ca/~krebs/books.html

Additional Reading Materials:
Will be made available through Blackboard http://maymester-classes.uaf.edu and the UAF library (electronic access).
Course Structure:
The course will consist of lectures, discussions, and labs. Attendance at all class meetings 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 techniques 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 provide practical experience 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:
Table 1. Distribution of points for grade calculation.

<table>
<thead>
<tr>
<th></th>
<th>Total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>DISCUSSION PARTICIPATION</td>
<td>50</td>
</tr>
<tr>
<td>LAB &amp; CLASS PARTICIPATION</td>
<td>100</td>
</tr>
<tr>
<td>LAB NOTEBOOK</td>
<td>100</td>
</tr>
<tr>
<td>ASSIGNMENTS</td>
<td></td>
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<tr>
<td>Assignments 1-2: 25 points each</td>
<td>250</td>
</tr>
<tr>
<td>Assignments 3-5: 50 points each</td>
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<tr>
<td>EXAM</td>
<td>100</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>600</strong></td>
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</tbody>
</table>

Grades will follow the following schedule:

- ≥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.

<table>
<thead>
<tr>
<th>Score</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>Actively engaged, provides insightful and thoughtful input, is well prepared, leads others in laboratory/field exercises, conducts laboratory exercises with care and attention to detail</td>
</tr>
<tr>
<td>90%</td>
<td>Engaged, speaks during discussion in a beneficial manner, is well prepared, conducts laboratory exercises with care and attention to detail</td>
</tr>
<tr>
<td>80%</td>
<td>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</td>
</tr>
<tr>
<td>70%</td>
<td>Not so engaged, cannot address questions when called upon during discussion, not well prepared, conducts laboratory exercises with minimal care and attention to detail</td>
</tr>
<tr>
<td>60%</td>
<td>Not engaged, silent during discussion, cannot address questions when called during discussion, conducts laboratory exercises only under duress</td>
</tr>
<tr>
<td>&lt;60%</td>
<td>Non-participatory</td>
</tr>
<tr>
<td>0%</td>
<td>absent</td>
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</tbody>
</table>
Policies:

- **Attendance**: Students are expected to attend all classes and to fully participate in all 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 Assignment Policy:**
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.

**Student Protections and Services Statement:**
Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans’ services, rural student services, etc., to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. For more information on your rights as a student and the resources available to resolve problems, please go to the following site: [www.uaf.edu/handbook/](http://www.uaf.edu/handbook/)

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


# Lecture/Discussion/Lab Schedule

*(subject to change)*

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Field</th>
<th>Lab</th>
<th>Reading</th>
<th>Discussion</th>
<th>Assignments</th>
<th>Low Tide</th>
<th>High Tide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun 5th</td>
<td>1700 - 2000 Course Intro and field prep. Pizza provided!</td>
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<tr>
<td>Mon 6th</td>
<td>Data Management</td>
<td>0700 – 1030 Intertidal transect/quadrat Point Louisa</td>
<td>Lab: Excel data management</td>
<td>Krebs Ch 1, 4, 5 and Borer et al. 2009</td>
<td>Best practices for data management (Borer et al. 2009)</td>
<td>1) Analytical Skills</td>
<td>-2.03 @ 0814</td>
<td>15.32 @ 2020</td>
</tr>
<tr>
<td>Tue 7th</td>
<td></td>
<td>0700 – 1100 Intertidal transect/quadrat Sunshine Cove</td>
<td>Krebs Ch 1, 4, 5</td>
<td>Analytical Skills</td>
<td>2) IACUC training</td>
<td></td>
<td>-2.38 @ 0849</td>
<td>15.14 @ 1507</td>
</tr>
<tr>
<td>Wed 8th</td>
<td></td>
<td>0730 – 1130 Intertidal transect/quadrat Point Bridget</td>
<td>Krebs Ch 2 Straley et al. 2009</td>
<td>Mark and Recapture (Straley et al. 2009)</td>
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<td></td>
<td>-1.93 @ 1009</td>
<td>14.04 @ 1633</td>
</tr>
<tr>
<td>Thu 9th</td>
<td>Alaska fishery surveys and sampling design</td>
<td>0900 – 1200 Beach Seine Eagle River</td>
<td>Lab: Data analysis and graphing</td>
<td>Lauth 2011, p. 1-30</td>
<td>Alaska Fishery Surveys (Lauth 2011)</td>
<td></td>
<td>-1.19 @ 1056</td>
<td>13.32 @ 1726</td>
</tr>
<tr>
<td>Fri 10th</td>
<td>Guest Lecture Siddon: Estimation of Abundance</td>
<td>0945 - 1230 Beach Seine Sunshine Cove</td>
<td>Work session: Data analysis and graphing</td>
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<td>-0.29 @ 1152</td>
<td>12.77 @ 1831</td>
</tr>
<tr>
<td>Sat 11th</td>
<td>Guest Lecture Pinchuk: Pelagic Sampling</td>
<td>Pelagic sampling</td>
<td>Lab: Phytoplankton Identification</td>
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<td>0.54 @ 1257</td>
<td>14.11 @ 0610</td>
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<tr>
<td>Sun 12th</td>
<td>Free day!</td>
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<td>1.00 @ 1411</td>
<td>13.33 @ 0731</td>
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<tr>
<td>Mon 13th</td>
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<td>3) Beach seine project</td>
<td>1.01 @ 1523</td>
<td>13.23 @ 0858</td>
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<tr>
<td>Tue 14th</td>
<td>Marking and Tagging and aging?</td>
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<td></td>
<td></td>
<td></td>
<td>Sampling Inefficiencies (Dew &amp; Austring 2007)</td>
<td>0.72 @ 1627</td>
<td>13.77 @ 1014</td>
</tr>
<tr>
<td>Wed 15th</td>
<td>Guest Lecture Donnellan/Rebert: Dive surveys and fishery quotas</td>
<td>Lab: Dive survey quota setting</td>
<td>Krebs Ch 7</td>
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<td></td>
<td>0.42 @ 1722</td>
<td>14.55 @ 1118</td>
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<tr>
<td>Thu 16th</td>
<td>Statistical Power</td>
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<td>Ecosystem Based Management (Barange 2003, Mueter et al. 2009)</td>
<td>4) Final Project 5) Notebooks</td>
<td>0.24 @ 1811</td>
<td>15.27 @ 1214</td>
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<tr>
<td>Fri 17th</td>
<td>Final exam, course evaluations</td>
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<td></td>
<td></td>
<td></td>
<td>0.33 @ 1856</td>
<td>15.77 @ 1304</td>
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