Description and purpose

Oceanography is a three (GEOS 111)- or four-credit (GEOS 110) introductory level course that satisfies the general education requirement in the natural sciences. The four-credit option includes a laboratory that meets weekly. This option meets the university studies laboratory requirement in the natural sciences. Students in oceanography will explore the world ocean and the geological, chemical, physical and biological processes which control:

- Evolution of the ocean basins, the sea floor, and its sediment cover
- Origin and composition of sea water and its physical properties
- Waves, ocean currents and ocean circulation, and tides
- Life in the sea, with emphasis on marine ecology.

Each student studying oceanography will gain an understanding and awareness of the complexity and inter-relatedness of processes that affect the world ocean, and how these ocean processes affect the hydrosphere, atmosphere and lithosphere of the entire planet.

University Studies Outcomes

The purpose of the Natural Science requirement in the University Studies program is to provide students with the tools to understand and be able to apply the methods by which scientific inquiry increases our understanding of the natural world. These courses must include requirements and learning activities that promote students’ abilities to...

a. understand how scientists approach and solve problems in the natural sciences;
b. apply those methods to solve problems that arise in the natural sciences;
c. use inductive reasoning, mathematics, or statistics to solve problems in natural science;
d. engage in independent and collaborative learning;
e. identify, find, and use the tools of information science as it relates to natural science;
f. critically evaluate both source and content of scientific information; and
g. recognize and correct scientific misconceptions.
Courses that satisfy the laboratory requirement in the Natural Sciences will additionally provide students the opportunity to practice scientific inquiry through hands-on investigations and to analyze and report the results of those investigations.

Course activities described throughout the remainder of this syllabus will be coded to the above list of outcomes by the corresponding letter. These outcomes will be integrated throughout course content—each new topic will be presented in a manner in which the student will be able to understand and apply the methods by which scientists approach and solve problems in the natural sciences, using inductive reasoning or mathematics (outcomes a-c). Common scientific misconceptions will be identified at the start of each topic, and class material will be directed toward correcting those misconceptions (outcome g). You will be asked to work collaboratively on certain in-class activities and independently on homework and exams (outcome d). In-class and homework assignments will require that you work with the internet, textbook web site, course web site, and other sources to critically evaluate scientific information as it relates to Oceanography (outcomes e, f). If you are enrolled in this course for laboratory credit, you will be required to attend weekly lab meetings. During those meetings, you will have the opportunity to engage in hands-on scientific investigation of oceanographic phenomena, and will be required to analyze and report the results of your investigations (laboratory outcome).

This course is designed to stimulate and challenge your thinking (outcomes a, b, c, f, g). There are no prerequisites for this course. If you can balance your checkbook, you can do all the math that will be required (outcome c). You are expected to understand and apply fundamental concepts (outcomes a, b, c, e, f, g), rather than to simply memorize information, on exams. You should strive to achieve as complete and sound a scientific interpretation as possible, by trying to integrate information across chapters of the text.

Policies

- **Academic honesty policy:**
  - Students who plagiarize laboratory work or any other assignments that are turned in from other students or other sources, and students who are discovered cheating on exams are subject to the Academic Integrity Policy and Due Process Rights on pages 9-11 of
  
  [www.winona.edu/studentaffairs/conduct.htm](http://www.winona.edu/studentaffairs/conduct.htm).

  Use of cell phones or IM during an exam, no matter what your
reason, will be considered cheating.

If you discuss an assignment with someone else, you are both expected to write up your answers individually and in your own words. It is a violation of academic honesty (in other words, cheating) to turn in answers copied from another student's paper, even if you worked together to achieve the answer!

