Biological Oceanography, MAR 349  
Spring

Instructor:  
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Office hours: Tu, 1pm-230pm, and by appointment

Course Description: The goal of biological oceanography is to understand what controls the abundances, composition, and temporal variations of organisms in the sea. Progress toward this goal usually entails identifying the patterns of variability in space and time, determining the processes producing and maintaining the patterns, then quantifying the processes. Approaches include field observations, laboratory experimentation with individual species or isolated parts of the system under study, and field experimentation. The path to predictive understanding of biological systems leads as often into physical, chemical, or geological oceanography as it does into purely biological interactions. During the semester we will work through the food chain, beginning with the basis for all life, phytoplankton, and progressing up to fisheries. It is my hope that students will learn both the details of biological processes in the ocean and the overall “big picture” biological ocean processes play in various global cycles.

Text: Biological Oceanography, by Charles Miller

Learning objectives:

- Understand the biomass and biodiversity of the ocean from microbes through megaplancton.
- Understand how biomass and biodiversity of microbes through megaplancton impacts the functioning and output of marine food webs and fisheries as well as global carbon cycles.
- Understand the processes which produce and maintain the abundances, composition, and temporal variations of organisms in the ocean, beginning with microbes and progressing through fisheries.
- Apply traditional biological oceanography methods in field and laboratory setting in observational and experimental studies.

Grades:
Grades for the class will be based on the following breakdown of percentages:
Exams = 55%  
Lab = 35%  
Lab and class participation = 10%

While I will attempt to have a ‘normal’ grading scale, a grading curve will be implemented if necessary.
**Exams:** There will be two or three exams scheduled during the semester. Each exam covers only material covered in the previous section of the class (i.e. there is no cumulative final). Exams will be short answer, and short essay format. There will also be an exam review session in the class before each exam. Material on exams will mostly come out of subject matter covered in class. The assigned readings are designed to complement the lectures.

**Labs:** Laboratory exercises for the Biological Oceanography class are designed to reinforce the principles learned in class. The weather will be a limiting factor on field work that can be done for the first half of the semester. The laboratory section of class will comprise 35% of your grade in Biological Oceanography. You should have a notebook designated for the lab section of this class, as during each week’s lab exercise you should take notes on procedures, and making calculations.

During the semester, you will be asked to write lab reports. Some lab reports will be small and simple, others will include results, discussion, figures, tables and references. I will give a more detailed hand-out explaining what is expected for each lab before it is due.

This semester’s Lab TAs are Lucas Merlo and Elizabeth Gomez.

**Class Participation:** Lectures are only once per week and there are only 13 lectures in the semester (two exams). Missing one lecture is 8% of the semester’s material. I ask that you arrive on time for every class and lab and attend every class and lecture. Skipping classes without prior notification will cause you to miss assigned work, quizzes or exams which can not be made up. Absences or lateness for lab or lecture will cause you to lose points from your participation grade.

**Stony Brook University Syllabus Statement**

**DISABILITY SUPPORT SERVICES (DSS) STATEMENT**

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services (631) 632-6748 or http://studentaffairs.stonybrook.edu/dss/. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities

**ACADEMIC INTEGRITY STATEMENT**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instance of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/

**CRITICAL INCIDENT MANAGEMENT**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that
interrupts their ability to teach, compromises the safety of the learning environment, and/or inhibits students' ability to learn.

**Lecture topics:**
The following are lecture topics for the semester. I am generally hesitant to provide precise dates for these for the following reasons. If a subject is easily understood, it will be completed very quickly. Alternatively, if a topic is complex, and generates much discussion, it may take longer to complete it than I had initially anticipated. Moreover, I will attempt to get us out on the water on a weekly basis &/or when weather permits. As such, I ask you to be patience and flexible. You will always be alerted to changes that occur in the curriculum and / or syllabus.

Approximate exam dates (subject to change): TBA

Introduction to Biological Oceanography.

Phytoplankton: Creators of life, providers of food, saviors of the planet.

Earth’s Most Important Phytoplankton: Niches, adaptations, and life cycles.

Photosynthesis and light.

Ocean productivity – nutrient relationships:

Seasonal and global distributions of primary production: The spring bloom and beyond

Upwelling: How it works and impacts on primary productivity

El Niño: Impacts on fisheries and productivity

Zooplankton: Classes, seasonal cycles, and global distributions

Zooplankton ecology.

Zooplankton biology.

Marine bacteria: Diversity and complexity, Ecological niches and trophic modes, Impacts on global elemental cycles.

Marine viruses.

The microbial loop:

Marine food webs.

Fisheries – productivity relationships

Impacts of climate change and ocean biology