

Introduction to Oceanography

Biology 342

Fall, 2020

Instructor: Dr. Jack DiTullio

TA: Rachel Prostko (prostkora@g.cofc.edu)

Lecture: Via Zoom T&Th: 09:25-10:40; Laboratory: Via Zoom: Wed 13:30-16:30 and Thurs 14:30-17:30: GML, Rm. 204; phone: 953-9196 (ditullioj@cofc.edu);
[Office/Zoom hours: W&Th following labs and by appointment].

This schedule is a general outline of the material that will be discussed each day. Please note, however, we will probably deviate from it somewhat as the course progresses. The outline is simply meant to be an overview of the topics to be discussed in roughly the order they will be covered. Some topics may take more time than listed.

	<u>Date</u>	<u>Topic</u>	<u>Chapter</u>
Aug.	25 T	Course Intro, Origin of Universe	(1,2)
	27 Th	Marine Geology/Plate Tectonics	(3,4)
Sept	01 T	Geophysics	(4)
	03 Th	Plate Tectonics/Plate Boundaries	(4)
	08 T	Marine Sediments	(6)
	10 Th	Properties of water/seawater	(5)
	15 T	Temperature-Salinity-Density	(5)
	17 Th	Nutrient Cycling	(Hand-out)
	22 T	Forces Governing Winds	(7)
	24 Th	Atmospheric/Oceanic coupling	(7)
	29 T	Exam I	
Oct.	01 Th	Currents & Wind-Driven Oceanic Circulation	(8)
	06 T	Currents & Wind-Driven Oceanic Circulation cont'd	(8)
	08 Th	Geostrophy and Subtropical Gyres	(8)
	13 T	Thermohaline Deep Circulation	(8)
	15 Th	Waves	(9)
	20 T	Waves/Tides	(9/10)
	22 Th	Dynamic Tides	(10)
	27 T	Coastal Oceans and Estuaries	(11,13)
	29 Th	Exam II	

Nov.	03 T	No Class (Election Day—VOTE!!!)	
	05 Th	Phytoplankton	(12)
	10 T	Primary Production	(12)
	12 Th	Zooplankton & Secondary Production	(12)
	17 T	Marine Food Webs & Ecology	(14,15)
	19 Th	Benthos/Coral Reefs	(15)
	24 T	Hydrothermal Vents	(15)
	26 Th	No Class (Thanksgiving Holiday)	
Dec.	01 T	El Nino and ocean decadal oscillations	(7 & Hand-out)
	03 Th	Oceans and Climate	(16 & Hand-out)
	07 M	Reading Day	
	08 T	Final Exam	

Text: *Introduction to Ocean Sciences*, 2018, Douglas Segar, 4th edition.

Individual chapters from this text or the whole book can be accessed for free at the following link:

<http://www.reefimages.com/oceansci.php>

Please note that the author has made the online text available to mitigate the high costs of textbooks to students. If possible, he requests any donations of a few dollars to help him defray the cost of producing future editions.

Course Objective: To introduce the student to all aspects of general Oceanography including: Geological, Physical, Chemical and Biological Oceanography. Additional lectures not covered in the textbook will address the importance of the oceans in biogeochemical cycling of various elements as well as their effect on global climate change. The lab sections will involve problem sets as well as analysis of oceanographic datasets. Students will also each lead a discussion on a high impact peer-reviewed journal article.

Student Learning Outcomes:

- Students will gain an understanding of how various sub-disciplines of oceanography are inter-related and the importance of employing a multidisciplinary approach.
- Students will learn how to analyze seawater for various chemical components including nutrients such as nitrate, phosphate and silicate.
- Students will learn how to measure acidification of seawater by determining various components of the carbonate system (e.g. alkalinity, pH and carbonate concentration)

- Students will gain experience in downloading large oceanographic dataset and plotting them using ocean data view
- Students will read and lead discussions of peer-reviewed journal articles
- Students will demonstrate an ability to interpret and synthesize large oceanographic datasets and present analytical results to the class.

