Shoals Marine Laboratory
Marine Environmental Science and Conservation (BIOSM 2770/MEFB 515)
13 - 27 June 2015

Course Syllabus and Schedule

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Prerequisites: one semester of college-level biology or equivalent.

Class enrollment limit: 20

Credits/credit hours: 3 Cornell/ 4 UNH

Course Objectives/Goals:
Marine Environmental Science and Conservation will provide students with an introduction to the topics of environmental science and conservation of marine and coastal organisms and ecosystems. This is a critical subject as over 70% of our planet is ocean and 80% of the world's population (and 50% of Americans) lives within 50-60 miles of the ocean. Humans use coastal areas extensively, which often leads to conflicts between humans and the natural roles and services provided by marine and coastal ecosystems, as well as their constituent organisms.

In this course, we will focus on the major principles of marine diversity and conservation and on methods to bring human communities into a better relationship with the natural resources they enjoy and rely on. We will investigate examples and topics local to the Gulf of Maine as well as topics that are relevant on regional and global scales. We will explore:
1. What we are conserving: marine ecosystem processes; the functional roles of marine and coastal organisms; biodiversity; relevance of marine science to current scientific, social, health, and economics
2. Threats to marine ecosystems
3. Conservation: species; communities; ecosystem function and services; adaptive management

The course project will revolve around applying the NE Region Ocean Management Plan (draft out in Spring 2016) and applying it to local concerns. Students will interact with local stakeholders, scientists, and conservation professionals.

The overall goal of this course is to provide students with a working understanding of marine and coastal environmental science and conservation biology. The specific objectives are for students to:
1. Understand the major divisions of marine life, and appreciate the diversity of forms, biological processes and evolutionary strategies that occur in the oceans.
2. Understand classic principles of conservation biology and adaptive management.
3. Understand relevance of the marine sciences to current scientific, social, health, and economic arenas.
5. Engage in active, student-directed learning.
6. Refine data analysis, written and oral communication skills.

The course will include lectures, active-learning exercises, and fieldwork. Lecture will cover the material described in the syllabus. Lectures and exercises are designed to include material relevant to the ecological setting of the course and as preparation for fieldwork.

Course Materials:
Students will be provided pdf copies of all reading materials before the course begins. Students are expected to participate in all discussions of reading assignments and stakeholder engagement. The required text is The World is Blue: How our Fate and the Ocean’s Are One. 2010. By Silvia Earle, National Geographic. (Available at many bookstores. We found it on amazon.com for $9.97 kindle/ $13.35 paperback)

Reference Books (NOT required but helpful. You have access to copies in the course library in Laighton Hall on Appledore Island)

Assignments & Grading:
This course utilizes project-based learning as the primary means of student evaluation. Grading is based on student participation and performance in the projects, in-class discussions, quizzes, and exercises. Class participation will be primarily judged based on student involvement, in terms of asking guest speakers about how their given topic relates to their project subject matter. Students are expected to ask at least two questions of every guest speaker. Five participation points will be reserved for involvement in class discussions and in-class exercises.

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<th>Assignment</th>
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Classroom and exercise participation (20pts): Success at SML requires a positive attitude and the willingness to accept changes in the schedule with grace. Changes will be made due to weather or unexpected opportunities to see rare wildlife or interact with marine science experts. 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 be a good citizen of the academic community. Students must be on time to all course meetings. They must actively engage through asking questions, actively listening, and working with team members when instructed. 5pts will be deducted for any missed activity without instruction permission.

Species Presentation (5pt): See Precourse Assignment for details. Students will provide a 10min oral presentation on 2 species on Day 1 or 2.

Guest speaker participation (10pts): Students must actively engage guest speakers. Every student must ask 2 questions of every speaker that pertains to their course project (and how it relates to the speaker’s expertise). Students are free to ask as many questions as they want.

Debate (15 pts) Students will participate in a ½ day marine science debate.

Quizzes (20 pts) Ten quizzes (2pt each). Quizzes will consist of two questions (1 pt each) and will be direct draw from the previous day’s lecture.

Presentation (5 pts) Students will give a short presentation to the class for input, helpful suggestions and feedback aimed at improving the final paper.

Final paper (25 pts): See project guidebook for details. Papers will be written individually based on group work. Final research papers are due on a date to be decided by the class by email to jrs583@cornell.edu.

