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| **Instructors:**  Dr. Naomi Levine  Office Hours: by appointment Email: n.levine@usc.edu |  Dr. Cameron Thrash  Office Hours: by appointment Email: thrash@usc.edu |

**TA:**

 Meagan He

 Office Hours: by appointment

 Email: meaganhe@usc.edu

Textbook: David Townsend, 2012, *Oceanography and Marine Biology: An Introduction to Marine Science*

Laboratory: Materials provided

Website: <https://blackboard.usc.edu> (course associated materials and grades)

Lectures: T/Th 2:00 - 3:20 (two lectures per week) KAP 167

Laboratory: T 3:30 - 6:20pm (one lab per week) ZHS 469

**Course Overview**

This course will cover the basics of biological, physical, and chemical dynamics in the oceans with a particular emphasis on life in different ocean environments. Specific topics include primary production of phytoplankton, secondary production by zooplankton, bacterial remineralization, physiology and ecology of fishes, and marine mammals.

Prerequisites: BISC 120 or 121; BISC 220 or 221 (*students with BISC 103 can request prerequisite waiver*).

**General aspirations of the course**

Through lectures, laboratories, and projects you will gain experience toward some of the general

curricular goals of the university as related to Biological Oceanography:

(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) in-depth knowledge of the sub-discipline of biological oceanography.

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| **Learning Objective**By the end of this course, students should be able to: | **Assignment/Assessment**This learning objective skill is measured by: |
| 1. Describe the features/mechanisms of general ocean circulation, including specific cases like oxygen minimum zones and El Niño, and local influences from tides and waves  | Exams, classroom activities |
| 2. Distinguish common features of water chemistry according to depth and oceanic region | Labs, exams, classroom activities |
| 3. Contrast the marine cycles of C, N, P, and S and their relationships with key phytoplankton, zooplankton, and bacterioplankton species | Labs, exams, classroom activities |
| 4. Describe a range of oceanographic measurement and predictive techniques, from remote sensing to molecular methods to modeling | Labs, exams |
| 5. Evaluate and summarize primary scientific literature in biological oceanography | Final written project, assignments |
| 6. Communicate current biological oceanographic research to a mixed audience | Final written project, final oral presentation |

**Preliminary schedule of lecture topics and labs (*subject to modification*):**

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| **Day** | **Activity** |  | **Readings** | **Assignments** |
| 08/23 | Lec 1 Geology: Earth’s structure, sediments, paleoceanography  | NL | Ch 1 |  |
| 08/25 | Lec 2 Water chemistry and properties of water | NL | Ch 4  |  |
| 08/30 | Lec 3 The Bio in BioOce | CT | Ch 7 |  |
| 09/01 | Lec 4 General circulation in the oceans  | NL | Ch 5 | A1 (due 9/9) |
| 09/06 | Lec 5 Circulation 2 – OMZ physics | CT | Paper  |  |
| 09/08 | Lec 6 Tides and Waves | CT | Ch 6 |  |
| 09/13 | Lec 7 Nutrient cycles Lab 1 Seawater density lab | NL | Paper | A2 (due 9/21)W1 |
| 09/15 | Lec 8 Limiting factors  | NL | Paper |  |
| 09/20 | Lec 9 Biological pump and Carbon exportLab 2 Nutrient modeling | CT | Paper | W2 |
| 09/22 | **MIDTERM I (Lectures 1-8)** |  |  |  |
| 09/27 | Lec 10 Dissolved Organic Carbon Lab 3 Ecosystem modeling | CT | Paper | W3 |
| 09/29 | Lec 11 Energy for life 1: phototrophy (intro FP) | NL | Ch 8  |  |
| 10/01 | ***R/CV Yellowfin* Research Cruise** |  |  |  |
| 10/04 | Lec 12 Primary producersLab 4 Coastal data gathering (or cruise processing) | NL | Ch 8 | W4 |
| 10/06 | Lec 13 Energy for life 2: chemotrophy | CT | Paper | **Final topic due**A3 (due 10/14) |
| 10/11 | Lec 14 Omics approach to oceanographyLab 5 BioInformatics Lab 1 | CT | Ch 6 | W5 |
| 10/13 | **FALL RECESS** |  |  |  |
| 10/18 | Lec 15 Estuaries: physical structure; Watershed activity, biological structureLab 6 BioInformatics Lab 2 | CT | Ch 12 pg 401-405 | W6 |
| 10/20 | 1 slide overview of final projectLab 7 Yellowfin Cruise Lab |  |  | **One slide presentation due**W7 |
| 10/25 | Lec 16 Microbial loop and zooplankton | CT | Ch 9 |  |
| 10/27 | Lec 17 Oxygen Minimum Zones | CT | Paper | A4 (due 10/28) |
| 11/01 | **MIDTERM II (Lectures 9 - 16)**Lab 8 Flow cytometry lab |  |  | W8 |
| 11/03 | Lec 18 Observing the oceans  | NL | Paper | **Final project bibliography due**A5 (due 11/16) |
| 11/08 | Lec 19 Ocean Acidification and its impactsLab 9 OA lab | NL | Paper | W9 |
| 11/10 | Lec 20 El Nino | NL |  |  |
| 11/15 | Lec 21 Modeling the ocean system | NL | Paper |  |
| 11/17 | Lec 22 History of OceanographyLab 10 History lab | CT | Ch 1 | W10 |
| 11/22 | Lec 23 Yellowfin data analysis |  |  |  |
| 11/24 | **THANKSGIVING**  |  |  |  |
| 11/29 | Student Presentations |  |  | **Final project presentations due** |
| 12/01 | Student Presentations |  |  |  |
| 12/08 | **FINAL EXAM (Comprehensive) 2pm-4pm** |  |  | **Final project paper, Yellowfin labs** |