Course Grading:

Exam I -----	15%
Exam II -----	15%
Labs -----	30%
Final -----	30%
Current Topics Paper-----	10%

The first 2 exams will cover material from the preceding section only. The final exam, however, will be cumulative. Exams will cover all assigned readings as well as lecture material. Exam questions may include multiple choice, short answers and short essay questions. More details regarding the structure of the exams will be given during class meetings. Please note that class attendance is strongly advised as lectures will sometimes include a significant amount of material not covered in the text. Final grades will be determined according to the following scale:

- A = 93-100
- A- = 90-92
- B+ = 87-89
- B = 83-86
- B- = 80-82
- C+ = 77-79
- C = 73-76
- C- = 70-72
- D+ = 67-69
- D = 60-66
- F = 0-59

Instructor Evaluation:

Please note that approximately 15 min will be allocated for students to fill out an instructor evaluation form on a mutually agreed-to scheduled date near the end of the semester.

Laboratories:

The labs will be held via zoom and/or possibly in GML Rm. #113/202. Lab reports will be due one week after they are assigned unless otherwise noted. Late lab assignments will lose 10% of the maximum grade per week. No write-ups will be accepted more than 3 weeks late. A voluntary field trip to Charleston Harbor and associated estuaries aboard the R/V *Silver Crescent* is scheduled tentatively for the afternoons of September 30 and October 01, 2020 (weather and covid permitting). More details about the cruise will be provided the week before the cruise. Students that opt out of participating on the cruise will not be negatively affected and will receive all the data to complete the lab assignment. A class debate/discussion will be held to discuss geoengineering and various ways of mitigating anthropogenic CO₂ rise and the associated climate change impacts.

Student Presentations:

Each student will prepare a 5-10 page paper (double spaced) on some current oceanographic topic of interest (not including the reference section). The topics will need to be approved before fall break by the instructor. A list of potential topics will be provided but students are encouraged to decide on a topic of their interest. Peer reviewed papers are expected to be the main part of the bibliography. The deadline for submission is on or before November 18/19, 2020.

Oceanography Lab

Biology 342, Fall 2020

Teaching Assistant: Rachel Prostko (prostkora@g.cofc.edu)

The labs will meet on Wed and Thurs online via zoom from 13:30-16:30 and 14:30 to 17:30 hr respectively. All Lab reports must be turned in the following week. Late lab reports will be penalized 10% per week. Each student will lead a discussion on a research journal paper. The discussion leaders will be required to post a 500-word summary/critique of the paper to the lab group before the discussion session. Those summaries should be posted online before midnight on the Sunday before the discussion period. We are tentatively scheduled for oceanographic sampling in Charleston Harbor aboard the R/V *Silver Crescent* during the last week of Sept. That sampling is tentative and completely voluntary. The data will be disseminated to all students regardless of student participation on the cruise. The requirements for the Debate, ODV and Current Events/Special Topics Presentations will be discussed during the first lab period. A 5-10-page Current Events Paper will be due on Nov 18/19.

	<u>Date</u>	<u>Topic</u>
Aug.	26/27 W/Th	Lab Intro/Assignments/Journal Discussions
Sept.	02/03 W/Th	Ocean Bathymetry
	09/10 W/Th	Ocean Data View (ODV) --- Intro/Assignment
	16/17 W/Th	Total CO ₂ & the Carbonate Buffering System in Seawater
	23/24 W/Th	Measurement of the Primary Nutrients in Seawater
	30/01 W/Th	Charleston Harbor Oceanographic Sampling
Oct.	07/08 W/Th	ODV presentations of Oceanographic Data + Journal Discussion
	14/15 W/Th	Atmospheric and Ekman Circulation + Journal Discussion
	21/22 W/Th	ARGO Data Intro + Journal Discussion
	28/29 W/Th	Tides + Journal Discussion
Nov	04/05 W/Th	Journal Discussion
	11/12 W/Th	Geoengineering Class Debate
	18/19 W/Th	Current Events Presentations
	25/26 W/Th	No Labs—Thanksgiving Break
Dec	02/03	Final ODV lab presentations

College Policies:

Academic Integrity Statement:

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when suspected, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student's actions are related more to misunderstanding and confusion will be handled by the instructor. The instructor designs an intervention or assigns a grade reduction to help prevent the student from repeating the error. The response is recorded on a form and signed both by the instructor and the student. It is forwarded to the Office of the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This status indicator will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent.

