**BIO 124: BIOLOGICAL OCEANOGRAPHY, Fall 2022**

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**Course Website**: BIOL124 tab in Canvas (location of Syllabus, lecture notes, Study Guides)
**Note:** This syllabus may adapt to our progress as a class – listen for announced changes & check your pipeline email & the course Canvas site frequently!

| **Wk of:** | **LAB: EBS 210**<br>**Tues OR Thurs**<br>**2:30 – 5:35pm** | **Lecture # (Date)** | **LECTURE: EBS 301**<br>**Tu &Th 12:45-2:05pm** | **Reading Homework**<br>**Castro & Huber 10th ed** |
|---|---|---|---|---|
| Aug. 29 | 1.Water Sampling (lab & SB docks) & plate set-up, Scientific Method | 1 (8/30) | Intro; Ocean World | Ch 1: 6-15;Ch 2: 33-36 |
| | | 2 (9/1) | Ocean Basin<br>Water Properties & Challenges | Ch 3: 40-48 |
| Sept 5 | 2. Water & Organisms (lab); Scientific Method Ocean Journal & Project Intro | 3 (9/6) | Salinity; Osmosis | Ch 4: 72-75 |
| | | 4 (9/8) | **Lecture Quiz 1**<br>Pressure; Temperature Layers; Vertical Circulation | Ch 3: 48-57<br>Ch 4: 75-76 |
| Sep 12 | 3. Currents, Waves, Slope (lab & Leadbetter beach); Scientific Articles<br>**DUE: Project Topic** | 5 (9/13) | Currents | |
| | | 6 (9/15) | Dissolved Gasses<br>Biology Basics; Nutrients | Ch 3: 47<br>Ch 4: 64-71 |
| Sept 19 | 4. Pigments (lab & Leadbetter beach)<br>**Oc. JOURNAL DUE** | 7 (9/20) | **Lecture Quiz 2**<br>Domains of Life; Epipelagic zone; Phytoplankton | Ch 5: 85-100<br>Ch 15: 336-339 |
| | | 8 (9/22) | Zooplankton;<br>Epipelagic Adaptations | Ch15: 339-352; 16: 372 |
| Sept 26 | 5. Plankton Productivity (SB docks & lab) | **9/27** | **MIDTERM 1** | Ch 4: 68; Ch 10: 225-231<br>Ch 15: 352-363 |
| | | 9 (9/29) | Nutrient Cycles; ENSO | |
| Oct 3 | 6. Trawl (boat)<br>** don't be late!** | 10 (10/4) | Nekton; Fisheries | Ch 17:387-404 |
| | | 11 (10/6) | Natural Selection & Evolution | Ch 4: 76-83 |
| Oct. 10 | 7. Infauna (docks & lab)<br>**DUE: Project Outline** | 12 (10/11) | **Lecture Quiz 3**<br>Benthic life; Marine Snow | Ch 13: 289-297 |
| | | 13 (10/13) | Kelp Forest Ecosystems | Ch 13: 300-309 |
| Oct 17 | 8. REEF (field trip to UCSB) | 14 (10/18) | Polar marine ecosystems | Ch 9: 188-190<br>Ch 13: 292-293 |
| | | 15 (10/20) | Marine Migrators | Ch8:169-172;Ch 9: 206-208 |
| Oct 24 | 9. Beach Ecology (Leadbetter beach) | **10/25** | **MIDTERM 2** | |
| | | 16 (10/27) | Marine Ecology; Food webs | Ch 10: 213-225 |
| Oct 31 | 10. **TERM PROJECTS** (lab) | 17 (11/1) | Tropics; Coral reefs | Ch 14: all |
| | | 18 (11/3) | Coral reef ecology | |
| Nov. 7 | 11. **Rocky Intertidal (Carpinteria fieldtrip)**<br>**meet in Carpinteria** | 19 (11/8) | **Lecture Quiz 4**<br>Tides<br>Rocky Intertidal | Ch 3: 57-62<br>Ch 11: 246-263 |
| | | 20 (11/10) | Bioluminescence;<br>Mesopelagic | Ch 16: 365-376 |
| Nov. 14 | **Due: Reading Wksht**<br>12. Ocean Acidification (lab) | 21(11/15) | Hydrothermal Vents<br>Deep Sea | Ch 2: 36-38; 54<br>Ch 16: 376-385 |
| | | 22 (11/17) | **Lecture Quiz 5**<br>Climate Change & Oceans | 233-245 |
| Nov 21 | 13. Citizen Science (online) | 23 (11/22) | Biodegradable pollutants | Ch. 18: 410-417 |
| | | (11/24) | **Thanksgiving Holiday** | *Relax* ☺ |

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| Nov 28 | 14: Settlement Plates (lab & SB docks) | 24 (11/29) | Persistent Marine Pollutants | Ch. 18: 417-421 |
| | | 25 (12/1) | Trash Gyres; Invasive Species | Ch 18: 421-423 |
| Dec 5 | 15: Adaptations & Final Review (lab) | 26 (12/6) | **Lecture Quiz 6**<br>Marine Careers | |
| | | 27 (12/8) | Ocean Futures | Ch 18: 424-429 |

