

GEOL 18000-01
INTRODUCTION TO OCEANOGRAPHY
Tuesdays and Fridays 2.10 pm to 3.25 pm
FALL 2020

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Office Hours: online only, by appointment (via zoom or email)
E-mail: sph0001@hunter.cuny.edu (communications to me must have GEOL-180 in the subject line and you must sign your full name as it appears in CUNYFirst.)

COURSE DESCRIPTION

This course will offer an introduction to the subject of oceanography. We will discuss the physical, chemical, biological, geological and human aspects of the oceans; learn about the structure and motion of the atmosphere and how it influences ocean circulation; and we will learn about waves, tides and life in the ocean. We will examine critical issues such as coastal erosion, ocean acidification, variability of the meridional overturning circulation and sea level fluctuation in response to climate change.

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' diverse 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, GEOL-180 is a foundational course for Environmental Studies, Geography and BA/MA Earth Science Education majors.

INFORMED REGISTRATION STATEMENT

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

COURSE STRUCTURE

This is a fully online course. All materials will be available on the **Hunter College Blackboard** site. The Blackboard site will have a **"Weekly coursework"** page. For each week there will be folder labelled by date containing recommended reading, additional articles, an assignment and/or other materials. Students are expected to complete all the work in each folder on a weekly basis.

Class meetings will be held synchronously on **Blackboard Collaborate Ultra**. All students must register with **Pearson's My Mastering** through Blackboard to be able to do the Mastering assignments. Instructions for registration are posted on Blackboard.

In addition, there will be a **class discussion board** where students can discuss the course material, ask and answer questions and discuss the case study material. I will be available

online during the scheduled virtual meeting days and will respond to Discussion Board posts, email and have virtual office hours by appointment.

This course will cover four big ideas:

- Marine Geology and its relationship to Plate Tectonic Theory
- Ocean chemistry and physics, and their relationship to climate
- Human impacts on the ocean
- The oceans role in sustaining a habitable planet

The course has been divided into four units, each with a corresponding “**BIG IDEA**” and **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

- Identify fundamental concepts in physics, chemistry, geology, biology, mathematics and engineering technologies as they apply to the study of modern oceanography
- Describe the common tools used in oceanography
- Demonstrate knowledge of the ocean’s role within the broader Earth System
- Produce well-reasoned written arguments using evidence to support conclusions.

CASE STUDIES

To support Expected Learning Outcomes and Unit 4: The Ocean Environment:

- 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 implications 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.

REQUIRED TEXTBOOK

Modified Mastering Oceanography with Pearson EText -- Standalone Access Card -- for Essentials of Oceanography Trujillo, Alan P., Thurman, Harold V., 13 Edition
9780135486948

<http://hunter.textbookx.com/institutional/index.php?action=browse#books/2264583/>

ASSESSMENT AND GRADING POLICY

Exams and assignments will be based on the material covered in class and in the textbook. See the syllabus for exam dates and information about which chapters will be covered. Grades will be based on class participation, homework assignments, two mid-term exams and one final exam.

Exams	50%
Mastering Assignments:	20%
Case studies	20%
Class Participation	10%

- There will be a total of **four exams** given during the semester, worth a combined total of 50% of the final grade.
- Mastering Assignments are online assignments that will be completed through **Pearson's MyLab and Mastering** on Blackboard to reinforce material taught in class.

ATTENDANCE AND CLASS PARTICIPATION

Class participation constitutes 10% of the final grade. Attendance is strongly encouraged at all lectures. This is a fully online course. There will be synchronous lectures during scheduled class meetings on **Blackboard Collaborate Ultra**. These lectures will be recorded and available after the class meetings. As this class is designed for asynchronous learning, you can log in any time during the day and access the class materials. It is important that you check in regularly.

I will be monitoring student online activity and requiring that you post at least one question/answer or comment on the course **discussion board** weekly and/or log into BB. The discussion boards will allow you to interact with one another and with the instructor.

CUNY GRADING POLICY:

- Your grades will be assigned based on the CUNY grading policy that can be found in the online undergraduate catalog that can be found at <http://catalog.hunter.cuny.edu/content.php?catoid=15&navoid=1433>
- The CR-NCR option will be honored only if the conditions stated on the CR/NCR form are satisfied: all course work has been completed and you earned grades such that you accumulate at least 50 points total in the course. Students on probation are ineligible.
- For an **IN** to be awarded you must contact me about making up the exam and fill out the *'Contract to Resolve an Incomplete Grade'* form **within 72 hours** of the day/time of the final exam. An unresolved IN becomes an FIN at the end of the following semester.

