

GEOL-28000-01
MARINE GEOLOGY
Mode of instruction: ONLINE
Tuesdays and Fridays 9.45 am to 11.00 am
Spring 2021

Instructor: Dr. Shruti Philips
Office: HC North, Room 1032
Office Hours: Wednesdays 12.30 pm-1pm *by appointment*
E-mail: sph0001@hunter.cuny.edu (communications to me must have GEOL 280 in the subject line and you must sign your full name as it appears in CUNYFirst.)

Introduction:

Marine Geology is the study of the seafloor and the geologic processes that have been at work throughout the seafloor's history. In this course we shall attempt to answer the questions “**what?**”, “**where?**”, “**when?**” and more importantly “**how?**” in order to better understand the processes that shape the ocean basins and determine the structure and composition of the oceanic lithosphere. The main patterns of sediment distribution in the ocean basins and how sediments preserve a record of past climatic and sea-level changes will be explored. In addition, the role of fluids in ocean sediments and the oceanic crust will be examined. The seafloor sediments will be studied with a focus on their role in marine biogeochemical cycles. We shall conclude with an examination of the how the marine environment has changed over Earth’s history.

Basic material covered in the course include:

- The structure, formation, and evolution of ocean lithosphere
- Hydrothermal circulation in the oceanic crust
- Sources & composition of marine sediments
- Biogeochemical processes in deep-sea sediments
- The climatic imprint on marine sediments
- Paleooceanography and sea-level changes

Learning Outcomes:

At the end of the course the successful student is expected to be able to:

- apply the fundamental concepts of the plate tectonics theory to explain how geologic processes shape the ocean basins, and influence the evolution of the oceanic lithosphere.
- describe the origin, nature, and distribution of marine sediments
- identify and describe various biogeochemical processes that operate in the ocean basins.
- analyze and interpret geologic data to identify the major paleoceanographic and climatic changes that Earth has experienced over time.

INFORMED REGISTRATION STATEMENT

This is a **3-hr, 3.0-credit**, science-based course, which fulfills **GER 3/B**.

Prerequisite: GEOL 10200 or GEOL 18000 or permission of the instructor.

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 modules**” page. For each module there will be folder 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**. In addition, there will be a **class discussion board** where students can discuss the course material, ask and answer questions and discuss the 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.

Note for Blackboard Collaborate sessions:

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 who are enrolled and unable to attend live. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera turned off and do not use a profile image. Likewise, students who unmute 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.

Important: Students should check their Hunter e-mail messages regularly for messages from the instructor!

Required Reading:

1. **The Ocean Basins: Their structure and evolution**, Open University Team, 2nd Edition. Elsevier, 2004. Paperback ISBN: 9780750639835. **eBook ISBN:** 9780080537931
2. **Marine Biogeochemical Cycles**, Open University Team, 2nd Edition. Elsevier, 2007. ISBN: 0-7506-6793-1. **eBook ISBN:** 9780080940779

Purchasing options:

- <http://hunter.textbookx.com/institutional/index.php?action=browse#books/2678497/> (Hunter College Bookstore).
- The eBook (ISBN 9780080537931) version of *The Ocean Basins: Their structure and evolution* is available from the publisher at <http://store.elsevier.com/product.jsp?isbn=9780080537931&pagename=search> .
- The eBook (ISBN 9780080940779) version of *Marine Biogeochemical Cycles* is available from the <http://store.elsevier.com/Marine-Biogeochemical-Cycles/-Open-University/isbn-9780080940779/>

Assessment and Grading Policy: There will be **two midterm** assessments given during the semester and a **final** assessment at the end of the semester. Assessments are based on

lecture, assigned readings, and text material. These exams will count for a total of **60%** of the grade. The remaining **40%** of the grade will be based on **homework assignments and detailed summaries of assigned readings from research journals and class participation** for a grand total of 100%. Assignments will **not be accepted** after the due date.

Midterm Assessment-1	20%
Midterm Assessment-2	20%
Final Assessment	20%
Assigned readings	20%
Homework quizzes/assignments	15%
Class participation	5%

ATTENDANCE AND CLASS PARTICIPATION

Class participation constitutes **5%** of the final grade. Attendance is strongly encouraged at all lectures. ***There is a direct correlation between good grades and good attendance.*** 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.

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/>.