**LECTURE FINAL EXAM: THURS DEC. 15th 11am-1pm ***NOTE TIME!****

**Required Materials:**
**Textbook (required**): Marine Biology, by Castro & Huber, 10th edition (or earlier)
**Lab books (required):** Biological Oceanography Lab Manual, Paddack & Anderson, 2022

**Welcome to Biological Oceanography!** This course is an introduction to the amazing world that awaits you just offshore. It is designed for non-majors in science but will also be valuable for biology majors interested in marine science.
In this class, we will be learning about the connections between the physical environment of the oceans and marine organisms, focusing on biological adaptations and ecology. We will be working with these concepts in both lecture and lab. The lab is your chance to put your learning into action, proving concepts for yourself and using tools & skills used by oceanographers worldwide to study the marine realm.
My goal is to help you discover how the oceans influence life on Earth, including your own. Along the way, you will better understand biology and ecology as you discover the many connections you have with the ocean and develop the ability to integrate scientific literacy and thinking into your daily life.

*This course satisfies the SBCC general education requirement in Natural Sciences and is transferable to both UC and CSU as a general education laboratory science course. This course does not apply toward the Biology major at SBCC.*

**Student Learning Outcomes (SLO's) for Bio124 Biological Oceanography:**
1. Physical: Summarize the major physical aspects of the oceans (salinity, temperature, dissolved oxygen, nutrients, pH), how each one varies or does not vary, and how each one affects marine life (geographically and/or seasonally).

2. Adaptations: Describe basic adaptations that occur in marine pelagic organisms to facilitate buoyancy, migrations, and reproduction.

3. Communities: Compare and contrast marine benthic communities in tropical, polar, and deep-sea marine environments.

4. Lab: Recognize the major pieces of oceanographic equipment, what each one samples or measures, and what the sample or measurement can tell about the ocean.

**GRADING** will be determined by the total percentage earned in the course. There is one letter grade for this 4 unit class (lecture and lab together) which will be based upon your percentage of points earned out of a possible 940 points using the following scale. A student who shows strong effort and/or improvement in the course may be bumped up into the next higher level at my discretion.

Final grades are determined according to the following scale:

| | | | |
|---|---|---|---|
| A+: ≥97% | B+: 86-87% | C+: 75-78% | D+: 67-69% |
| A: 91-96% | B: 82-85% | C: 70-74% | D: 60-66% |
| A-: 88-90% | B-: 79-81% | | F: <60% |

Students taking pass/no pass must get at least 70% to pass the class. Points are earned as follows:

| **Lecture Activities** | **Pts** | **% of grade** | **Lab Activities** | **Pts** | **% of grade** |
|---|---|---|---|---|---|
| Lecture Quizzes (6 at 20 pts each – drop lowest) | 100 | 10% | Lab Exercises (15@15 pts ea) | 225 | 22% |
| Midterm 1 | 100 | 10% | Lab Quizzes (13 at 10 pts each – drop lowest) | 120 | 12% |

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|---|---|---|---|---|---|
| Midterm 2 | 100 | 10% | Acidification Worksheet | 10 | 1% |
| Midterm 3 | 100 | 10% | Project topic (on-time) | 5 | 0.5% |
| Lecture Final | 100 | 10% | Project Outline | 10 | 1% |
| Ocean Journal | 30 | 3% | Project abstract & bibliography | 26 | 3% |
| | | | Project | 100 | 10% |

**NOTE: 10% per day late will be deducted from grades for all late assignments**

**Extra Credit** opportunities will be offered throughout the semester and announced in class. If you hear of an activity/lecture/etc that you think would be a valuable learning experience, let me know. All extra credit opportunities will be no cost, or a no cost option will be available.

Here are some Extra Credit opportunities you will have the opportunity to do:

1. News Flash: If you read or hear a news article about the ocean environment, share it with the class (a quick summary) done orally in lecture. You may do up to 4 of these (3 points each). For credit on this, you must:
   a) Provide specifically where you found this information
   b) Summarize what you heard/read
   c) Provide a thoughtful statement about it (e.g., how it relates to the class, biology, or a question that arises for you from this)
2. Beach clean-up (5 pts)
   a) Attend an organized beach clean-up event or create one (during low tide)
   b) Spend at least an hour collecting trash
   c) Within in 1 week hand-in a typed document with:
      i) A summary of where, date & time, tide height, how long you collected, how many people
      ii) a table listing the types of trash you or your group found and how many of each (e.g., how many cigarette butts, plastic bottles, etc.)
      iii) 3-4 sentences of your thoughts/reaction/questions
3. Local scientific lectures/films (will be announced). Worth 5 points each.
   For any lecture/presentation you attend, you must hand in WITHIN 1 WEEK:
   a) the notes you took during the lecture
   b) a brief summary of the lecture/presentation
   c) 3-4 sentences of your thoughts/reaction/questions

**Participation:** A key element of the sciences is to be inquisitive and interactive with your subject and your peers. Your participation is therefore an important part of your learning, so is a part of your grade. Do not be afraid to ask questions or to seek help in understanding from your instructor or your peers – discussion & debate are important aspects of science. **I encourage you to ask questions in class**. If you don't understand something, it is most likely that someone else in the class shares your confusion. The easiest way to resolve your misunderstanding is to speak up.
All science classes build on the foundations laid in each lecture, so it is important that you *do not get behind*. Text readings will support the lecture material, but additional material WILL be presented in lectures. Therefore, if you are absent, it is important that you get class notes from a classmate.