- Pursuant to CUNY policy, an **Unofficial Withdraw (WU)** is assigned to students who **attended a minimum of one class**. It is important to understand the definition of a WU and the difference between this grade and an **F** grade. The conditions for assigning the WU grade include:
 1. A student's enrollment has been verified by the course instructor, and
 2. The student has *severed all ties* with the course *at any time before the final exam week* and, consequently, has *failed to complete enough course work*, as specified in the course syllabus, to earn a letter grade, and
 3. The student has *not officially withdrawn* from the course by completing the process for a W grade, or made arrangements to receive an INC.

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. Updates will be posted regularly on Blackboard.

EXAMPLES OF INTEGRATING CASE STUDIES

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 culling in the 19th and 20th 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. Students 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.
- **Monitoring Ocean Changes in the 21st Century:** Ocean temperature and chemistry changes strongly influence the well-being of organisms and the composition of marine food webs. Since the preindustrial era, the oceans have absorbed at least one fourth of the carbon dioxide (CO₂) that humans have put into the atmosphere, resulting in an increase in ocean acidity. The amount of oxygen dissolved in ocean water has changed as well, driven by warming and changes in circulation patterns. These effects are further compounded in coastal regions, where marine ecosystems face additional human pressures such as pollution, land use changes, and overfishing. How do scientists learn about the oceans and how and when changes take place? What are those changes? It's all about observations!
- **Climate, the Oceans, Climate Change and the Role Humans Play:** Students investigate the development of what has become a topic of current concern and debate: global warming and policies (or lack of) to address it. This topic is selected because it includes the entire Earth system, a system in which the ocean has occupies

a central place, and because an important part of a course in science is to provide information about topics that affect our everyday life.

TIPS FOR GETTING GOOD GRADES

In general, the more time you put in, the better your grade will be. The following are useful tips to do well in this or any class:

- Attend class and take detailed notes.
- Actively participate in class discussions.
- Read the assigned material in the course textbook (or another textbook) *before* coming to class.
- Re-write your notes as soon as possible after class. This will allow you to fill in the details still fresh in your memory, and prepare questions for the next time the class meets.
- Test yourself by answering the questions in the book and in class.
- Carefully study the diagrams and charts in the book and in the lectures

ACADEMIC 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. See the following report by the Hunter College Senate for more details:

<http://www.hunter.cuny.edu/senate/assets/Documents/Hunter%20College%20Policy%20on%20Academic%20Integrity.pdf>

ADA POLICY

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 E1214B, to secure necessary academic accommodations. For further information and assistance, please call: (212)772-4857 or (212)650-3230.

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, on 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, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link:

<http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf>

TENTATIVE SYLLABUS FOR FALL 2020

Dates	Unit	Topic	Chapter
F 8/28	Marine Geology	Introduction to Planet Earth	1
T 9/1		The Origin of the Ocean	
F 9/4		Plate Tectonics and the Ocean Floor	2
T 9/8		Plate Tectonics and the Ocean Floor	
F 9/11		Marine Provinces	3
T 9/15		Marine Provinces	
T 9/22		Marine Sediments	4
F 9/25		Ocean Chemistry	Marine Sediments CASE STUDY-1
F 10/2	Exam-1		1,2, 3,4
T 10/6	Water and Seawater		5
F 10/9	Water and Seawater		
T 10/13	Air-Sea interaction		6
F 10/16	Air-Sea interaction CASE STUDY-2		
T 10/20	Ocean Dynamics		Circulation of the Ocean
F 10/23		Circulation of the Ocean	
T 10/ 27		Exam-2	5,6,7
F 10/30		Waves	8
T 11/3		Waves	
F 11/6		Tides	9
T 11/10		Tides CASE STUDY-3	9
F 11/13		Ocean Environment	Beaches, Shoreline Processes and Coasts
T 11/17	Beaches, Shoreline Processes and Coasts		
F 11/20	Exam-3		8,9,10
T 11/24	Marine Pollution		11
W 11/25	Marine Pollution		
T 12/1	Biological Productivity		13
F 12/4	The Ocean and Climate Change		16
T 12/8	CASE STUDY-4		
TBA	Exam-4		11,13,16