EE 144 - INTRODUCTION TO OCEANOGRAPHY FALL 2022

Instructor: Dr. Robinson (Wally) Fulweiler (she/her/hers) *Office:* STO SCI 141D *Email:* <u>rwf@bu.edu</u> Office Hours: W: 3:30-4:30 pm, F: 1:15-2:15, & by appointment

Graduate Teaching Fellow: Nish Etige Office: CAS 130G Email: <u>netige@bu.edu</u> Office Hours: M: 11:00-12:30, T: 2:00-3:30 pm

Lecture: MWF 2:30-3:20 pm in CAS 522

FINAL EXAM: No final - "Not Test" instead (more info below and on blackboard).

Required Text: No required text; We will use an online text book and additional resources that I will post on our Blackboard Site. Be sure to check out the Course Materials Folder for details of what to read each week.

Welcome – I am really excited for the semester. I am here to teach you about the ocean – and I can also help with answering questions that are beyond this course. For example, if you are interested in a particular subject and would like more information on current topics, something you saw on the news, read in the paper or if you are interested in careers in oceanography, becoming a marine science major, research opportunities at BU, etc.– I am happy to help and point you in the right direction. Please don't be shy about reaching out if you have questions, suggestions for course improvements, or confirmation that you liked something we did in class, etc.

Expectations – There are multiple stressors impacting all of us in complex ways. We all need to be cognizant of these stressors and treat each other with empathy and grace. My expectations then are as follows, I want us to:

- Stay mentally and physically healthy
- Be kind and considerate of each other
- Work together
- Communicate clearly

If you have questions – please check our Blackboard site first. My bet is that 99% of the questions you have about the class can be answered there. If you need to email me – please use the subject line: EE 144 Question. This will help me filter your questions in my inbox. A note on email – if I don't respond in 48 hours, please email again.

Course Overview – Oceanography is a branch of Earth Sciences that encompasses a variety of topics from ocean currents and plate tectonics to chemical fluxes and ecosystem dynamics. Over 70% of the earth's surface is ocean - so learning about the oceans will help us to understand how the whole earth system functions. In addition, the oceans are not only one of the most important agents controlling global climate but they are also one of the chief sinks (and in some cases, sources) for many of the gases and chemical compounds about which mankind is worried (e.g., carbon dioxide and methane). As you might guess, an interdisciplinary approach is critical to understanding how the oceans function.

In this course we will examine all four major disciplines of oceanography including physical (e.g., waves, currents, tides, and the behavior of light and sound), geological (e.g., plate tectonics, weathering, coastal erosion), chemical (e.g., composition of seawater, interactions of seawater with the atmosphere), and biological (e.g. distribution and ecology of marine organisms). By the end of this course you will have a solid understanding of controls on oceanic circulation, the connection between the ocean and the atmosphere, the major chemical transport and reactions in the ocean, and the how organisms alter the ocean and vice versa. You will also learn about how human activities alter the ocean, and how the ocean makes our earth habitable.

Course objectives:

- You will identify the ways the four major disciplines of oceanography (physical, geological, chemical, and biological) investigate the controls of oceanic circulation, the connections between the ocean and the atmosphere, the impact of ocean chemistry on life, and the ecology and biology of the ocean as well as interactions between humans and the ocean. You will learn how scientists employ interdisciplinary methods to explain the complexity of the physical world and the human impact on it. (*Scientific Inquiry I*)
- You will recognize the ocean as a site of conflict and opportunity among and within human cultures, and you will discuss the ways exploration, commercialism, and food production continue to impact intercultural relations. You will also analyze the ocean as a site for the study of climate change. (*Ethical Reasoning*)
- As the course begins with intercultural contacts and proceeds to human interactions with the environment, you will contend with the ethical issues that face communities when oceans bridge them and affect their livelihood, and you will examine the ways your own communities and interactions with the ocean may affect future generations. (*Ethical Reasoning*)

Diversity & Inclusion – Diversity enriches all research and education, and is realized only with all voices, views, and perspectives operating within a supportive and respectful community. For this reason, the Department of Earth & Environment, including myself are committed to fostering diverse, inclusive, and equitable living, learning, and working environments that are supportive and free from violence, harassment, disruption, and intimidation. As a student taking this course, you are also committing to fostering such an environment. Further, the Department of Earth & Environment recognizes that creating a safe environment and a culture of respect is the shared responsibility of all members of our community. To ensure an equitable environment that values and respects the unique experiences and perspectives of our community, the Department, including myself are dedicated to promoting diversity, inclusion, and equity among all members of our departmental community and encouraging open, honest, and compassionate communication. Again, as a student enrolled in this course you are committing to creating such an environmental efforts for fostering a safe, inclusive, learning environment here: http://www.bu.edu/earth/about/diversityinclusion/.

Exams and Course Grading – This semester you will have five exams. I will drop your lowest grade. We are having exams that are more frequent so that material doesn't build up and become overwhelming.

We will not have a final exam. Instead, you will on the "not-test" - see blackboard.

If you are in the lecture only (A1) your grade will be calculated as follows:

• Each exam is worth -21% of your grade (4 *21% = 84%)

○ Not-Test (see blackboard) – 16% of your grade

If you are a marine science major, you are taking the marine discussion and your grade is calculated differently. Please see that syllabus for more details.