Any schedule changes will be discussed in class and posted on Blackboard with a modified syllabus.

**Assignments**

There will be 5 assignments given through Blackboard as part of lecture activities (see above A1-5)

**Exams**

There will be three exams, with exam 3 being the final. Exams may include multiple choice questions, fill-in answers, definitions, T/F, short answers, and short or long essays. Material will be drawn from lectures, readings, laboratory material, and problem set material. The final will focus heavily on the third portion of the course but will test material from throughout.

**Final Project**

Each student will choose a research topic from a list provided. The project will focus on a previous study done by a biological oceanographer and published in a peer-reviewed journal. The student will summarize this study and associated previous work that has been done on the topic and come up with a proposed “next steps” for a research study or experiment that would address unanswered questions related to the topic. Each student will prepare:

1. Final topic - DUE 10/07
2. 1-slide recorded overview of topic - DUE 10/21
3. Feedback of other student slides - DUE 10/21
4. Bibliography - DUE 11/04
5. Presentation - DUE 11/30
6. Paper - DUE 12/09

Further details of expectations regarding the final project will be posted on Blackboard.

**Labs**

Lab activities will be in person or online if necessary. They will emphasize how the ocean works and how biological oceanographers test their ideas, through quantitative observations, models, and manipulative, controlled, and replicated experiments. During each lab students need to record their results (drawings, observations, calculations) in the provided worksheet. Tables need to be filled and all post-lab questions answered. Each student is required to show the lab work whenever requested. We will cover details on lab requirements and expectations for each specific lab.

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| Category | Points |
| Exams (x 3, 200 pts ea) | 600 |
| Assignments (x 5, 10 pts ea) | 50 |
| Labs\*  | 185 |
| Final project | 165 |
| Total | **1000** |

**Grading scale**

90-100% A

80-89% B

65-79% C

55-64% D

0-54% F

\*see course emails about lab grading options

**Grading Policies**

Late assignments will be penalized 10% of a grade per day. Any document associated with grading may be photocopied by the instructional staff.

**Policy on Re-grading Examinations**

If you feel that an error was made in the grading of an examination, you need to do the following: 1) Prepare a printed statement explaining why you feel your grade was incorrect, and 2) submit this and your original examination to your instructor within one week of the time the examination was returned to you. Your entire exam may be re-graded and, as a result, your grade may increase or decrease from a requested re-grade.

