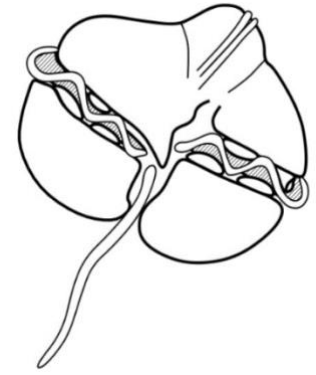




MSCI 476

Biology of Marine Plankton

Spring 2024



Instructor: Dr. George Boneillo
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Phone: 843-349-5068
Email: GBoneillo@coastal.edu
Office Hours: Wednesday 2:00-5:00 and Thursday 11:30-2:30 (also available by appointment).

Lecture: Monday & Wednesday 05:25PM - 06:40PM, Brittain Hall, Room 101
Lab: Section 01 Tuesday 11:30AM - 02:20PM, Science Building II, Room 320
Section 02: Tuesday 02:30PM - 05:20PM, Science Building II, Room 320

Webpage: Moodle (<http://www.coastal.edu/moodle>)

Text: There is no required textbook, but you are required to read assigned scientific articles.

A syllabus is a general guide to the course. It is not a contract or agreement. The instructors reserve the right to unilaterally change anything contained in the syllabus, including but not limited to, assignments, tests, or grading, upon their discretion or following announcements by the University administration

Catalog Description

This course explores the structure and function of planktonic communities. The role of phytoplankton, zooplankton and bacteria are examined in detail. Concepts such as: mineral cycling, energy flow, predator/prey relationships, trophic interactions as well as spatial and temporal dynamics are investigated in lecture, discussion, and an integrated laboratory setting. The laboratory will demonstrate the topics and principles presented in lecture. The laboratory consists of field studies conducted in estuarine and marine environments and may require weekend commitments.

Course Objectives

The objectives of the lecture and laboratory sections of this course are to further develop student knowledge regarding the evolution of marine plankton, and the trophic and geochemical importance of these organisms. Further, to demonstrate the interdisciplinary interactions of planktonic communities with the geological, physical, and chemical environment. Lastly, using the laboratory component of the course, to provide a high-quality field and laboratory research experience that demonstrates key concepts from the lecture. The research will involve in small groups and careful development of; hypothesis, experimental design, techniques, field or laboratory sampling, data analysis and interpretation, and presentation.

Student Learning Outcomes

Upon completion of MSCI 476 / 476L, Biology of Marine Plankton students should be able to;

- 1) Order the hypothetical chronology for the milestones required for the abiotic and biotic evolution of life and to understand the linkage between biological evolution and atmospheric and geological change driven as the result of that evolution.
- 2) Classify planktonic organisms based upon distinguishing characteristics and adaptations of multiple categories, including major taxonomic groups (domains, kingdoms, major marine phyla, etc.), and major biogeographic and habitat/depth patterns related to the physical characteristics of the ocean.
- 3) Detail the major anatomical and physiological adaptations of plankton to the physical, chemical, and geological conditions of marine and estuarine environments. Examples include the impact of variations in temperature, light, nutrients, organic matter, depth, and dissolved oxygen.

- 4) Interpret and predict the influence of interacting factors on marine primary production, including nutrient availability, light, water column hydrography, biogeochemical cycles, grazing activity, and latitudinal/seasonal patterns.
- 5) Describe and interpret patterns of secondary production, including energy flow through marine foodwebs, trophic structure and efficiency, and the microbial loop.
- 6) Describe the manner in which planktonic organisms interact with other organisms through processes such as growth, reproduction, competition, predation, and varied symbioses. Describe how these behaviors and processes are influenced by the abiotic environment.
- 7) Describe the types of methods and inherent assumptions for determining abundance, biomass, cellular growth, and carbon production appropriate for various plankton types (prokaryotic vs eukaryotic, autotrophic vs heterotrophic).
- 8) Understand the types of trophic interactions and controls upon community components occurring within a pelagic foodweb and how these may interact with the benthos.
- 9) Describe and predict potential anthropogenic impacts upon pelagic estuarine and pelagic marine ecosystems, and the propagation of these impacts to nekton and benthic organisms.
- 10) Investigate, analyze, interpret, and report on the concepts above using critical thinking, visual and quantitative skills, library and web resources, and effective writing.