Accommodating COVID-related absences and other extenuating circumstances: If you will miss more than two classes due to COVID or other any other circumstances (including planned absences due to athletics, religious observations, etc.), you will need to notify me as soon as possible. Together we will build a plan for keeping up and engaging with the missed material.

I will post available lecture material within 36 hours of the lecture.

If you are having difficulties – please reach out. And please do not wait for the end of the semester. There is often little that can be done at that point. So reach out early an often as you need.

I stress the importance of your familiarity with, and adherence to, Boston University's *College of Arts and Sciences Academic Conduct Code*. It is the responsibility of every student to be aware of the Academic Conduct Code's contents and to abide by its provisions. The Academic Conduct Code can be found at <u>http://www.bu.edu/academics/policies/academic-conduct-code/</u>. Cases of academic misconduct will be promptly referred to the Dean's Office.

Finally, please refer to the University's policy on Religious Observance (<u>http://www.bu.edu/chapel/religion/</u>) and the Multi-faith Calendar (<u>http://www.interfaith-calendar.org/</u>)

Course Recording:

No student may record any classroom or other academic activity (including advising sessions or office hours) without my express written consent. Unauthorized use of classroom recordings – including distributing or posting them – is also prohibited. If you have (or think you may have) a disability such that you need to record classroom activities, or need other assistive services, you should contact Disability & Access Services to request an appropriate accommodation. More information may be found <u>here.</u>

WWW Sites of Interest - There are several Web sites that you may find interesting to check out. Several are from educational/research institutions, several are from research groups, and others are just sort of "miscellaneous oceanography". There are many more –these are just to get you started.

- The Oceanography Society (TOS): http://www.tos.org/
- Joint Ocean Global Flux Study (JGOFS): http://www1.whoi.edu/jgofs.html
- Ocean Drilling Program (ODP): http://www.oceandrilling.org
- Sea Education Association (SEA): http://www.sea.edu
- Women in Oceanography: http://www.womenoceanographers.org/
- Earth from Space: http://www.earthfromspace.si.edu/
- The American Society of Limnology and Oceanography: http://www.aslo.org/
- Coastal and Estuarine Research Federation: http://www.erf.org/
- The Intergovernmental Panel on Climate Change: http://www.ipcc.ch/
- Careers in Oceanography and marine sciences: http://ocean.peterbrueggeman.com/career.html
- El Nino (NOAA Page): http://www.pmel.noaa.gov/tao/elnino/nino-home.html

• The Naked Scientists: <u>http://www.thenakedscientists.com/</u>

A note on the schedule: Below is the proposed schedule for the class. As we move through the semester some of this may change. Look to our Blackboard site for weekly updates. I do not plan to change the dates of the exams or when the final project is due.

Date		Торіс
	7	Hello - Introductions, Class logistics, etc.
r	9	History of Ocean Exploration - early days to the 20th Century
	12	Origin of the solar system, the earth, and its oceans
	14	Water, Water everywhere and not a drop to drink
nbe	16	Plate Tectonics 101- Theory and Evidence
ten	19	Plate Tectonics - Shape of the Ocean Basins
Sep	21	Plate Tectonics - Mid-Ocean Ridges, Subduction zones, Volcanic arcs
	23	Exam 1 - Readings & Lectures from 9/9-9/21
	26	Something wicked this way comes - Hurricanes
	28	Ocean Circulation I - Judging A Book by Its Cover
	30	Ocean Circulation II - It's So Much Deeper Than You Thought
	3	Surf Lessons
October	5	Tides are waves too.
	7	Exam 2 - Readings & Lectures from 9/26-10/5
	10	Indigenous Peoples Day - No School
	11	Monday Schedule: Special Topics Lecture - Topic TBD
	12	Light and Photosynthesis
	14	Limiting Nutrients in the Ocean
	17	Global Ocean Productivity - Where, Why, and How do we know?
	19	Primary Production and Respiration
	21	The Sea is on Fire - Harmful Algal Blooms and Red Tides
	24	Life not from Sun - Hydrothermal vent communities
	26	Exam 3 - Readings & Lectures from 10/11-10/24
	28	Special Topic Lecture: The Immortal Life of Jellyfish
	31	Plankton, Nekton, Benthos, and Food Webs
	2	Tiny Water Column Dwellers -Zooplankton
	4	Invertebrates - from small worms to colassal squid
		Everything you need to know about Fish
	9	Marine Mammals and other Charistmatic Megafauna - I
er	11	Marine Mammals and other Charistmatic Megafauna - II
Novemb	14	Exam 4 - Readings & Lectures from 10/28-11/11
	10	The Extension of Second Action of the Internet of the Internet of Second Action of Second A
	18	The Existence of Sea Monsters - 1
	21	The Existence of Sea Monsters - 2
	23	
	25	Thanksgiving Recess
	28	Ocean Birds
	30	San warsnes and Mangroves
mber	2	Coral Keels Exam 5 Deadings and Leatures from 11/16 12/5
	3	Exam 5 - Keaungs and Lectures from 11/10-12/5
ece	/	Climate Unange and the IPCU
Ā	9	The Future of Ocean Research
	12	Sharing Not-tests with class