**Synchronous vs. Asynchronous Considerations (if necessary)**

All lectures and labs will be recorded for those who cannot attend synchronous sessions. Students will be able to complete any and all graded regardless of ability to attend the synchronous sessions. Defined instructions and deadlines will be made available for all assignments, and accommodations for alternative deadlines will be made for students when necessary. Please communicate with the Instructors about any anticipated deadline issues (e.g., for religious observances, time zone conflicts, etc.) at least *2 weeks in advance* of the conflict, although notice at the beginning of the semester is better.

**Website**

Postings on Blackboard (<https://blackboard.usc.edu>) will be an official source for announcements, course materials, lecture notes, Zoom sessions and recordings, grade postings, and general discussions. Students are responsible for checking the course website on a regular basis. Lecture and lab grades will also be available on Blackboard. It is the student’s responsibility to notify his/her Instructor ASAP in the event of any mistakes, so please check your scores on Blackboard weekly.

**Communication**

Email is the preferred form of communication with the instructor outside of class. Responses can be expected within 24-48 hours, though there may be an additional delay over weekends/holidays.

**Online Course Behavioral Norms and Netiquette**

***Behavioral norms***

* Treat everyone with respect and dignity.
* Criticize ideas, not individuals.
* Always be mindful of the following: would you say it to the individual in person?
* Be courteous and refrain from interrupting others.
* Don’t dominate conversations- ensure everyone has a chance to contribute.
* Ask questions, especially when you don’t understand something.
* Support your statements with evidence and explain your rationale.

***Course netiquette (in case of online sessions)***

* Mute your microphone if you are not speaking.
* Chat will only be used to make comments to the entire class (private chat will be disabled).
* Please use the “raise hand” function in Zoom to request clarification or ask questions. This will reduce interruptions.
* Please use your video whenever possible and participate actively if you are attending the live sessions.
* If you have technical issues, please email the active instructor or TA (n.levine@usc.edu, thrash@usc.edu, TBD).

**Students with Disabilities**

Students requesting academic accommodations based on a disability are required to register with the Office of Disability Services and Programs (DSP; 213-740-0076) each semester. DSP can provide a letter specifying accommodations. If a student’s approved accommodation is limited to extra time on examinations, accommodation will be provided. Students must make prior arrangements with the DSP office *2 weeks before* the first exam date. For more information visit: <http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html>.

**Statement on Academic Integrity**

Ethics of academic integrity is a primary focus of the course. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. SCampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00: <http://web-app.usc.edu/scampus/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Recommended sanctions are located in Appendix A. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

**Statement on Academic Conduct and Support Systems**

**Academic Conduct**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](https://policy.usc.edu/scampus-part-b/). Other forms of academic dishonesty are equally unacceptable.  See additional information in *SCampus*and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

**Support Systems**

*Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. [engemannshc.usc.edu/counseling](https://engemannshc.usc.edu/counseling)

*National Suicide Prevention Lifeline – 1 (800) 273-8255*

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. [www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org/)

*Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. [engemannshc.usc.edu/rsvp](https://engemannshc.usc.edu/rsvp/)

*Sexual Assault Resource Center*

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: [sarc.usc.edu](http://sarc.usc.edu/)

*Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086*

Works with faculty, staff, visitors, applicants, and students around issues of protected class. [equity.usc.edu](http://equity.usc.edu/)

*Bias Assessment Response and Support*

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. [studentaffairs.usc.edu/bias-assessment-response-support](https://studentaffairs.usc.edu/bias-assessment-response-support/)

*The Office of Disability Services and Programs*

Provides certification for students with disabilities and helps arrange relevant accommodations. [dsp.usc.edu](http://dsp.usc.edu/)

*Student Support and Advocacy – (213) 821-4710*

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. [studentaffairs.usc.edu/ssa](https://studentaffairs.usc.edu/ssa/)

*Diversity at USC*

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. [diversity.usc.edu](https://diversity.usc.edu/)

*USC Emergency Information*

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. [emergency.usc.edu](http://emergency.usc.edu)

*USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.*

Provides overall safety to USC community. [dps.usc.edu](http://dps.usc.edu/)