Shoals Marine Laboratory
Sustainable Fisheries (BIOSM 2800/MEFB 702)
1 - 15 June 2021

Course Syllabus and Schedule

Faculty:
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Prerequisites: one semester of college-level biology or equivalent; preferably (but not required) familiarity with Excel and PowerPoint

Class enrollment limit: 12

Credit hours: 3 Cornell / 4 UNH

Course Objectives/Goals:
Students will explore the theory and practice of fisheries sustainability through lectures, readings, laboratory exercises, and groundtruthing in the “real world” (in the field) by interacting with local fishermen and other fisheries experts. This course will focus primarily on species harvested in the Gulf of Maine, with an emphasis on finfish. Topics and activities included in this course are:

- An overview of commercial fisheries in the Gulf of Maine
- Fish collection and dissections
- Fishing gear types and modifications
- Age and growth techniques (length-frequency distributions, otoliths, scales, maturity)
- Quantitative data collection and analysis (species assemblage, diversity, catch-per-unit-effort, forecasting, stock assessment)
- Current, past and future directions in fisheries management strategies (including sector and ecosystem based, community-based and adaptive management)
- Collaborative research and ‘conservation’ fishing gear
- Environmental changes like ocean acidification and global warming
- Perspectives from different stakeholders in today’s New England fisheries
- Hands-on demonstrations with commercial fishermen from different industries
- Sustainable seafood and the marketplace
- Human dimensions of sustainable fishing (cultural and socio-economic issues)
- Creative thinking and collaborative problem-solving skills
- Public communication skills
Course Materials:
Students will be provided pdf copies of all reading materials during the course. Students are expected to participate in group discussions of reading assignments.

Recommended materials: composition book or notebook, clipboard, laptop computer, foul weather gear, water shoes, waterproof boots, binoculars.

Assignments & Grading:
This course utilizes project-based assignments, lectures, demonstrations and hands-on experiences spending time with fishermen on their boats. Grades will be based on student participation and performance in the projects, in-class discussions, quizzes, and exercises.

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Course participation and preparedness</td>
<td>20%</td>
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<tr>
<td>Quizzes (4)</td>
<td>20%</td>
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<tr>
<td>Field projects (3)</td>
<td>30%</td>
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<tr>
<td>Social-ecological Synthesis Case</td>
<td>10%</td>
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<tr>
<td>Final Project (Presentation and Paper)</td>
<td>20%</td>
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Course participation: Success at SML requires a positive attitude and the willingness to accept changes in the schedule with grace. Island living demands respect for your fellow classmates, and residents on Appledore. Students are expected to actively participate in all facets of this course, and to display good citizenship while at Shoals. Students must be on time to all course meetings. They must actively engage by means of asking questions, actively listening, and working with team members when instructed. 5% will be deducted for any missed activity without instructor’s permission.

Readings will be assigned throughout the course. Readings will be used to frame group discussions on topics that will be facilitated by instructors.

Guest lectures are an important component of this course. These will provide the perspectives and realities that collectively comprise a “fishery.” Students are expected to attend all guest lectures and must actively engage guest speakers. Every student must ask two questions of every speaker related to their course project (and how it relates to the speaker’s expertise). Students are free to ask as many questions as they want.

Four quizzes will be given during the course on topics covered by faculty and guest lecturers. These quizzes will include a combination of essay questions, lab reports, and fisheries problems.

Demonstration fishing trips also are critical to this course because it is an opportunity for students to appreciate the realities of working as a fisherman. Due to COVID, 2021 activities will include dockside demonstrations and ride-alongs in Shoals vessels. During these trips, students will participate in “collaborative research” projects while participating in (or simulating) demersal trawl net, lobster, and other fishing operations. In addition, a survey for seabirds and marine mammals may be conducted to demonstrate the importance of other components of the marine ecosystem to fishing practices.

Field/Lab Reports Three fishing trips/activities will be organized as a scientific study with data collected, analyzed, and written up as individual reports. The reports will be produced in small groups and individuals will be asked to contribute some part of the report for each project. These will be due two days after each field trip.

Socio-Environmental Synthesis Case Halfway through the course, students will participate in a two-part case study using oyster aquaculture siting as an example of the complex social-environmental systems at play in coastal and ocean issues. Students are expected to fully engage in all discussions, activities, and assignments associated with the case.

Fisheries Project A comprehensive fisheries project will be completed during the course in which students will work together to explore multiple facets of a current controversial fisheries issue in the Gulf of Maine. This will focus on the history, current fishing practices, management, relevant biology and ecology, as well as
economic, cultural, and social issues related to the fishery and intersecting issues. At the end of the course, students will give a presentation about their project. Students are expected to incorporate principles of public communication in their presentations and to ask questions of their peers just as they would a guest speaker.

**Expectations and Conduct:**
Students are responsible for fully understanding all of the information presented in this syllabus. If there are any questions regarding this information, it is the student’s responsibility to bring it to the instructor’s attention. In addition, students are responsible for attending all activities associated with this course and completing all assignments. Students are responsible for asking questions anytime they need clarification (remember, there is no such thing as a bad question).