Tips for getting good grades: *The more time you put in, the better your grade will be.*

- Attend class and take detailed notes.
- Read the assigned material in the text (or other) 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 help you 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.

Assessment Policy: A ‘make up’ for the midterm will be given only if you miss it because (1) you are ill and can prove that with a physician’s note; and (2) you e-mail me BEFORE the exam and leave your name & phone number at which you can be reached. There will be **no make-ups** for missed quizzes.

- If you **miss the final assessment** a makeup will be given only if you inform me within 72 hours of the day/time of the final exam **and** present me with checkable documentary evidence of the reason for your absence--a doctor's note, a bill from the hospital, a note

from the funeral home etc. 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.

- **Information for students** on the new CR/NC policy is available at [Credit/No Credit page](#).
 - To select the CR/NC grading option for a course, students must complete and submit the electronic CR/NC form available on the [Credit/No Credit page](#).
 - To complete the form, students will need the following information:
 - their EMPL ID number and Hunter email address,
 - the course prefix, number, section and class number,
 - the course instructor's first and last name, email address, and academic department.
 - Choice of a grade of D or NC, if the earned course grade is a D.
 - Students may NOT elect the CR/NC grading option after the deadline and there are no appeals allowed for late election.
 - Once students choose a CR/NC grade for a course, that choice is final and irrevocable.
 - A CR/NC request is invalid if the election of the CR/NC grading option violates college-wide and/or program-specific restrictions.
- As per CUNY, 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.

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 Spring 2021

Dates	Lecture Topic	Chapter
F 1/29	Introduction and overview	1 OB
T 2/2	The shape of the Oceans	2 OB
F 2/5	Continental margins, ocean ridges, transform faults, deep ocean	2 OB
T 2/9	The evolution of the Ocean Basins	3 OB
T 2/16	Red Sea, Mediterranean Sea	3 OB
F 2/19	The structure, formation & fate of the Oceanic Lithosphere	4 OB
T 2/23	Pillow lavas, segmentation of axes, rates of spreading, seamounts, OIB, MORB	4 OB
F 2/26	Hot spot-ridge interactions, LIP's, Subduction factory, Back-arc basins;	4 OB
T 3/2	Hydrothermal Circulation in Oceanic crust	5 OB
F 3/5	Chemical changes, biological significance, black & white smokers	5 OB
T 3/9	MIDTERM ASSESSMENT-1	
F 3/12	Biogeochemical processes in sea water	2MBC
T 3/16	Biological particle cycle;	2MBC
F 3/19	Role of N, P, Fe, S, O ₂ in seawater;	2MBC
T 3/23	Vertical & lateral variations, & behavior of dissolved constituents	2MBC
F 3/26	Sediments in the Ocean- shelf seas & shallow marine sediments	6 OB
T 4/6	The distribution & nature of deep-sea sediments; Seafloor resources;	3MBC
F 4/9	The Accumulation of Deep-Sea sediments:	3MBC
T 4/13	Biogenic sediments, CCD, Acidification; Terrigenous sediments	3MBC
F 4/16	Authigenesis & Diagenesis	5 MBC
T 4/20	MIDTERM ASSESSMENT-2	
F 4/23	Climatic Clues from Restricted seas	readings
T 4/27	Deep Sea Sediments and Paleoceanography:	4MBC
F 4/30	Evolution of the ocean basins: Opening & Closing Gateways; use of proxies	4MBC
T 5/4	Paleoceanography & The Long-Term Climate record:	readings
*F 5/7	Major Ice ages-Proterozoic & Phanerozoic, HE/DO, Bipolar seesaw;	readings
T 5/11	Paleoceanography & Sea Level changes-Messinian Salinity crisis;	6OB
F 5/14	The broader picture: The Global cycle	7OB
TBA	FINAL ASSESSMENT	

- *All assignments due by this date.
- A **reading list** of research articles will be posted on Blackboard. You are expected to hand in detailed summaries of **10** of these articles by **Friday May 7th, 2021**. Each summary must be in two parts: **part-1** will be in the form of bullet notes on the significant points made in the article; **part-2** will be a summary **in your own words** explaining the content of the article. You must **conclude** with the significance of the information and what you have learnt from it. This is worth **20%** of your total grade.
- **OB** = The Ocean basins: Their Structure and evolution; **MBC**= Marine Biogeochemical Cycles

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. Any changes to the syllabus will be posted on Blackboard.