**Tardiness/Absences:** Please be on time! Coming in late is confusing for you and disruptive for the class. If you miss more than 3 lectures &/or 2 labs you are subject to being dropped.

**Lecture Quizzes:** There will be a total of 6 lecture quizzes. Scheduled quizzes will be closed-book on material from the previous 2 lectures. Your lowest lecture quiz score will be dropped or considered extra credit. Make-ups ONLY with a documented valid absence (e.g., doctor's note).

**Exams** will be a combination of Scantron & short answer. Each mid-term will cover material up to the test. The final exam will be half material from the last third of the class and half cumulative.
No exit/re-entry allowed during exams, so be sure that you use the restroom prior to the exam.
You must bring a #2 pencil and 100 question Scantron form to each exam.
NOTE THE TIME OF THE FINAL (11-1) differs from the regularly scheduled lecture time!

**ASSIGNMENTS**:
**Ocean Journal** is a short outside assignment (literally). You will be required to write an essay that includes at least 2 journal entries and an analysis. Your journal entry will be based upon a minimum of 20 minutes spent outside of class/lab during the semester where you take time to simply observe whatever aspects of the ocean interest you (e.g., the waves, particular marine organisms, tide pools, etc.) The details for this exercise can be found in your lab manual under the tab "Ocean Journal".

**Term Project** will be a short, formal presentation on the biology and/or ecology of any aspect of biological oceanography. You will work on and present your project in lab. A list of suggested topics will be provided in your lab manual, or you may come up with your own idea.
Your topic must be based upon published scientific studies. Topics & outlines must be cleared with the instructor - only one student can write on each topic so sign up early.
The project will be an oral 8 minute (solo) or 15 min (buddy team) presentation - each team member must take part in the oral presentation. This will provide you with valuable presentation and collaborative skills as well as help to teach each other about the interesting topics you have researched.
Although the presentation is oral, you are required to submit in printed form your topic, outline, an annotated bibliography, and an abstract prior to the presentation date (see syllabus). The format of the presentation is your choice – PowerPoint is recommended as it is a tool you will use again & again, but you are welcome to use any other format (e.g., overheads, the blackboard, a poster, an artistic representation), as long as you are able to convey the information to the class in a meaningful, understandable, & engaging way. On the day of your presentation, you must bring in a printed abstract and bibliography. Your sources must include at least 1peer-reviewed scientific article.
**Be sure you understand the difference between a peer-reviewed, scientific article and one written for the public.**
Do not try to read an article that you do not understand. Periodicals are available in our library both electronically and in print- new ones are in the mezzanine and older ones are in the stacks (often bound in volumes). Take advantage of our amazing librarians at the Luria library for help on finding articles. Some excellent, on-line scientific journals which provide free on-line access to some or all articles include: Marine Ecology Progress Series, Journal of Marine Biology, Current Biology, Bioscience, Ca. Fish & Game Bulletin, Science, Nature, PLoSONE and PLoSBiology.

Your lab manual contains format instruction sheet, rubric, and in-class pointers.

**Lab Quizzes**- will be given during the first 10 minutes of each lab in which they are scheduled. They will cover lab material from the previous labs as well as test your preparedness for the lab you are about to do (read over your labs BEFORE class!). Students who are late will not have time extended for quizzes. Make-ups will be given only with a valid doctor's/emergency note. The lowest scoring quiz will be dropped.

**Lab Exercises**-– Your lab notebook has all of the labs you will do (with the exception of week #1, which will be passed out in the first lab). It is your responsibility to bring your lab notebook to class. Students who forget their printed labs will receive no higher than 75% on that lab. Lab exercises are to be completed during the laboratory period and turned in or checked over before leaving.
NOTE: all labs begin & end in the lab room with the exception of the field trip labs. Location of meeting place for those labs are in the lab notebook and will be discussed the week prior to the lab.

**Your role in this class:** Congratulations on taking the initiative to learn a fascinating subject! This will be a class that will have you interacting directly with the things we are studying, and with each other. We will provide great tools for you to learn, but it is ultimately YOU who is responsible for your knowledge. If you need extra help, come to my office or make an appointment - I am here for YOU.

Respect your fellow classmates and instructor: Any student who causes any disruption, such as using the above items or talking out of turn, will be given a single verbal warning and points will be deducted from participation grade. If the disruption continues then or any following classes, the student may be removed from class & will not be able to return until meeting with the Academic Dean.
Accommodations for Students with Disabilities:

**Disabled Student Programs & Services (DSPS)** www.sbcc.edu/dsps
Please see the statement in Canvas.