Every student is responsible for their own behavior—specifically in being respectful and collegial to other students and with instructors. Students are responsible for fully understanding and adhering to all of the information presented in the SML Appledore Handbook ([http://www.sml.cornell.edu/sml_forms.html](http://www.sml.cornell.edu/sml_forms.html))

1. **Personal Technology.** Do not use phones, tablets, headphones, or similar devices in the classroom or during course activities. If you take notes with your computer, disable wireless during lecture.
2. The lab has a modest computer facility in Laighton Library; please treat this shared facility with respect. Printers are available, but please limit printing.
3. **Transmission of Course Materials.** Students are not authorized to replicate, reproduce, copy or transmit lectures and course materials presented, or derivative materials including class notes, for sale or free distribution to others without written consent of the instructors who are the original source of the materials.
4. **Academic Integrity.** Any work submitted must be your own. Uncredited use of another person’s words, data or images is considered plagiarism, a serious violation of the Code, whether the material comes from another student, a website, or a published paper. Students must adhere to Cornell’s and UNH’s Policy for Academic Honesty/Plagiarism and Discrimination
   A. Cornell: [http://cuinfo.cornell.edu/aic.cfm](http://cuinfo.cornell.edu/aic.cfm)
   B. UNH: [www.unh.edu/vpsas/handbook/welcome-university-new-hampshire](http://www.unh.edu/vpsas/handbook/welcome-university-new-hampshire)
5. **Disabilities & ADA Accommodation.** Students with a disability must contact Cornell’s (420 CCC building; 607-254-4545) or UNH’s Student Disability Services ([http://www.unh.edu/disabilityservices](http://www.unh.edu/disabilityservices)) four weeks prior to start of class for confidential discussion of needs and for registration to verify eligibility for academic accommodations. No retroactive accommodations can be made.
6. **Mental Health.** Shoals Marine Laboratory cares about you and your well-being. If you experience unusual personal or academic stress during the course or need to talk with someone about a personal problem, seek support from your instructors as soon as possible. In addition, any SML staff is available for consultation 24/7. Find staff in the office in the Hamilton House between 8am – 7pm or knock on the door of Bartell House after hours.
Working Schedule as of 04/26/21:

Details, updates, and corrections to the schedule, assignments and readings will be provided daily: check the whiteboard in Kiggins early and often!

Meals: breakfast 7:30; lunch 12:30 unless otherwise noted; dinner 6pm; Sun. brunch 10am, dinner 5pm

[1] TUESDAY 6/01 Welcome: Life at SML and Course Introduction
Afternoon:
4:00 PM Arrive on Appledore: welcome, time to settle, initial reading

Evening:
7:00 PM Introductions and course overview, syllabus review, fisheries project and lab expectations, island expectations (clean-up, etc.), class T-shirt? Initial reading

[2] WEDNESDAY 6/02 Setting the Stage: Gulf of Maine ecosystem
Morning:
9:00 AM Lecture/Discussion:
   Physical setting of the GOM & Appledore
   Oceanography and Ecology of the Gulf of Maine

11:00 AM Activity:
   Physical setting walking lecture

Afternoon:
1:30 PM Lecture/Discussion:
   Intro to global fishing trends and Gulf of Maine fisheries

3:00 PM Activity:
   Fishing gear demonstration / activity

4:00 PM Food Run / work time

Evening:

[3] THURSDAY 6/03 Lobster and the Gulf of Maine
Morning:
8:30 AM Activity:
   Dockside Lobster Gear Demonstration and Discussion (Capt. Ward Byrne)

9:00 AM Group 1 on water, Group 2 lecture
11:00 AM Group 2 on water, Group 1 lecture
   Activity: Lobster hauling demo w/ Capt. Ward Byrne (evaluate trap catch efficiency with/without escape vents)
   Lecture: New England fishing industry social characteristics lecture and reading discussion

Afternoon:
1:30 PM Work time / free time
3:30 PM Lecture/Discussion:
   Intro to Ocean and Coastal Policy / Fisheries Management Institutions

Evening:
8:00 PM Rock Talk

Morning:
9:00 AM Lecture/Activity:
   Fish biology and anatomy lecture/lab

11:00 AM Lecture/Discussion:
   State of the Ecosystem Report and links to project

Afternoon:
1:30 PM Lecture/Discussion:
   Lobster biology/ management - Heidi Henninger, Atlantic Offshore Lobstermen’s Association (to be confirmed)

3:30 PM Activity:
   Lobster gear modification / innovation

Evening:
7:00 PM - QUIZ 1
Reading/Project Time

[5] SATURDAY 6/05 Multispecies trawl fishery

Morning
8:30 AM Activity:
   Dockside Demersal trawl Demonstration and Discussion (Capt. David Goethel)

9:00 AM Group 2 on water, Group 1 lecture
11:00 AM Group 1 on water, Group 2 lecture
   Activity: Demersal trawling w/ Capt. Goethel
   (evaluate how changing gear configuration impacts fishing efficiency and selectivity)
   Lecture: TBD