Academic Integrity/Cheating

Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and are committed to creating an atmosphere of mutual respect and trust. Cheating or plagiarism will result in removal from the course and assignment of a grade of FX. Poor grades earned due to cheating or plagiarism cannot be removed through the Repeat Forgiveness Policy. “Cutting and pasting” from online sources is plagiarism and will be dealt with accordingly. You are obligated to report instances of cheating according to the university honor code. Violations of the Student Code of Conduct (including but not limited to academic dishonesty – cheating & plagiarism) will not be tolerated and may result in removal from the course and a grade of FX. Any such violations will be dealt with in strict accordance with Coastal Carolina University guidelines. FX grades cannot be removed through the Repeat Forgiveness Policy. For information on the Code of Student Conduct, please see your Student Handbook or <http://www.coastal.edu/conduct/documents/codeofconduct.pdf>

Attendance Policy

We will strictly enforce the University’s class attendance policy, found here:
<https://www.coastal.edu/policies/policyDetails.php?x=120>

Students are obligated to attend class regularly. Absences, excused or not, do not absolve a student from the responsibility of completing all assigned work promptly. Students who miss assignments, quizzes, or other course work obligations due to excused absences will be allowed to make up the work in a manner deemed appropriate by the instructor. It will be the responsibility of the student to contact the instructor and make arrangements at the convenience of the instructor. The instructor is not obligated to allow a student to make up work missed due to an unexcused absence. For a list of excused absences, please refer to the University’s class attendance policy.

Missing an excess of 25% of the regularly scheduled lab or lecture meetings (unexcused absences) will result in assigning the grade of F for the course. **An unexcused absence from lab will result in a 5-point deduction from your final grade.**

Dress Code and Safety Rules

- Because this lab meets in a laboratory space that uses and houses chemicals, we will be enforcing a dress code standard for entry into the laboratory.
- **Proper Clothing Required for Entry to the lab** – Shirt that covers chest, stomach, sides, back, shoulders and upper arms. **Pants that cover body from waist to ankles....LONG PANTS.** No shorts, short skirts, tank tops, mid-drifts, low rise jeans, etc.

- **Proper Shoes Required for Entry to the lab – CLOSED TOED SHOES**, must completely cover feet and have back strap. No flip flops or sandals.
- The lab manager & your instructors reserve the right to refuse entry to lab room to anyone wearing inappropriate attire.
- **NO FOOD OR DRINK ALLOWED**
- Any student that is wearing inappropriate attire will not be allowed into the laboratory, and therefore, this will count as an **absence** (see attendance policy above for further information).

Required Safety Goggles

Students are responsible for purchasing and bringing their own pair of splash safety goggles to designated labs. The instructor will inform you which labs safety goggles are required for. Failure to bring splash safety goggles will result in an unexcused absence.

Honesty and Behavior Policies

Violations of the Student Code of Conduct (including but not limited to academic dishonesty – cheating & plagiarism) will not be tolerated and will result in a minimum of a zero for an assignment and potentially removal from the course with an F. Poor grades earned due to cheating or plagiarism cannot be removed through the Repeat Forgiveness Policy. For information on the Code of Student Conduct, please see your Student Handbook.

Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and reporting the inappropriate action of others and are committed to creating an atmosphere of mutual respect and trust.

