BI 353 Pacific Northwest Coastal Ecosystems

Course Times & Location          Course website
Tuesday / Thursday 9a - 2:20 pm           Canvas: https://oregonstate.instructure.com
June 25 to July 20; HMSC 30/32

Course Credits             Prerequisites
Four credits           (BI 211 or 211H) and (BI 212 or 212H) and (BI 213 or 213H)

Instructor:
Dr. Sarah Henkel, Hatfield Marine Science Center  sarah.henkel@oregonstate.edu

Learning Resources (On reserve at Guin Library):
Pacific Seashores: A Guide to Intertidal Ecology (Carefoot)
Seashore Life of the Northern Pacific Coast (Kozloff)

Additional and suggested readings will be posted to the course’s Canvas website

Course Description
A field-based introduction to the diversity of ecosystems of the Pacific Northwest coast. Biological and physical processes affecting the distribution, structure, community composition and physical features of these systems are explored through a variety of lectures and field trips. Ecosystem services and human impacts are examined.

Course Goals:
By the end of this course, you will be able to:
- Understand the geologic origins of the Pacific Northwest coast.
- Describe the major ecosystems of the Pacific Northwest Coast.
- Identify the major structuring organisms (vegetation type/structure-forming invertebrate) in each ecosystem and the ecosystem functions and services they provide.
- Identify various other species in the ecosystems covered and how they interact in communities.
- Describe the major oceanographic and climatic processes important to the ecosystems covered.
- Be able to explain how climate change and anthropogenic activities are impacting the structure and functioning of Pacific Northwest ecosystems.
- Discuss management strategies and personal actions that can be taken or are proposed to mitigate climate/anthropogenic impacts.

Expectations
My goal is to facilitate your learning of ecology in an environment of mutual respect. Learning is not a passive activity but requires you to be an active participant in the process. You are expected to (1) attend all classes, (2) arrive on time and be prepared, (3) actively participate by asking questions, (4) complete readings and be ready to discuss them in class, and last but not least (5) work cooperatively, productively, and respectfully with your class colleagues on activities.

Readings are chosen to compliment the material presented in class. These readings provide additional examples and in-depth reviews of topics. The books should also serve as a reference for you to pursue additional ecological topics of interest that we don’t have time to cover in class. You are responsible for the major concepts presented in the readings, not all the minor details; however, if they are also covered
in the lecture, assume you are responsible for them. Any supplementary readings, assignments, and media will be made available on Canvas.

Tentative Schedule

| June 26 (Tues)   | 09:00 – 09:30 Introduction to course  
|                 | 09:30 – 10:30 Lecture 1: Overview of PNW Geology and Oceanography  
|                 | 10:30 – 10:45 Break  
|                 | 10:45 – 11:45 Lecture 2: Estuarine Habitats: Mud flats & eelgrass beds  
|                 | 11:45 – 12:30 Lunch break  
|                 | 12:30 – 13:30 Lecture 3: Estuarine Habitats: Salt marshes  
|                 | 13:30 – 14:20 Field trip prep  
| June 28 (Thurs) | 09:00 – 11:30 Field trip to Yaquina Bay eelgrass beds  
|                 | 11:30 – 12:15 Lunch break  
|                 | 12:15 – 14:20 Lecture 4: Subtidal Habitats: Sandy & Rocky  
| July 3 (Tues)   | Field trip to Umpqua Dunes (depart at 0800) – Lecture 5 there (pack lunch)  
| July 5 (Thurs)  | Start at 1000 to make up for Tuesday long day  
|                 | 10:00 – 11:30 Lab: Subtidal core collections  
|                 | 11:30 – 12:15 Lunch break  
|                 | 12:15 – 14:20 Visit to Oregon Coast Aquarium to see Subtidal Species  
| July 10 (Tues)  | 09:00 – 10:00 Lecture 6: Rocky Intertidal  
|                 | 10:00 – 11:30 Lab: Subtidal trawl collections  
|                 | 11:30 – 12:15 Lunch break  
|                 | 12:15 – 13:15 Lecture 7: Coastal Forests and Streams  
| July 12 (Thurs) | Field trip to Beaver Creek/Cape Perpetua: Coastal Forests and Streams & Marine Reserves  
| July 17 (Tues)  | Field trip to Intertidal Site TBD  
| July 19 (Thurs) | Final student presentations  
|                 | Final exam  

Assignments:

- Regular reading before each class  
- Detailed field/laboratory notebooks (30%)  
- Final Presentation (30%) – team grade  
- Final exam (30%)  
- Participation (10%)