Afternoon
1:30 PM Work time / free time
3:30 PM Lecture/Discussion:
   Social-ecological synthesis / Oyster Aquaculture siting case - Part I

Evening:
Lab 1 Due - Lobster
Reading/Oyster Case/Project Time

[6] SUNDAY 6/06  Systems Thinking, Communities, and Negotiation

Morning:
Aquaculture case prep work
9:00 AM Dorm clean up

10:00 AM Brunch

11:00 AM Activity:
   Oyster Aquaculture siting case - Part II

1:00 PM Lecture/Activity:
   Fish ID / otoliths
2:00 PM Discuss project draft/ Outline expectations/ Reading Discussion

**Evening:**
7:00 PM Discussion
The role of the consumer, community supported fisheries (CSF) and other new models

[7] **MONDAY 6/07**  Stock Assessments and Science for Fisheries Management

**Morning:**
9:00 AM Activity
Seine/Survey overview and activity

11:00 AM Lecture
Fisheries Stock Assessment

**Afternoon:**
1:30 PM Lecture/Discussion:
Science for Fisheries Management, Dr. Jon Hare, NOAA NEFSC (to be confirmed)

3:30 PM Lecture/Discussion:
New England Fishery Management Council (NEFMC), NEFMC speaker to be confirmed

**Evening:**
7:00 PM Quiz 2
Lab 2 Due - Trawl

[8] **TUESDAY 6/08**  Cooperative Research and Science Advising

**Morning:**
9:00 AM Lecture/Discussion:
NMFS Cooperative Research Program - Dr. Anna Malek Mercer (to be confirmed)

11:00 AM Lecture/Discussion:
Community-Based Collaborative Fisheries Research on Marine Mammal and Fisheries Interactions

**Afternoon:**
1:30 PM Lecture/Discussion:
Social science in fisheries mgmt / Science in a contested setting, stakeholder engagement, disputes

3:30 PM Lecture/Discussion:
Science advising in a fisheries context / FMC Scientific and Statistical Committee process

**Evening:**
7:00 PM Discussion: Mid-course Reflection
Oyster case writing - Negotiation Reflection and Memo Due
Project Outline/summary for peer editing due

[9] **WEDNESDAY 6/09**  Aquaculture, Marketing and the Future of Fishing Communities

**Morning:**
8:30 AM - New Castle Boat Departure (on docks by 8)
9:00 AM - On The Water: Aquaculture (Erich Berghahn/ Aaron Jones, NHSG/UNH), UNH Marine Facility, New Castle
   *Bag lunches*

**Afternoon:**
3:30 PM Lecture/Discussion
Cooperative Extension and engaging the consumer, Dr. Gabby Bradt (to be confirmed)

**Evening:**

**Lab 3 Due – Seine/assessment activity**

[10] **THURSDAY 6/10 GOM Fisheries Management at the National and International Scale**

**Morning:**

9:30 AM Lecture/Discussion  
Tuna 101 w/ Dr. Walt Golet (Gulf of Maine Research Institute)

11:30 AM project/reading time

**Afternoon:**

1:30 PM Lecture/Discussion  
Federal Agency Roles in Fisheries Management - NMFS Greater Atlantic Regional Fisheries Office (GARFO)

3:30 PM Quiz 3

**Evening:**

8:00 PM Rock Talk


**Morning:**

8:30 AM On-water: Mackerel fishing and discussion of recreational fishing in the GOM

**Afternoon:**

1:30 PM Lecture/Discussion  
Bycatch reduction and gear research

3:30 PM Activity:  
Marine debris / derelict fishing gear discussion and art project

**Evening:**

7:00 PM Book review / discussion  
Work on quiz prep/presentations/final project  
Peer edits due

[12] **SATURDAY 6/12 Science and Stakeholders in Fisheries Policy Making**

**Morning:**

9:00 AM Lecture/Discussion  
Science in Public Policy / Fisheries Management

11:00 AM Preparation for afternoon panel

**Afternoon:**

1:30 PM “Ask a fishermen” panel discussion

3:30 PM Independent project time

**Evening:**

7:00 PM career panel discussion


9:00 AM Dorm clean up
10:00 AM Brunch

11:00 AM QUIZ 4 – summary/synthesis and reflection questions

12:00 PM Free time / project work time

3:00 PM Practice presentations

**Evening:**
6:00 PM Documentary screening and discussion
9:00 PM Squid lighting (optional)

[14] MONDAY 6/14  Information Integration: Class Review and Discussion

**Morning:**
9:00 AM Activity:
   Vessel terminology and boat handling discussion / demo w/ Shoals staff

11:00 AM Activity (optional limited slots)
   Small boat handling hands on learning

**Afternoon**
1:30 PM Career Discussions / Course Review / Evaluations
2:00 PM Project work time

**5:59 PM - Final Project Presentation Due**

**Evening:**
7:00 PM Final Presentations

**11:59 PM - Final Project Paper Due**


**Morning:**
8:30 AM - Final Check In (luggage out on porches before)

Depart Island