Accessibility & Disability Services

Coastal Carolina University is committed to equitable access and inclusion of individuals with disabilities in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Individuals seeking reasonable accommodations should contact Accessibility & Disability Services (843-349-2503 or <https://www.coastal.edu/disabilityservices/>). The Americans with Disabilities Act indicates "title II and title III entities must permit service animals to accompany people with disabilities in all areas where members of the public are allowed to go." As such, service animals are permitted in lab settings at Coastal Carolina University. Emotional support animals are not permitted in lab settings unless it is approved as a classroom accommodation. Students with service animals are strongly encouraged, but not required, to inform lab instructors of the use of a service animal. This communication provides both the student and the instructor with an opportunity to discuss and plan for the safety of the service animal as well as any other safety concerns. Students and instructors should contact Accessibility & Disability Services (843-349-2503 or <https://www.coastal.edu/disabilityservices/>) regarding any potential accommodations or for support and assistance.

Closing of the University for Inclement Weather

In the event of hazardous weather, faculty, staff, and students are requested to listen to local radio and television stations or visit the Coastal Carolina University website for official University closing announcements. Announcements about hazardous weather are also posted on the University's homepage. Review the Hazardous Weather and Emergency Conditions Leave Policy (FAST-HREO-220). Instructors may refer to the Contingency Instruction website or Section VIII N. Contingency Instruction for information about what to do if class has been cancelled.

Grading

I do not post total grades or letter grades on Moodle. Students are responsible for calculating their own grades throughout the semester. ***Here is how you can determine your grade throughout the semester using Moodle:*** Take the total points that you have earned so far in the course, divide that by the total possible points at that time, and then multiply by 100. That will give you your percent grade. For details and point distribution, please see the section called "Grade Breakdown" below.

Grading Breakdown

The lecture and lab components of the course are interrelated. Therefore, you will receive the same grade for both courses.

<u>Lecture</u>		<u>Lab</u>	
Exam 1	14%	Worksheets (5 at 2 pts each)	10%
Exam 2	14%	Lab Quizzes (3 at 2 pts each)	6%
Exam 3	14%	Lab Practical	6%
Final Exam	14%	Lab Presentation	6%
Literature Assignments (5 at 2 pts each)	10%	Plankton Guide	6%

Late assignments will automatically lose 25% of the total point value for each day late. Late assignments will not be accepted after 3 days. There are no makeups for missing exams and quizzes unless you have a documented University approved excuses.

Grade Scale: 90-100: A; 85-89: B+; 80-84: B; 75-79: C+; 70-74: C; 65-69: D+; 60-64: D; > 60: F

Copyright

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this classroom environment and your use only. All copyright materials are credited to the copyright holder.

Student Services

Academic Support:

Link to [Learning Assistance Center](#)

Link to [Kimbel Library Website](#)

Link to [Counseling Services](#)

Technology Support:

Link to [Technical Support from Student Computing Services](#)

Link to [Student Computing Services Hours and Computer Lab Locations](#)

Link to download Microsoft Office: [Download Microsoft Office for free](#)

Other Student Services:

Link to [Office of the Registrar](#)

Link to [Financial Aid and Scholarships](#)

Link to [Student Activities and Leadership](#)

Link to [Dean of Students Office](#)

