GEOL 200-2

Oceanography

J Term 2027

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Office Hours: By appointment

KEY ACADEMIC DEADLINES:

- **January 5:** Self-Service add/drop period ends at 5:00 PM. Last day to drop a course without a grade of “W”.
- **January 6:** Instructor approval required to add a course.
- **January 10:** Last day to add a course.
- **January 22:** Last day to withdraw from a course.

Please talk to your advisor about any changes you are thinking of making to your course schedule, since such changes can affect your progress toward completing your degree, as well as your eligibility for Financial Aid and Athletics. Your advisor can help you make informed decisions in support of your academic success. If you are unsure of who your advisor is, please let me know and I can help you check this.

Catalog Course Description

(3 credits). This non-lab course is intended for both introductory-level science students and science majors. The course covers the complex physical, chemical, and biological interactions involving Earth's oceans using an "Earth Systems" approach. Topics will be covered through a mixture of lecture, in-class exercises, and student presentations. Upon successful completion of this course, students will be able to: 1) develop simple models of Earth systems; 2) evaluate the relationships between physical, chemical, and biological components of the Ocean System; 3) predict how natural disturbances and human impact will affect the system; and 4) be able to evaluate and critique ocean-related news stories from a scientific perspective. No prerequisites.

> **DHG Note:** Although 200-level courses have no prerequisites like 100-level introductory courses, they involve a slightly more advanced level of content and additional effort than 100-level intro courses. I expect a bit more effort in this class than our average 100-level intro courses.

Flightpath & Learning Outcomes / Goals

Upon successful completion of this course, students will be able to:

1. Understand simple models of Earth systems (6A & B).
2. Evaluate the relationships between physical, chemical, and biological components of the Ocean System (6A & B).
3. Predict how natural disturbances and human impact will affect the system.
4. Be able to evaluate and critique ocean-related news stories from a scientific perspective.
5. Be able to communicate scientific concepts involved with current issues in oceanography to others.

Outcomes Assessment

Understanding of basic systems science and the scientific method will be assessed by evaluation of specific system science and scientific method exercises and through examinations. Knowledge of components of the Ocean System and human impact will be evaluated by specific research/presentation assignments (including final group project) and certain examination questions. Understanding of current oceanographic issues and ability to communicate them will be assessed by evaluation of a short group presentation.

Required Texts

Two books are required for this course:

1. **Corson, Trevor (2005).** *The Secret Life of Lobsters*. Harper Perennial, New York, NY, 289 p. + 16 pages of appendices.
    - *Note:* Reading assignments from this book are listed as *Lobsters* in the course schedule. We will be reading this popular book throughout the J-Term and there will be reading discussions and quizzes based on this reading. While there is a copy of this book on closed reserve (not for outside loan) in the Hartwick library, use is first-come-first-served for the library copy and your reading plans for this copy will have to avoid the other students in the course. Given the relatively low cost of this book, I highly recommend that you consider purchasing this book outright.
2. **Dinwiddie, R., Eales, P., Scott, S., Scott, M., Bryan, K., Burnie, D., Dipper, F., and Cousteau, F. (2014).** *Ocean: The Definitive Visual Guide*. DK Publishing, New York, NY, 512 p.
    - *Note:* Reading assignments from this book are listed as *Ocean* in the course schedule. This book will be used for both out-of-class readings and in-class reference for several lab-style exercises. While there is a copy on closed reserve in the library, there will be a need for 8–10 copies of this book in the classroom as we will be using the many visual reference pages in this book to complete lab-style exercises. Given its relatively low cost and "coffee table" picture book quality, many previous students have elected to buy and keep this book.

Class notes will be available via the Hartwick D2L website for review prior to class. In many cases, in-class exercises and quizzes will rely on you doing this advance review of both the online class notes and the short reading assignments in Ocean. In addition, test material comes from material covered in the class notes and those portions of the books covered. These books are also excellent sources of information for all group assignment research.

