INTRODUCTION TO OCEANOGRAPHY
GEOL 18000
TUESDAY/FRIDAY, 1300-1415
HUNTER NORTH C002

CONTACT INFORMATION

Instructor: Dr. Frank Buonaiuto
Email address: fbuonaiu@hunter.cuny.edu (*)
Office Hours: Tuesday 1430 – 1600, ***and by appointment***.

***Note:** The best way to contact me is through your **Hunter College** @myhunter email – (1) You must include the **GEOL 18000** in your subject line (2) sign your full name as it appears in CUNYfirst, and (3) send all email from your @myhunter email address. I do not respond to personal email addresses. I try to answer all emails within 24 hours during the week and 48 hours on the weekend.

COURSE DESCRIPTION

This course will offer an introduction to the subject of oceanography. We will discuss the physical, chemical, biological and geological aspects of the oceans; learn about the structure and motion of the atmosphere and how they influence ocean circulation; and we will learn about waves, tides and tsunamis. The ocean, comprising 71% of the Earth's surface, is a crucial component of the Earth's climate system and its dynamics determine the cycling of carbon and the production of oxygen throughout the planet. The oceans' extreme environments host unusual forms of life, which are sensitive to anthropogenic influences. It is an important source of energy and economically valuable materials. Accordingly, the ocean has a profound influence on humans and civilization. In addition to providing a good introduction to aspects of the scientific world, it is a foundational course for Environmental Studies, Geography and BA/MA Earth Science Education majors.

The course has been divided into four units, each with a corresponding **INTEGRATING CASE STUDY** designed to achieve the expected **LEARNING OUTCOMES** listed below.

- Unit 1-Marine Geology
- Unit 2-Ocean Chemistry
- Unit 3-Ocean Dynamics
- Unit 4-The Ocean Environment

EXPECTED LEARNING OUTCOMES

1. Gather, interpret, and assess information from a variety of sources and points of view.
2. Evaluate evidence and arguments critically and analytically.
3. Produce well-reasoned written arguments using evidence to support conclusions.
4. Identify fundamental concepts in physics, chemistry, geology, biology, mathematics and engineering technologies as they apply to the study of modern oceanography:

5. Identify and contribute to modern Ocean discourse:
6. Demonstrate knowledge of the Ocean's role within the broader Earth System:

CASE STUDIES

To support Expected Learning Outcomes:

- In addition to traditional instruction, each **CASE STUDY** will require students to gather data from several marine databases (NOAA, USGS, NASA), relevant journal articles and white papers. Through class discussions students will learn to interpret the collected data as they pertain to the specific process(es) or problem(s) presented and will be guided to assess the quality of the data being used.
- For each **CASE STUDY** a series of analytical questions (4-6) will be formulated, designed to highlight different perspectives or points of view that may be derived from the data. Students then will be required to provide a substantial answer to each question evaluating these perspectives.
- For each **CASE STUDY** students will be required to construct a 'position paper' about any potential controversy surrounding the topic(s), and to show exactly (in the assigned chapters and journal articles, lectures, data) what supports their arguments. Guidelines for the position paper will be distributed separately.

INFORMED REGISTRATION STATEMENT

This is a **3-hr**, **3.0-credit**, science-based course, which meets the Scientific World requirement of the Hunter Common Core and the GER 2E General Education Requirement.

RECOMENDED TEXT BOOKS

Essentials of Oceanography (13th Edition), Trujillo, A. P. and Thurman, H. V., 2020
ISBN 9780134891521, Pearson, retail $181 (paperback).
Earlier editions are acceptable. **Open Source** https://open.umn.edu/opentextbooks/textbooks/732

GRADING METHOD AND SCALE

Grades will be based on class participation, homework assignments (Ocean News and Chapter Review Questions), case studies and a final exam. I prioritize attendance and class participation, in doing so, you will have the option of your grade being based on traditional metrics of your performance on assigned tasks or on your overall contribution to our collective learning environment. Each of you is required to submit all assignments and I as your instructor will report the higher of your two final grades to the college. A detailed description of the Hunter College Grading System may be found at http://catalog.hunter.cuny.edu/content.php?catoid=23%navoid=3149**.** An itemized breakdown of the final grading rubric is provided below:

- Class participation: 0 - 100%
- Case Study Assignments: 30%
- Ocean News: 30%
- Chapter Review Questions: 30%
- Final exam: 10%

SYLLABUS CHANGE POLICY
Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice (1 week). Updates will be posted regularly on Blackboard with an email notification.