**Research paper** Working in groups of two students, we are going to address conservation concerns of the Isles of Shoals. Everyone we encounter in our time together is a potential resource (Scientists and/or Stakeholders) for finding out information about your chosen topic- we expect that you will take full advantage of this unique situation (your final grade depends on it if that helps to motivate you). The purpose of this project is for you to both apply course knowledge to a problem and give you sense of the wide array of issues that must be considered in conservation planning.

*Presentation. June 26th.* Each group will present the ideas in their research papers. This is an opportunity for feedback and improvement from the entire class and all faculty before submitting the final paper.

*Paper. Due date: on a date to be decided by the class. Each individual will write a paper. Papers should be 10-12 pages of text (not counting literature cited, tables, or figures), double-spaced, 12 point font, and with 1 inch margins. You should reference at least 10 articles in the literature cited section. More details are provided in the project guidebook.*
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 by 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.shoalsmarinelaboratory.org/about-appledore). Students should put safety above all else and ask questions and make decisions that reflect this priority.

1. **Personal Technology.** Do not use cell phones, smart phones, iPads, mp3 players, headphones, or similar devices in the classroom or during course activities. If you take notes with your computer, disable wireless access 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 to your FINAL document (if required).

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 web site, 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
   B. UNH: 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) four weeks prior to start of class for confidential discussion of needs and for registration to verify eligibility for academic accommodations. No retroactive accommodations once you are on Appledore Island 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 person is available for consultation 24/7. Find staff in the office in the Hamilton House between 8am – 7 pm or knock on the door of Bartels House after hours.

Finally, and most importantly, students are responsible for sharing their views, perspectives, opinions, and experiences with the class. Each student brings to the class a unique worldview that has been shaped by their personal experiences and observations. By sharing this worldview, each of us will develop a broader and more enlightened worldview and, as a result, develop a better understanding of how to apply the principles of the marine sciences and conservation biology to the preservation and management of real landscapes.
SCHEDULE

Day 1 (June 13) - arrive in the afternoon, fire and water, walking tour
Lecture: Introduction to Course & Each Other & Course Project
Lecture: Properties of Seawater

Day 2 (June 14)
Lecture: Physical setting of the Gulf of Maine & Appledore
Lecture: Adaptions to living in the water
Field: Exploring the islands with stakeholders
Project: Introduction
Rock Talk: Owen Nichols, Center for Coastal Studies- Fisheries Mgt

Day 3 (June 15) - quiz, food run
Lecture: Biological setting of Shoals
Lecture: Ocean circulation, waves, tides
Field: Bio oceanography outing
Project: Picking Issues/Teams

Day 4 (June 16) - quiz
Lecture: Marine Invertebrates
Field: Whale watch 10-3pm
Project: TBD

Day 5 (June 17) - quiz
Lecture: GOM Marine Ecosystems- rocky intertidal, zonation, mud/sand, & salt marsh
Lecture: Nekton I: fish and fisheries
Field: intertidal exploration
Project: TBD

Day 6 (June 18) - quiz
Lecture: Nekton II: cephalopods, marine mammals, sea turtles, seabirds
Lecture: Seabird conservation issues
Field: White Island Field trip
Project: Goals & objectives

Day 7 (June 19) - quiz
Lecture: Marine pollution
Lecture: Marine invasions
Field: Invasive Species Scavenger Hunt
3pm Marine Mammal Research Symposium
Project: Goals & Objectives

**Day 8 (June 20)** - quiz
Lecture: Fisheries Extraction Management 101
Lecture: Climate change 1
Field & Project: Stakeholders

**Day 9 (June 21)** - quiz
Lecture: Climate change 2
Field: Commercial Fisheries
Rock Talk: Jennifer Felt, Conservation Law Association, National Ocean Planning

**Day 10 (June 22)**  quiz, food run
Lecture: Conserving species
Lecture: Conserving Communities
Field: Ocean Acidification mock conference activity
Project: Adaptive management

**Day 11 (June 23)** - quiz
Lecture: Conserving Ecosystem Function and services 1
Lecture: Conserving Ecosystem Function and services 2
Field: SML Intern field trip
Project: Defining indicators

**Day 12 (June 24)** - quiz
Lecture: Conserving Ecosystem Function and services 3
Film: Ocean Frontiers
Field: TBD
Project: Final Products

**Day 13 (June 25)**
Film: Blue Mission
Project: Work time
Field: Star Island Fun
Day 14 (June 26)
Lecture & Field: Fisheries Management
Project: Work time and Group Presentations

Day 15 (June 27)
Clean up
Depart

Paper Due June 30