



Appledore Island, Isle of Shoals, Kittery, Maine
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Shoals Marine Laboratory
Introduction to the Biology of Sharks, Skates, & Rays (BIOSM 1640)
Dates August 12-19

Course Syllabus and Schedule

Faculty: Dr. Ashley Stoehr (stoehra@sacredheart.edu)
TAs: Scott Lynch; Lily Oliver

Prerequisites: None

Class enrollment limit: 20

Credit hours: 1

Course Objectives/Goals:

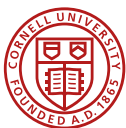
Elasmobranchs (sharks, skates, and rays) are the subjects of numerous headlines and blockbuster movies, but what do we really know about them? Our main objective is to discover the current state of knowledge of elasmobranch (shark, skate & ray) biology and explore areas for future research and conservation initiatives. This includes separating fact from fiction, analyzing various types of media including peer reviewed scientific literature, and exploring experimental methods in both laboratory and field settings for studying sharks, rays, and other marine life. Get ready for a great adventure!

Course Materials:

If possible, we highly recommend bringing a laptop computer for writing papers and a notebook for use during lecture, lab and field activities. We also require sturdy, close-toed shoes for work on research vessels and in the lab. Snorkeling gear and binoculars are optional and suggested if you have them. Also, bring sun protection and layers for wind and rain. A flashlight or headlamp is also useful. Reading assignments will include a variety of types of literature from both popular media and scientific literature.

Assignments & Grading:

Outreach Project: It's time to get creative! To complete this project, you will choose a topic related to elasmobranch conservation and produce your own form of media to communicate information to the general public or specific audiences like fishermen or tourism operators. Types of media include infographics, videos, guides and more! As a part of this project you will give a presentation explaining why what you have created is useful and how it is effective. *This is a group project.*



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Elasmobranch Family Tree Project: Review the basics of phylogenetics in this group project where each team will figure out how and why elasmobranchs are separated into different groups and how they all fit together in the big picture.

Anatomy & Physiology Project: This multi-part exercise will give you the chance to relate form to function for major body parts and systems and explore how they differ within elasmobranchs and what those differences might mean for these animals. This is an individual project.

Experimental Design Activity: After reviewing what we know and don't know about elasmobranchs it's time to think about what sort of experiment you could design to address one of the unanswered questions. This is a group project.

Evaluation:

Your points for this class will result directly from your participation and performance on the projects, exercises, and activities described within this syllabus. The course will total to 800 points.

Category/Assignment	Points
Course Projects	500
<i>Outreach Project and Presentation</i>	200
<i>Anatomy and Physiology Project</i>	150
<i>Experimental Design Project</i>	100
<i>Elasmobranch Family Tree Project</i>	100
Laboratory Assignments	150
<i>Dissection Activity</i>	50
<i>Elasmobranch ID Activity</i>	50
<i>A and P Activity</i>	25
<i>Boat Trip Data Collection</i>	25
Lecture Assignments	50
<i>Shark Tracking Activity</i>	15
<i>Elasmedia Activity</i>	15
<i>Phylogenetic Tree Activity</i>	10
<i>Rock Talk Notes</i>	5
<i>Marine Mammal Data Collection</i>	5
Attendance and Participation	100
<i>Lecture, Laboratory, and Boat Participation</i>	30
<i>Participation in Group Projects</i>	60
<i>Game Night</i>	10
Total	800

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 all of the information presented in the SML Appledore Handbook (http://www.sml.cornell.edu/sml_forms.html)

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 Loughton 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 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

Schedule:

Day 1: Monday August 12

- 4:15 Student arrival
- 4:30 Island Intro: Fire and water/Facilities tour
- 6:00 Dinner
- 7:00 Lecture: Introduction to the Biology of Sharks, Skates, and Rays
- 7:30 Island Hike and Icebreakers
- 8:30 Lecture: Physical Oceanography
- 9:30 Lecture Activity: Burning Elasmobranch Questions and Outreach Project
- 10:00 Dorms

Day 2: Tuesday August 13

- 7:30 Breakfast
- 8:30 Lecture: Evolution and Phylogeny
- 9:30 Lecture Activity: Building a Phylogenetic Tree
- 10:00 Lecture: Phylogeny and Diversity of Elasmobranchs
- 11:00 Lab: Elasmobranch ID (requires defrost)
- 12:30 Lunch
- 2:00 Lecture: Anatomy and Physiology of Elasmobranchs
- 3:00 Workshop: Elasmobranch Family Tree
- 6:00 Dinner
- 7:00 Lecture Activity: Outreach Project
- 8:00 Rock Talk
- 9:00 Workshop: Elasmobranch Family Tree
- 10:00 Dorms

Day 3: Wednesday August 14

- 7:30 Breakfast
- 8:30 Elasmobranch Family Tree Due**
- 8:30 Lecture: Reproduction in Elasmobranchs
- 9:30 Lab: Shark Dissection (requires defrost)
- 11:00 Seal Tour
- 12:00 Lab: Oily Liver
- 12:30 Lunch
- 2:00 Lecture: Feeding and Sensing
- 3:00 Workshop: Anatomy and Physiology (Food Run @ 4:00) (requires defrost)

6:00 Dinner
7:00 Workshop: Anatomy and Physiology
10:00 Dorms

Day 4: Thursday August 15

7:30 Breakfast
8:30 Anatomy and Physiology Project Due
8:30 Boat: Fishing Trip, Environmental Testing (packed lunch)
4:00 Lecture: Swimming and Migration
5:00 Workshop: Outreach Project
6:00 Dinner
Return Project Workshop: Anatomy and Physiology OR Outreach
6:00 Dinner
7:00 Lecture: Learning and Behavior
8:00 Movie: Jaws
10:00 Dorms

Day 5: Friday August 16

7:30 Breakfast
8:30 Outreach Project Proposal Due
8:30 Lecture: Fisheries and Bycatch
9:30 Lecture Activity: Elasmobranchia
10:00 Whale Watch (packed lunch)
2:30 Lecture Activity: Careers in Marine Science
3:00 Workshop: Outreach Project
6:00 Dinner
7:00 Lecture: Changing Ecosystems
8:00 Workshop: Outreach Project
10:00 Dorms

Day 6: Saturday August 17

7:30 Breakfast
8:30 Outreach Project Draft Due
8:30 Lecture Activity: Tagging Analysis
9:00 Lecture: Scientific Method
10:00 Workshop: Experimental Design
12:30 Lunch
2:00 Workshop: Experimental Design
5:00 Lecture Activity: Elasmobranch Jeopardy
6:00 Dinner
7:00 Experimental Design Project Due
7:00 Workshop: Outreach Project
10:00 Dorms

Day 7: Sunday August 18

Project Workshop: Outreach Project and Presentation
10:00 Brunch
11:00 Project Workshop: Outreach Project and Presentation
1:00 Outreach Project Presentations, Product and Presentation Due
3:00 T-Shirt Design
4:00 Course Evaluations and Packing
5:00 Dinner
6:00 Cleanup
7:00 Boat: Trip to Star Island
8:30 Movie
10:00 Dorms

Day 8: Monday August 19

7:30 Breakfast
8:30 Final Packing & clean up

10:00 Departure