ACADEMIC INTEGRITY
All students are expected to approach their respective academic endeavors with integrity. Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.

ACCESSIBILITY AND ACCOMMODATION
To the best of our ability, materials used in this course should be accessible to you. Videos in the Science Forward Video Series have closed captioning (when viewed via YouTube), written transcripts, and are available with audio descriptions of the visual content. If you are having trouble accessing any of the assigned readings or videos, do not hesitate to let me know and I will try to fix the issue.

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (emotional, medical, physical and/ or learning) consult the Office of AccessABILITY located in Room HE1124 to secure necessary academic accommodations. For further information and assistance please call (212-772-4857)/ TTY (212- 650- 3230). You must be registered with the Office of AccessABILITY to qualify for the accommodations.

ONLINE ETIQUETTE ANTI-HARASSMENT STATEMENT
In order to maintain an environment conducive to personal and intellectual growth, harassment of any kind is prohibited in our classroom and on our course site. CUNY's policy on sexual misconduct can be found here.

The University strictly prohibits the use of University online resources or facilities, including our course site, for the purpose of harassment of any individual or for the posting of any material that is scandalous, libelous, offensive or otherwise against the University's policies. For online interactions that happen through our course, we will follow the CUNY School of Professional Studies guide to an online academic setting available here.

HUNTER COLLEGE POLICY ON SEXUAL MISCONDUCT
In compliance with the CUNY Policy on Sexual Misconduct, Hunter College affirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students,

employees, or visitors, as well as certain intimate relationship. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.

a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444)
b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Room HE 1123.

CLASS POLICY ON VIDEO RECORDING AND PARTICIPATION

All students are expected to attend synchronous class meetings. Should a situation arise that does not permit a student to participate please contact the professor or designated TLC via email. Synchronous class meetings **will not be recorded by any individual**. Participants have the choice to share their video and audio or may choose to communicate through the chat option. For your own edification the statement by the CUNY Executive Vice Chancellor is provided below.

CUNY Executive Vice Chancellor

Students who participate in this class with their camera on or use a profile image are agreeing to have their video or image recorded solely for the purpose of creating a record for students enrolled in the class to refer to, including those enrolled students who are unable to attend live. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live.

"Nobody Likes COVID" Policy

I acknowledge the impact COVID-19 has had on our society. As we gather together during the semester please be mindful of your state of health and follow Hunter College policies for reporting potential exposure. Under extreme circumstances we will move to synchronous zoom lectures. Instruction will be posted under Course Materials on Blackboard.

Inclusionary Classroom Policy

All people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed. I will do my best to address and refer to all students accordingly and support classmates in doing so as well.

INTEGRATING CASE STUDIES

Four case studies selected from the list below will be used to foster students' understanding of the ocean. Each case study highlights various content and themes within the discipline, and is designed to promote the development of a citizen scientist, from describing fundamental concepts in oceanography, collecting, analyzing and synthesizing data to articulating the empirical evidence that supports theories and points of view. Students will be responsible for constructing a position paper for each selected case study.

- **Plate Tectonic Theory:** Possibly the most substantial contribution the discipline has made to society, this theory details the basic processes of the scientific method from the construction of the continental drift hypothesis to the elevated unified theory involving mantle convection and sea floor spreading.

- **Sand Waves:** The mining of sand waves on the continental shelf is crucial for the maintenance of the NY barrier island system. However, little is known about the processes shaping these features and timescales upon which they evolve. The DOD and the DOI have different perspectives on the roles these features currently play and should play in coastal resilience and management strategies.

- **Hurricane Sandy:** Students investigate the role of significant storm events in barrier coastline evolution. Analysis of the acute and long term impacts will be discussed. How did the storm influence the economy, habitat gain/loss, and bay water quality? How is it now shaping our thoughts and policies on climate change and coastal resilience?

- **Eutrophication, Gulf of Mexico Dead Zones to Lobster Die Offs in Long Island Sound:** Students deconstruct the processes that give rise to eutrophication on the local and regional scale, and how these conditions have been influenced by land use and management policies. Students will review the current research to determine what role eutrophication played in the decline in lobster populations in LIS.

