

GEOL-28000-01
MARINE GEOLOGY
Mode of instruction: IN-PERSON
Tuesdays and Fridays 10am to 11.15am
Fall 2022

Instructor: Dr. Shruti Philips

Office: HC North, Room 1032

Office Hours: Tuesdays and Fridays: 9.30 am to 10 am or *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

Class meetings will be held in-person at the Hunter College campus. 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 check the site regularly and keep up with the material.

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/3405669/> (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 publisher at <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.*

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.

Classroom Etiquette: Conversation during class and walking in and out of the room is disruptive and must be kept to a minimum. Please keep eating and drinking to a minimum.

Cell Phone Policy: Out of respect for preserving a positive learning environment, all cell phones, beepers, and other portable noise-making devices must be SILENCED for the duration of the class period.

CUNY grading policy:

- Your grades will be assigned based on the CUNY grading policy that can be found in the online undergraduate catalog <https://hunter-undergraduate.catalog.cuny.edu/policies-and-requirements/academic-requirements/grading-policies/grading-definition>
- **Pass/No Credit Option:**
You have the option to request a grade of Pass/No Credit for this course. To receive this grade, you must submit the request for a Pass/No Credit grade by completing the form linked to the registrar's website (<https://hunter.cuny.edu/students/registration/register-for-classes/credit-no-credit/#instructions>). The form must be submitted by 11:59 pm the day before the last day of classes. The decision is irrevocable. To qualify for a Pass/No Credit grade, you must complete all the requirements for the course, including attendance, assignments, exams, and the final exam/project. To Pass, you must earn at least a D. If you stop attending, stop submitting assignments, and/or do not take the final exam, you receive a grade of **WU (Unofficial Withdrawal)**, which cannot be converted to Pass/No Credit, and may affect your financial aid status.
- 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.
- 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 a FIN at the end of the following semester.

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 2022

Dates	Lecture Topic	Chapter
F 8/26	Introduction and overview	1 OB
T 8/30	The shape of the Oceans	2 OB
T 9/6	Continental margins, ocean ridges, transform faults, deep ocean	2 OB
F 9/9	The evolution of the Ocean Basins	3 OB
T 9/13	Red Sea, Mediterranean Sea	3 OB
F 9/16	The structure, formation & fate of the Oceanic Lithosphere	4 OB
T 9/20	Pillow lavas, segmentation of axes, rates of spreading, seamounts, OIB, MORB	4 OB
F 9/23	Hot spot-ridge interactions, LIP's, Subduction factory, Back-arc basins;	4 OB
F 9/30	Hydrothermal Circulation in Oceanic crust	5 OB
F 10/7	Chemical changes, biological significance, black & white smokers	5 OB
T 10/11	MIDTERM ASSESSMENT-1	
F 10/14	Biogeochemical processes in sea water	2MBC
T 10/18	Biological particle cycle;	2MBC
F 10/21	Role of N, P, Fe, S, O ₂ in seawater;	2MBC
T 10/25	Vertical & lateral variations, & behavior of dissolved constituents	2MBC
F 10/28	Sediments in the Ocean- shelf seas & shallow marine sediments	6 OB
T 11/1	The distribution & nature of deep-sea sediments; Seafloor resources;	3MBC
F 11/4	The Accumulation of Deep-Sea sediments:	3MBC
T 11/8	Biogenic sediments, CCD, Acidification; Terrigenous sediments	3MBC
F 11/11	Authigenesis & Diagenesis	5 MBC
T 11/15	MIDTERM ASSESSMENT-2	
F 11/18	Deep Sea Sediments and Paleooceanography:	4MBC
T 11/22	Evolution of the ocean basins: Opening & Closing Gateways; use of proxies	4MBC
T 11/29	Climatic Clues from Restricted Seas	readings
F 12/2	Paleooceanography & The Long-Term Climate record:	readings
T 12/6	Major Ice ages-Proterozoic & Phanerozoic,	readings
F 12/9	HE/DO, Bipolar seesaw;	readings
T 12/13	Paleooceanography & Sea Level changes-Messinian Salinity crisis;	6OB
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 **Dec 6th, 2022**. 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.