Attendance, Conduct & Accommodations

Regular class attendance is required and attendance will be taken each day. Please keep casual departures to a minimum, especially during lectures and lab introductions. If you depart from lecture, you are going to miss information and I won't have time to update everyone independently on what they may have missed. I recommend that you get into the habit of using the restrooms before and after lecture times.

Use of cell phones is prohibited during class time, unless used for approved apps (calculator or web searches) only when allowed by the instructor; each cell phone must be completely stowed away before the beginning of class and not left on the table. Similarly, laptop use is only allowed when cleared by the instructor (and approved for notetaking by AccessAbility Services).

Tests and quizzes must be taken on the dates scheduled (with the exception of documented emergencies). Assignments are due during class time. Late assignments will be accepted up until the majority are graded and handed back (usually 2–3 class days later). Late assignments handed in during the same day will incur a minimum 5% grade reduction. Each additional day that an assignment is late will incur an additional 10% grade reduction before the assignment is graded on its content.

Hartwick students are expected to be familiar with, and abide by, the following policies:

- **Academic Honesty:** Academic Policies Link
- **Title IX / Sexual Misconduct:** Title IX Link
- **Counseling Center:** Counseling Center Link | Phone: (607) 431-4420; Heart Peer Counselors Phone: (607) 431-5050.

Hartwick College is committed to the creation of an inclusive and safe learning environment for all students, and welcomes students with disabilities into all the College's educational programs. The AccessAbility Services Office is responsible for the determination of appropriate modifications for students who encounter barriers due to a disability. If a student with a disability wishes to request academic accommodations, they should contact Lara Sanford, Director of AccessAbility Services and Academic Inclusivity, at sanfordl@hartwick.edu or AccessAbilityServices@hartwick.edu.

COVID-19 & Health Guidance

Any COVID-19 updates will be provided on the College website. Instructors will communicate with students about any specific adjustments that are being made to their courses, such as modality of instruction, expectations for participation, and any changes to assigned work; students should check their Hartwick email accounts frequently for information from their instructors. Regardless of what virus may be responsible, if you are feeling minor symptoms of illness (congestion, runny nose, cough) but are fit enough to attend class otherwise, then please wear a mask (over both nose and mouth) in consideration of your fellow students and the instructor.

Grades & Assessment Breakdown

Grades are based on a total of 100 points and assigned in the following breakdown: **A** (91–100), **A-** (89–90), **B+** (87–88), **B** (81–86), **B-** (79–80), **C+** (77–78), **C** (71–76), **C-** (69–70), **D+** (67–68), **D** (61–66), **D-** (59–60), & **F** (<59).

- **30% — Three 1-hour Tests (10% each):** Tests are not designed to be cumulative, yet some information/concepts overlap from one course segment to the next.
- **45% — Class Assignments:** Includes short homework assignments & small group projects.
- **25% — Final Group Presentation:** Theme & topics to be selected during the term.

Group Presentation Project Guidelines

Details: Each student is required to participate in researching, preparing, practicing, and presenting a presentation to the class. The PowerPoint (or similar formal presentation) must be concise, practiced, and run from 12–15 minutes. Group size must be 3 students (no larger). Each group will present a different topic area. The presentation should include:

1. Description of the major natural phenomena involved with as much quantification (how much, how big, rates, etc.) as possible.
2. A few feedback relationships central to the topic.
3. A brief historical account of the topic.
4. Human-environmental impact (both ways).
5. Scientific perspective is a must, but reference to socio-political consequences or policy-making is acceptable.

Other Requirements: Each group must write a one-page summary of the research findings, complete with at least eight (8) references used, sent as a PDF file. No more than 50% of the references can be web references. Your textbook counts as 1 reference, no matter how many chapters are used. Each group will be required to answer questions during a 2-minute Q & A after their presentation.

Suggested Topics:

- Ocean mineral resources and mining
- Thinning/shrinking of the Arctic Sea ice sheet

- Histories and policies of the Grand Banks fishery
- Sustainable fisheries and marine seafood farming (other than lobsters)
- Noise pollution in the oceans and its effects on sea life
- Freshening of the Atlantic Ocean basin & effects of the Gulf Stream
- Gas hydrates (clathrates): What are they? What are benefits and risks?
- Canary Islands tsunami potential
- Effects of constructing the Palm Island Resort, Dubai
- History and current practice of whaling
- Microplastic pollution in the oceans (Other topics are possible but must be approved by the instructor.)

