Syllabus for Marine Biology - Biology 477, Fall Term, 2019

Lectures: 11-12:20 Tues/Thurs in Th297. Labs: Thurs 12:30-4:30 p.m., Fri 12-4:50 p.m. Th215

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Office hours: Tuesday 12:30-1:30 pm, Friday 11:00 - noon, and by appointment

Canvas:
- The materials for this course are available on Canvas.
- Please refer to this site for the definitive version of the course schedule, syllabus, reading list, lecture materials, assignments, and data sources for projects.

Required texts:

Recommended additional texts:
- Your writing guide from introductory biology

Course description

The marine environment encompasses 99% of the Earth's biosphere and contains an incredible diversity of microbial, algal, and animal life forms. This course will examine the biology of these organisms and the abiotic (e.g., salinity, nutrients, water currents and tides) and biotic factors (e.g., competition, predation, symbiosis) that influence their distribution and abundance. Specific topics will include primary and secondary production, rocky intertidal biodiversity, estuaries, subtidal communities, coral reefs, pelagic and deep sea communities, impacts of humans on the ocean, and conservation. Lecture periods will include discussions of primary literature and student presentations. Laboratory sessions will involve fieldwork, laboratory analyses, report writing, and multimedia presentation of project results. Prerequisites: Biology 111, 112, and 211.

General objectives of the course

Through lectures, laboratories, and projects you will gain experience toward some of the general curricular goals of the university: (1) the ability to think logically, analytically, and independently; (2) the ability to communicate clearly and effectively, both orally and in writing; (3) the ability to learn on one's own and as part of a group; and (4) depth of knowledge in a single field.

Student learning outcomes

1) To develop an appreciation and understanding of the marine environment, especially the waters of Puget Sound, through readings, lectures, discussions, field studies, and laboratory analyses.
2) Learn the basic principles concerning the physical conditions of the marine environment (e.g. temperature, salinity, DO, nutrients, water currents and tides), and be able to describe how
marine organisms have adapted to these physical conditions. Also be able to explain how the
distribution and abundance of marine organisms is influenced by changes in these physical
parameters.
3) Be able to recognize many of the organisms that occur in particular marine habitats (e.g.,
plankton, nekton, rocky and soft-sediment intertidal and subtidal, docks and pilings), and
describe major aspects of their natural history.
4) Gain an understanding of the important ecological relationships among different marine
organisms (e.g., predator-prey, competition, symbiosis, indirect effects), and their influence on
distribution and abundance patterns and community structure.
5) Obtain practical experience in applying different sampling methods in the marine environment
and then using standard techniques for analyzing samples in the laboratory. Then, analyze the
data appropriately and produce a written research report.
6) Formulate hypotheses, develop a research proposal, and conduct a research study to investigate
a particular problem in marine biology. Work as part of a team to design the research project,
carry it out effectively, and then present the results in both oral and written formats.

Quizzes and Exams

There will be 4 quizzes, one midterm exam, and a final exam (see schedule). Questions on quizzes
and exams will be a combination of multiple choice, short answer, problem sets, and essays. The
quizzes and exams will cover specified sections of the text and assigned reading. You should be
able to utilize your knowledge of local marine species (know common or species names) to provide
examples of concepts discussed in lecture.

Each quiz will cover material from the previous lectures. They will be take-home quizzes, and I
will post the questions along with problem sets on Canvas. The take-home quizzes are due at the
start of the Tuesday lecture each week.

All exams will be held in our regular lecture room (Th 297). Note the dates of the exams on the
Course Schedule. **THERE WILL BE NO MAKE-UP EXAMS.** If you have any anticipated
problem with taking an exam on the specified date, see me ASAP. If you do miss an exam for a
legitimate reason (e.g., documented medical problem), I will consider that in the calculation of your
final grade.

Reviews of primary literature

You will write 4 reviews (approximately two pages in length, 1.5 spacing) of papers from the
primary literature on marine biology. **Everyone will write a review of the first paper,** and then you
can choose to write a review of 3 of the next 5 papers. A set of instructions follows in a separate
handout.

Group Projects

Two group projects conducted in lab will be graded. 1) An examination of water quality and
plankton at different sites in Commencement Bay, and 2) An investigation of organismal diversity
in the rocky intertidal.
**Research project**

The objective of this project is to have you study living marine organisms in the field or lab and examine some aspect of their behavior, ecology, morphology, biochemistry, etc. that interests you. This project will involve all of the components of the scientific process: making critical observations, recognizing patterns, asking questions and formulating hypotheses, testing hypotheses, then attempting to explain the patterns from a functional or evolutionary perspective. You will then present your results in a multimedia presentation and produce a written scientific report. A more detailed description of this project will be provided in a separate handout.

**Late work**

All assignments must be turned in on Canvas. Do not put any printed assignments under my door. Late assignments will be penalized 10% of a grade per day.

**Class participation**

Since this course will be interactive and will require you to work closely with others, part of your grade will be dependent on your ability and willingness to participate in class discussions and laboratory investigations, as well as interact positively with other members of the class.

**Grading**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Points</th>
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<tbody>
<tr>
<td>Quizzes – 4 @ 30 pts each</td>
<td>120</td>
</tr>
<tr>
<td>Midterm lecture exam</td>
<td>100</td>
</tr>
<tr>
<td>Final lecture exam</td>
<td>150</td>
</tr>
<tr>
<td>Reviews of papers – 4 @ 10 pts each</td>
<td>40</td>
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**Laboratory**

| Group projects – 2 @ 60 pts each | 120 |

**Research project**

| Project proposal                  | 5   |
| Project progress reports          | 10  |
| Oral presentation                 | 40  |
| Written report                    | 75  |

**Participation**

| 40 |

Total 700
**Classroom Emergency Response Guidance**

Please review university emergency preparedness, response procedures and a training video posted at www.pugetsound.edu/emergency/. There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.

If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.

If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.

**Student Accessibility and Accommodation**

If you have a physical, psychological, medical or learning disability that may impact your coursework, please contact Peggy Perno, Director of Student Accessibility and Accommodation, 105 Howarth, 253.879.3399. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

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