- **Testing**
  - **Exams:** Three regular examinations will be given. Each exam will be announced one week in advance. The format of the exams will be entirely multiple choice. *Bring a scantron, pencil and good eraser to each exam.* In addition to these three exams, a final examination will be given during the final examination period. The final will emphasize the last segment of the course. However, approximately 1/3 to 1/4 of this exam will also include material from the earlier portions of the course.
  - Dates of the exams are scheduled on the course assignment page and are also announced a week in advance. *Students are obliged to take exams at the scheduled times.* The obvious reason for the exam policy is fairness to the entire class. If you do not think you can abide by this policy, you should drop the course as soon as possible.
  - **All exams must be completed in order to pass the course.** If you miss an exam, you are expected to take a make-up. Note that a penalty of 10% of the maximum points attainable per late day will be deducted from the score of those who miss an exam because of an unexcused absence. Examples of unexcused absences include but are not limited to: attendance at weddings, convenient rides home, oversleeping, and unpreparedness. Examples of excusable absences include verifiable illness and family emergency. For excused absences, *prior notice must be given* by contacting the instructor before the scheduled time of the examination. And *written documentation verifying the necessity for the absence* must be presented to the instructor before taking the makeup exam. For excused absences, you must take the test the following weekday of the emergency day, or the deduction penalty goes into effect. If you are in doubt of the status of a pending absence, discuss the matter with the instructor *prior* to the examination date. In the event that a snow-day falls on the same date as a scheduled exam, the exam will be given during the next class meeting following the snow day, so come prepared.
  - Dishonesty on an exam constitutes forfeiture of the exam grade. During testing times, students are expected to sit as far from neighbors as possible and to keep their answers secure. Different versions of each exam will be distributed throughout the class to provide greater assurance of honest
If you are enrolled in a laboratory section, you will receive only one final grade for this course, not separate grades for lecture and lab. Remember that the lab counts as 25% of your course grade. A lab grading policy, attendance policy and completion of lab work policy will be in effect (see below, and see laboratory syllabus).

- **Grading**
  - **No student will pass the course without completing all exams and achieving a passing average.** Because this class counts for university studies laboratory credit (if you take the lab), students enrolled in a laboratory section who miss more than three lab sessions, or fail to complete more than three laboratory exercises by the assigned deadlines, automatically fail the course. Students missing lab with an unexcused absence may not make up the work.
  - **Non-laboratory students**
    - Exam 1 20 %
    - Exam 2 25 %
    - Exam 3 25 %
    - Exam 4 30 %

  - **Laboratory students**
    - Exam 1 15 %
    - Exam 2 15 %
    - Exam 3 20 %
    - Exam 4 25 %
    - Laboratory 25 %
  - **Grading scale for all course work: Based on percentage!**
    - A 80%- 
    - B 70-79% 
    - C 60-69% 
    - D 50-59% 
    - E <50%

---

**Guidelines for surviving a large lecture class at WSU:**

Here is some advice about how to achieve at your highest academic level in a large enrollment course.

- **Class attendance is essential for success.**
o You are responsible for knowing what is covered and assigned in class regardless of whether or not you are present.
o Assignments will not be accepted on papers torn out of notebooks; all assignments must be neat, legible, and on paper with clean edges.
o I will not regurgitate a lecture during office hours simply because you chose not to attend class.
o Videos shown in class will not be made available outside of class.

- Attendance and participation will affect the outcome of your final grade.
- **Arrive on time!** The first five minutes of class are often the most important part of the entire lecture. I usually use them to discuss how the day’s topics fit into the broader goals of the course, and where the course is headed in the next few lectures. Important logistical information like homework assignments and items that will and won’t be on exams, are often discussed here as well. Everyone is unavoidably late now and then, but my experience is that most students who consistently arrive a few minutes late for the lecture also receive a poor final grade in the course.

- **Assignments**- The course outline summarizes readings in the textbook. Assignments should be read before coming to class, so that more effective listening, individual and group participation, and note-taking can take place. Following class, notes should be reviewed together with careful re-reading of the assignments. If this is done on a regular basis, performance will be enhanced. Classroom sessions will be more meaningful and discussion will be possible. Assignments will not generally be announced. You are responsible for following the course outline.

- **Course Web Page** - Consult the course web page daily. There you will find class announcements, assignments, links to web sites that provide additional study materials related to all aspects of the course, links to self-testing, and daily lessons for you to complete that illustrate the kinds of reasoning you are expected to achieve.