Field & Laboratory Notebooks (30%):

A field/lab notebook is an essential tool for a biologist or ecologist. Field notebooks enable scientists to record critical data they observe or measure at the time they make the observation or measurement, thus serving as a valuable scientific record. Careful maintenance of this notebook is an important part of your assessment of this course. During the course of our six field excursions and three lab investigations, you will need to have your notebook with you to record your observations. For each field trip you should record the weather, a site map, and any other data collected. For the labs, I will give you the “metadata” about how and when the samples were obtained. For each field/lab trip, you must make sketches of at least three species observed (at least one animal and one “plant” for each
trip – the third can be your choice). Sketches should note sizes, shapes, colors, and any other pertinent information for each organism you have chosen to illustrate. If possible, try to select similar types of taxa across all of the trips so you can contrast what you found in different habitats. All of these observations should be recorded in your notebook. Following each field trip/lab, you should review your notes, refine your drawings, and fill in missing details about the species in your notebook as needed. We will collect some species in nets and traps that do not allow the observation of their natural behavior. You will need to obtain this information from consultation with references and online resources. For each species description, please include the following:

**Species names**: Provide both the scientific—Genus species (Family)—and common names of the species.

**Morphology**: What are some of the unique characteristics that enabled you to identify this species in the field? Briefly describe them, and label them on your drawings. Are there any characteristics you would need to find in the lab to definitively distinguish it from similar species?

**Habitat**: What habitat does this species live in (estuary, rocky reef, open ocean)? What are some microhabitat features that can help you find it/distinguish it from similar species?

**Ecology & Behavior**: What other organisms does this species interact with, and how? Is this species solitary or does it form beds? Does this species live on the seafloor/ground, swim in mid-water/fly in air, hide in vegetation, etc?

**Feeding**: What does this species eat, and how does it feed? (If a heterotroph)

**Reproduction**: How does this species reproduce (brooder/spawner/clonal)?

**References**: please include the references you use to research your fish species. References should be cited at least once in the text and a complete reference written out in *Ecology* format.

*You do not need to be a wonderful artist but should focus on accurately representing the important characteristics of each species. Drawing these details helps you to more clearly observe and more thoroughly learn which characteristics define particular groups and species. Do NOT copy drawings from the internet, books, or photos. Draw the organisms as they appear to you in the field or lab.*

**Final Presentation (30%) – Team grade**
You and a teammate will develop a three-panel display regarding one of the habitats we have covered in class. This display should address a threat (climate/anthropogenic) to the habitat, the consequences, and some potential measures to mitigate it. The display should include enough background information on the geological/oceanographic/climatic drivers of the habitat to put this issue in context as well as what species/communities are particularly threatened and enough about their biology/ecology to understand the threat. An important part of this presentation will be to pick your audience so that your messaging will reach them. Are you reaching out to school children? Fishermen? Resource Managers (e.g. ODFW)? Elected officials? Shellfish farmers? Recreational Boaters?

**Final Exam (30%)**
There will be 7 lectures covering various coastal habitats and issues. One of these lectures will be delivered by a guest professor on our Dunes field trip and a guest scientist will lead our Forest & Stream field trip. The content provided by me, our guests, and found in our reading and discussions
may be found on the exam. The exam will be a combination of multiple choice, short answer, and short essay questions.

\textit{Course Participation (10\%):}
This course is hands-on and interactive; thus, full participation is key to the success of the course and your evaluation. For that reason, I expect you to attend all the lectures, field trips, and laboratories. There will be three assigned readings from the primary literature that we will discuss in class. Participation in these discussions will contribute to your class grade so it is important that you complete the reading and come prepared discuss the readings. Note that cleaning up the laboratory space and equipment at the end of each day is required.

\textbf{Academic Honesty and Student Conduct}
The Integrative Biology Department follows the University’s rules on student conduct. All the work you do in this class must be your own, must be new, and must be original. Plagiarism or cheating of any type will result in a zero on the illegitimate assignment. Cases of academic dishonesty will also be referred to the academic unit and the Student Conduct and Community Standards Office for additional disciplinary action. For more information, please see OSU’s Student Conduct Code at:\nhttp://studentlife.oregonstate.edu/code.

\textbf{Statement Regarding Students with Disabilities}
Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

\textbf{Disclaimer}
I reserve the right to change the schedule, policies, and assignments in this course due to extenuating circumstances or by mutual agreement between the instructor and students.