General Writing and Outline Grading Rubric

Criteria	**0 Points**	**1 Point**	**2 Points**	**3 Points**
Mechanics	3 or more "mechanical" elements missing or incorrect	2 "mechanical" elements missing or incorrect	1 "mechanical element" missing or incorrect	Typed; proper format; article citation(s); name(s) of student(s); class title; assignment name; date
Spelling & Punctuation	More than 6 significant spelling or punctuation errors	No more than 6 significant spelling or punctuation errors	No more than 4 significant spelling or punctuation errors	No more than 2 significant spelling or punctuation errors

Sentence Structure & Organization	<20% of sentences are complete, well written, and clearly represent synthesis. Most supporting points not arranged appropriately.	20–<50% of sentences are complete, well written, and clearly represent synthesis. Supporting points usually arranged appropriately.	50–80% of sentences are complete, well written, and clearly represent synthesis. Supporting points nearly always arranged appropriately.	≥80% of sentences are complete, well written, and clearly represent synthesis. Supporting points arranged appropriately.
Information Relevance & Coherence	<20% of info included is relevant and presented in an organized, coherent fashion.	20–<50% of info included is relevant and presented in an organized, coherent fashion.	50–80% of info included is relevant and presented in an organized, coherent fashion.	>80% of info included is relevant and presented in an organized, coherent fashion.
Content Coverage	<20% of major ideas/themes captured.	20–<50% of major ideas/themes captured.	50–80% of major ideas/themes captured.	≥80% of major ideas/themes captured.

Course Schedule (Modules & Topics)

Module 1: Foundations of Ocean Science & Earth Systems

- **Topics:** Course Introduction & Ocean Science; Origins of the Earth and Hydrosphere; Plate Tectonics (Parts I & II); Ocean Provinces; Ocean Chemistry; Ocean Stratification, Circulation & Climate Effects.
- **Readings:** *Ocean*: pp. 30–35, 36–37, 39–51, 53–69, 87–93, 140–141, 168–177, 218–219.
- **Assessment: EXAM 1**

Module 2: Waves, Tides & Major Disturbances

- **Topics:** Wave Physics and Wave Types; Tides; Tsunamis; Wind Waves; Major Storms; Storm Impacts and Climate Change.

- **Readings:** *Ocean*: pp. 49, 54–55, 70–73, 76–79, 462–463.

Module 3: Marine Ecology & Coastal Environments

- **Topics:** Origins of Ancient & Modern Marine Life; Marine Biology and Ecology; Intro to Coastal Environments (Deltas, Tidal Flats, Beaches, Barrier Islands); Shallow Marine Environments.
- **Readings & Discussions:**
    - *Lobsters*: Chapters 1–5 (Book Discussion 1).
    - *Ocean*: pp. 44–45, 92–113, 124–137, 139–151, 205–229.

Module 4: Ocean Resources & Carbonate Systems

- **Topics:** Ocean Resources (Energy & Fisheries Assignments); Carbonate Banks; Reef Environments (Parts I & II); Reefs in Crisis.
- **Readings & Discussions:**
    - *Lobsters*: Chapters 6–12 (Book Discussion 2).
    - *Ocean*: pp. 108, 152–161, 354–355, 441, 448–449, and handout readings.
- **Assessment: EXAM 2**

Module 5: Open Oceans & Oceanic Islands

- **Topics:** Open Ocean Environments (Parts I & II); Ocean Islands (Hawaii Focus); Group Project Finalization.
- **Readings & Discussions:**
    - *Lobsters*: Chapters 13–17 (Book Discussion 3).
    - *Ocean*: pp. 49, 103, 161, 166–175, 180–189, 468.

Module 6: Capstone Presentations & Final Assessment

- **Activities:** Final Group Presentations and Q&A Sessions.
- **Assessment: EXAM 3 (Final Exam Period)**