- **Work in groups** - **form study groups** Because scientific understanding does not usually progress in a vacuum—it is through discussions and arguments with colleagues that most advances stem—you are encouraged to
  o work in groups and to discuss your ideas and to work through confusing concepts with your classmates.
  o **One of the best ways to study and understand and learn is to form a small study group-quiz one another. Make up questions that you think will be on the exam, and be certain you can answer them. If you can accurately explain a concept to your peers, then you can feel comfortable that you understand it. If you’re confused in doing this, you’re likely to be confused about the material. (outcome d)**

- **Use email often** - Read it daily! Get access to it if you don’t have it yet. I will communicate with you via your webmail account, so make certain it is up and running. Electronic mail has become the basic means of communication among scientists. You’ll
find that I answer most email messages and queries within minutes. Don’t hesitate to ask questions this way. My email address is: jmeyers@vax2.winona.msus.edu

- **Study for the exams mainly from your lecture notes** - The lectures, labs, book and web site all cover somewhat different topics, at different levels of detail. It would be silly if it were otherwise: why do the same thing three times? My lectures excerpt those portions of the book and web site that I feel are most important for the course. The main purpose of the book is to allow you to hear things in a different voice, quietly, at your own pace, to help you figure out puzzling things from the classes. You will receive a handout that provides suggestions for good note-taking in this course. This handout is also on the course web site.

- **Make frequent use of the course web site** that accompanies your textbook. Here you will find various study aids, including study guides and self-testing.

- **Consultation** - I will be available for consultation throughout the semester and you are urged to keep in touch, especially if you are having difficulty. Office hours are posted on my door (PA 114-H) and are listed on the course web site. If these hours are in conflict with your schedule, please make other arrangements with me. My telephone extension is 5266 and e-mail is jmeyers@vax2.winona.msus.edu

---

**Course Outline**

**See Assignment page(s) for details**

I. Introduction and history of oceanography (Ch. 1)

II. The Water Planet (ch. 2)

III. Geological oceanography
   A. Bathymetry of the sea floor - sea-floor topography (Ch. 4)
   B. Plate tectonics and origin of ocean basins (Ch. 3)
   C. Marine sediments (Ch. 4)

**EXAMINATION 1**

IV. Chemical oceanography
   A. Properties of the water molecule (Ch. 5 and 6)
   B. Constituents of seawater (Ch. 6)
   C. Origin of sea water (Ch. 2 and 6)

V. Physical oceanography
   A. Physical properties of seawater (Ch. 5)
   B. Earth’s heat budget and atmospheric precipitation-evaporation patterns (Ch. 7)
C. Atmospheric circulation and El Nino (ch. 7)
D. Density layering and vertical oceanic circulation (Ch. 8)
E. Water masses (ch. 8)
F. Surface ocean circulation (ch. 9)

EXAMINATION 2

G. Waves (Ch. 10)
H. Tides (Ch. 11)

VI. Coasts, Beaches and Estuaries (Ch. 12)

EXAMINATION 3

VII. Environmental Concerns (Ch. 13)

VII. Biological oceanography
A. Oceans: environment for life (ch. 14)
B. Production and Life (ch. 15)
C. Plankton, Nekton and Benthos (Ch. 16, 17 and 18)

EXAMINATION 4 (part of this exam is comprehensive, but emphasis will be on last segment of course)

Textbook


For GEOS 110 only - Oceanography Laboratory Manual, WSU Print Shop, 2008

Other Learning Resources

Web site to accompany textbook - Use it throughout the semester! Here you will find a textbook website with

- links to online resources
- virtual field trips
- weblinks listed by chapter
- current ocean news stories
- an online learning center providing reviews of major concepts and keywords and terms for each chapter
• "downloadable" study guide for each chapter, including self-testing
• online self-testing

The smart student will take full advantage of these resources in order to succeed in learning the material and doing his or her best in the course. Use your registration information on the perforated hard page at the front of your text to access this web site.