

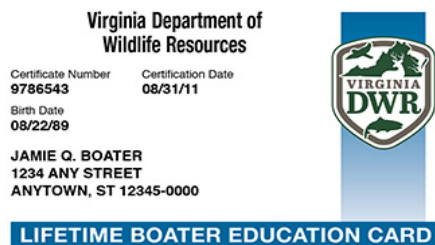
GEORGE MASON UNIVERSITY
Oceanography: GEOL 309-EVPP 309-BIOL 309
Spring 2026

Course: GEOL 309-EVPP 309-BIOL 309: Oceanography (3.0 credits)
Instructor: Dr. David J. Verardo
Office Hours: By appointment (email: dverardo@gmu.edu)
Class Meeting: Meets in-person, on-campus Monday and Wednesday from 1:30 P.M.- 2:45 P.M. in Exploratory Hall room1005

Course Description: Explores the geological, chemical, physical, and biological aspects of the global oceans.

Course Learning Outcomes: Develop an understanding of plate tectonics, ocean basin formation, seafloor provinces; marine sediments; physical and chemical properties of seawater; air-sea interactions; global ocean circulation; wave dynamics, and tides; marine life, marine environments; and biological productivity and energy transfer.

Special Notice Spring 2026: Students in GEOL 309-EVPP 309-BIOL 309: Oceanography (3.0 credits) will have an optional and guided opportunity to earn a Virginia Boating Certificate from the Virginia Department of Wildlife Resources. This certificate is required of all personal watercraft operators age 14 and older and all motorboat operators of 10 horsepower or greater regardless of age. Details will be provided for those interested.



Course Materials: No textbook is required since any necessary materials will be provided.

Grading Related Policy

- This is a lecture-based course with no required field trips.
- Grading scale: A=90-100, B=80-89, C=70-79, D=55-69
- Three Examinations worth 60% of final grade.
- Attendance & Active Participation: 40% of final grade.
- Class attendance is mandatory, as is completion of all exams and assignments, since class participation, engagement, and knowledge assessment through examination, as part of active learning, are essential to meeting our course learning outcomes.

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GMU POLICY GUIDELINES

These university and class policies are important to understand:

- Integrity: GMU has an Honor Code with guidelines regarding academic integrity; please see <http://oai.gmu.edu> for more information.
- Disability: If you are a student with a disability and you need academic accommodations, please see me and also contact the Office of Disability Services (ODS) at 703-993-2474 or <http://ods.gmu.edu>. All academic accommodations must be arranged through the ODS.
- Privacy: Students must use their MasonLive email account to receive important University information, including messages related to this class. Please see <http://masonlive.gmu.edu> for more information.
- Electronics: Please be respectful of our time together and do not engage in activities that are unrelated to class. Cell phones may be left on but muted and used for emergencies only.
- Use of Artificial Intelligence Tools: The judicious use of AI tools is permitted for class work as an aid in learning but not as a replacement for original independent work.

CLASS OUTLINE & OVERVIEW OF TOPICS

1/21-26, 2026 1. Introduction

- Organization to semester
- History of Ocean Exploration

1/26-2/2/2026 2. Orientation to Oceanography & Plate Tectonics

- Latitude and Longitude
- Marine Charts
- Theory of Plate Tectonics
- Paleomagnetic Evidence for Plate Tectonics
- Mechanisms for Plate Motion
- Plates and Plate Motions
- Divergent Plate Boundaries
- Convergent Plate Boundaries
- Transform Plate Boundaries
- Earthquakes and Plate Tectonics
- Seamounts and Hot Spots
- Hydrothermal Vents

2/4-11/2026 3. Chemical Oceanography

- Properties of Water
- Salinity Patterns
- Dissolved Gases: Oxygen
- Dissolved Gases: Carbon Dioxide, pH, and Ocean Acidification
- Nitrogen and Nutrients
- Classifying Elements in Seawater

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| 2/16-18/2026 | 4. Physical Oceanography <ul style="list-style-type: none">• Pressure• Temperature• Density• Sound• Light |
| 2/23-25/2026 | 5. Primary Production <ul style="list-style-type: none">• Primary Production• Factors Influencing Production• Patterns of Primary Production |
| 3/2/2026 EXAM 1 Topics 1-5 Inclusive | |
| 3/4-11/2026 | 6. Oceans and Climate <ul style="list-style-type: none">• Structure and Composition of the Atmosphere• Energy in the Atmosphere• Weather processes and Systems• Collecting Weather Data |
| 3/16-18/2026 | 7. Ocean Circulation <ul style="list-style-type: none">• Surface Gyres• The Gulf Stream• The Ekman Spiral and Geostrophic Flow• Western Intensification• Currents, Upwelling and Downwelling• El Niño and La Niña• Langmuir Circulation• Thermohaline Circulation |
| 3/23-25/2026 | 8. Waves <ul style="list-style-type: none">• Wave Basics• Waves at Sea• Waves on the Shore• Tsunamis |
| 3/30-4/1/2026 | 9. Tides <ul style="list-style-type: none">• Tidal Forces• Dynamic Theory of Tides• Tide Classification |

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4/6/2026 EXAM 2 Topics 6-9 Inclusive

- 4/8-13/2026 **10. Ocean Sediments**
- Classifying Sediments
 - Lithogenous Sediments
 - Biogenous Sediments
 - Hydrogenous Sediments
 - Sediment Distribution

- 4/15-20/2026 **11. Coastal Oceanography**
- Beaches
 - Longshore Transport
 - Landforms of Coastal Erosion
 - Landforms of Coastal Deposition
 - Human Interference with Shorelines
 - Estuaries
 - Sea Level Change

- 4/22-29/2026 **12. Marine Operations**
- Small Craft Operations for Marine Research

5/6/2026 FINAL EXAM Topics 10-11 Inclusive