Biology of Marine Plankton Lecture Schedule
Spring 2024
Subject to Change

Day	Date	Topic
Mon.	1/09/2024	Introduction: The Paradox of Plankton
Wed.	1/11/2024	The Evolution of Plankton
Mon.	1/16/2024	No Class Martin Luther King Day
Wed.	1/18/2024	Viruses, Bacteria, and the Microbial Loop
Mon.	1/23/2024	Nutrient Assimilation, Primary Productivity and Biomass
Wed.	1/25/2024	Nutrients vs. Grazing (bottom-up and top-down controls)
Mon.	1/30/2024	Cyanobacteria: <i>Prochlorococcus</i> and <i>Synechococcus</i>
Wed.	2/01/2024	Cyanobacteria: <i>Trichodesmium</i>
Mon.	2/06/2024	Cyanobacteria HABs
Wed.	2/08/2024	Exam 1
Mon.	2/13/2024	Phytoplankton Ecology: Diatoms
Wed.	2/15/2024	Phytoplankton Ecology: Diatoms
Mon.	2/20/2024	Phytoplankton Ecology: Dinoflagellates
Wed.	2/22/2024	Phytoplankton Ecology: Coccolithophores
Mon.	2/27/2024	HABs: Brown Tide (<i>Aureococcus</i> & <i>Aureoumbra</i>)
Wed.	3/01/2024	HABs: <i>Cochlodinium polykrikoides</i> and <i>Karenia brevis</i>
Mon.	3/06/2024	No Lecture: Spring Break
Wed.	3/08/2024	No Lecture: Spring Break
Mon.	3/13/2024	HABs: <i>Pfiesteria</i> and Harmful Algal Bloom Mitigation
Wed.	3/15/2024	Exam 2
Mon.	3/20/2024	Local Plankton Dynamics (Winyah Bay & Surrounding Waters)
Wed.	3/22/2024	Zooplankton: Copepods
Mon.	3/27/2024	Zooplankton: Marine Larval Ecology
Wed.	3/29/2024	Global Issues: Microplastics and Plankton
Mon.	4/03/2024	Global Issues: Climate Change and Plankton
Wed.	4/05/2024	Global Issues: Eutrophication, Dead Zones & Plankton
Mon.	4/10/2024	Global Issues: Ocean Acidification and HABs
Wed.	4/12/2024	Lecture Redirected to The Research Competition
Mon.	4/17/2024	Exam 3
Wed.	4/19/2024	Biohacking the Planet: Ocean Fertilization & Vitamins
Mon.	4/24/2024	Biohacking the Planet: Plankton as Biofuel
Wed.	4/26/2024	Synthesis and Review

The Cumulative Final Exam will be on Monday, May 2, 2024, between 6:30-8:30 pm (Brittain Hall, Room 101)

Biology of Marine Plankton Laboratory Schedule
Spring 2024
Subject to Change

Week	Date	Lab Topic	Assignments Due
1	1/10/23	Introduction to Plankton	Diatoms Quiz 1 (Closes on Friday at 5:00pm)
2	1/17/23	Identifying Phytoplankton	Diatoms Quiz 2 (Closes on Friday at 5:00pm)
3	1/24/23	Measuring Plankton Diversity	Dinoflagellates Quiz (Closes on Friday at 5:00pm)
4	1/31/23	Culturing Phytoplankton	Culturing Phytoplankton Worksheet
5	2/7/23	Cyanobacteria Sampling in Wall Pond	Cyanobacteria Worksheet
6	2/14/23	Plankton Diversity at Huntington Beach	Diversity of HBSP Worksheet
7	2/21/23	Growth Curves	Growth Curves Worksheet
8	2/28/23	Research Proposal Meetings	
9	3/7/23	No lab, Spring Break	
10	3/14/23	Zooplankton of Myrtle Beach State Park	Zooplankton of MBSP Worksheet
11	3/21/23	Research Projects & Cruise Data	
12	3/28/23	Research Projects & Cruise Data	
13	4/4/23	Research Projects & Cruise Data	Plankton Guides
14	4/11/23	Lab Practical	Lab Practical
15	4/18/23	Research Projects & Cruise Data	
16	4/25/23	Research Presentations	Research Presentation

Spring 2024 Cruise Dates*

Sunday, March 19, 2024	8:00 AM - 3:00 PM
Sunday, March 26, 2024	8:00 AM - 3:00 PM
Sunday, April 2, 2024	8:00 AM - 3:00 PM
Sunday, April 16, 2024	8:00 AM - 3:00 PM

*You are required to attend at least one plankton cruise. Failure to attend a cruise will be counted as a laboratory absence.

Because we will be setting up experiments that will run 24-72 hours, you may be required to come into lab outside of the regular lab date and times.