- **Grey Seals To Great Whites:** Through this case study students explore population dynamics and fishery management. The rebound in the grey seal population following cullings in the 19^{th} and 20^{th} centuries has led to the return of the North Atlantic white sharks and a birth of ecotourism for Cape Cod, MA.

- **Garbage Islands, Plastic Land Up For Grabs:** Students explore ocean circulation and the world's most pervasive surface drifter. Ownership and responsibility is called into question as Ocean Stewardship becomes an increasing global priority.

- **Arctic Sea Ice, The Polar Vortex and Planetary Scale Waves:** Students investigate how accelerated sea ice loss in the Arctic has influenced the recent breakdown of the polar vortex, mechanisms for ocean-atmosphere coupling and global teleconnections.

- **Meridional Overturning Circulation:** Students research the debated primary and secondary processes influencing the rate and variability of MOC, the role observing systems play in deciphering the redistribution of heat and carbon.

- **Antarctica, the Southern Ocean and Climate Change:** The Antarctic Peninsula is one of the fastest warming spots on the planet and the latest evidence seems to indicate that it

is the warm ocean waters that are eating away the ice along the western part of the Peninsula. **S**tudents will research the primary and secondary processes influencing the rate and variability of melting, the role the atmosphere and the ocean systems play in deciphering the redistribution of heat and the specific conditions of this area that may be aiding the melting process.

- **The Oceans and their Giant Waves** - Learning from the mariners, the scientists and the surfers. Students will read different chapters of the book "The Wave" by S. Casey and will then research the most recent evidence of these giant waves as detected by modern measuring methods.

- **From Whales To Wind** – Thinking critically about the potential link between offshore wind farms and the record number of whale mortality events along the east coast of the US.

Month	Date	Day	Topic	Reading	Unit Assignments
Jan	28	Tue	Introductory Lecture: Fluid Planet	Chapter 1	**Marine Geology**
	31	Fri	Introductory Lecture: Fluid Planet	Chapter 1	Ocean News 1
Feb	04	Tue	Plate Tectonics & The Ocean Floor	Chapter 2	RQ Chap-1
	07	Fri	Plate Tectonics & The Ocean Floor	Chapter 2	Ocean News 2
	11	Tue	Marine Provinces	Chapter 3	RQ Chap-2
	14	Fri	**No Class**		Ocean News 3
	18	Tue	**Monday Schedule**		**Assign Case Study 1**
	21	Fri	Marine Provinces	Chapter 3	Ocean News 4
	25	Tue	Marine Sediments	Chapter 4	RQ Chap-3
	28	Fri	Marine Sediments	Chapter 4	Ocean News 5
Mar	04	Tue	Water & Seawater	Chapter 5	**Ocean Chemistry** RQ Chap-4
	07	Fri	Water & Seawater	Chapter 5	Ocean News 6
	11	Tue	Water & Seawater	Chapter 5	
	14	Fri	Air-Sea Interaction	Chapter 6	**Assign Case Study 2** Ocean News 7
	18	Tue	Air-Sea Interaction	Chapter 6	RQ Chap-5
	21	Fri	**Air-Sea Interaction (Zoom Lecture)**	Chapter 6	Ocean News 8
	25	Tue	Ocean Circulation	Chapter 7	**Ocean Dynamics** RQ Chap-6
	28	Fri	Ocean Circulation	Chapter 7	Ocean News 9
Apr	01	Tue	Ocean Circulation	Chapter 7	RQ Chap-7
	04	Fri	Waves & Water Dynamics	Chapter 8	**Assign Case Study 3** Ocean News 10
	08	Tue	Waves & Water Dynamics	Chapter 8	
	11	Fri	Waves & Water Dynamics	Chapter 8	RQ Chap-8, Ocean News 11
	15	Tue	**Spring Recess**		
	18	Fri	**Spring Recess**		
	22	Tue	Tides	Chapter 9	
	25	Fri	Tides	Chapter 9	Ocean News 12
	29	Tue	Beaches & Shoreline Processes	Chapter 10	**The Ocean Environment** RQ Chap-9
May	02	Fri	Beaches & Shoreline Processes	Chapter 10	**Assign Case Study 4 (Sharks)** Ocean News 13
	06	Tue	Shoreline Processes & The Coastal Ocean	Chapter 10	
	09	Fri	Marine Pollution	Chapter 11	RQ Chap-10, Ocean News 14
	13	Tue	Marine Pollution	Chapter 11	RQ Chap-11
			Final Exam	**TBD**	