Students can find the complete Honor Code and all related processes in the Student Handbook at: <http://deanofstudents.cofc.edu/honor-system/studenthandbook/>."

Accommodations for Students with Disabilities:

Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged. [Center for Disability Services/SNAP](#).

OAKS:

OAKS, including Gradebook, will be used for this course throughout the semester to provide the syllabus and class materials and grades for each assignment, which will be regularly posted.

Inclement Weather, Pandemic or Substantial Interruption of Instruction:

If in-person classes are suspended, faculty will announce to their students a detailed plan for a change in modality to ensure the continuity of learning. All students must have access to a computer equipped with a web camera, microphone, and Internet access.

Resources are available to provide students with these essential tools.

Recommended Syllabus Content

Optional statements related to Section 4.0 of the [Policy on Course Syllabi 7.6.10](#).

Continuity of Learning

Due to social distancing requirements, this class may include a variety of online and technology enhanced components to reinforce continuity of learning for all enrolled students. Before the drop/add deadline, students should decide whether the course plan on the syllabus matches their own circumstances. Any labs that may involve participation such as the Charleston Harbor Cruise will be completely voluntary.

Recording of Classes (via ZOOM)

Class sessions may be recorded via both voice and video recording. By attending and remaining in this class, the student consents to being recorded. Recorded class sessions are for instructional use only and may not be shared with anyone who is not enrolled in the class

Online Courses with Exam Proctoring

This course will require the use of an exam proctoring service for the course exams. Students are responsible for registering, scheduling, and the cost of the service prior to each exam. Instructions and additional information on proctoring can be found at <https://academicaffairs.cofc.edu/distance-education/online-proctoring/index.php>.

Mental & Physical Wellbeing:

At the college, we take every students' mental and physical wellbeing seriously. If you find yourself experiencing physical illnesses, please reach out to student health services (843.953.5520). And if you find yourself experiencing any mental health challenges (for example, anxiety, depression, stressful life events, sleep deprivation, and/or loneliness/homesickness) please consider contacting either the Counseling Center (professional counselors at <http://counseling.cofc.edu> or 843.953.5640 3rd Robert Scott Small Building) or the Students 4 Support (certified volunteers through texting "4support" to 839863, visit <http://counseling.cofc.edu/cct/index.php>, or meet with them in person 3rd Floor Stern Center). These services are there for you to help you cope with difficulties you may be experiencing and to maintain optimal physical and mental health.

Food & Housing Resources:

Many CofC students report experiencing food and housing insecurity. If you are facing challenges in securing food (such as not being able to afford groceries or get sufficient food to eat every day) and housing (such as lacking a safe and stable place to live), please contact the Dean of Students for support (<http://studentaffairs.cofc.edu/about/salt.php>). Also, you can go to <http://studentaffairs.cofc.edu/student-food-housing-insecurity/index.php> to learn about food and housing assistance that is available to you. In addition, there are several resources on and off campus to help. You can visit the Cougar Pantry in the Stern Center (2nd floor), a student-run food pantry that provides dry-goods and hygiene products at no charge to any student in need. Please also consider reaching out to Professor ABC if you are comfortable in doing so.

Additional Resources:

The College of Charleston offers many resources for LGBTQ+ students, faculty and staff along with their allies.

[Preferred Name and Pronoun Information](#)

[On Campus Gender Inclusive facilities](#)

[Campus Resources](#)

[College of Charleston Reporting Portals](#)

[National Resources for Faculty & Staff](#)

[GSEC Reports](#)

[Documenting LGBTQ Life in the Lowcountry](#) (CofC Addlestone Library Special Collections Project)

[College of Charleston Quality Enhancement Plan \(QEP\)](#)

[Articles about CofC and LGBTQ+ Issues](#)