

**SYLLABUS: BSC4930 Special Topics in Biology: Biological Oceanography (3 credits)**

**Class number: 22220**

**Section: 1003**

**T Periods 2-3 8:30am-10:25am / R Period 3 9:35am-10:25am**

**Turlington Hall 2354**

*Face-to-face instruction*

**INSTRUCTOR:**

Bryndan P. Durham (she/her)

Office Hours: Thursdays 2-4pm; or by appointment, in person or zoom

Office: Cancer and Genetics Research Complex Rm 404

Phone: (352) 294-6312 (office)

Email: b.durham@ufl.edu

**COURSE DESCRIPTION:**

Biological oceanography is the study of marine organisms, their quantitative distributions in time and space, and their interactions with each other and their ocean environment. In this course, we 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 by phytoplankton, secondary production by zooplankton, bacterial production and remineralization, distributions of pelagic and benthic organisms, and the energy and nutrient cycles driven by these organisms. In the final portion of the course, we explore the impacts of human perturbations and global climate change on ocean ecosystems and their inhabitants.

**Pre-requisites:** BSC 2010, BSC2011, and BSC 2010L/2011L

**COURSE GOALS & STUDENT LEARNING OUTCOMES:**

Through reading, watching, and/or listening to assigned materials, attending in-class lectures, completing written and oral assignments, and participating in group discussions, you will gain experience toward the following broad university curricular goals:

1. The ability to think logically, analytically, and independently;
2. The ability to communicate clearly and effectively, both orally and in writing; and
3. The ability to learn on one's own and as part of a group.

More specific to topics in Biological Oceanography, you will achieve the following learning outcomes:

1. Define the major life forms in the ocean and describe the characteristics that differentiate these life forms and how these life forms interact with each other.
2. Explain how marine organisms influence the flow of energy and cycling of elements in the oceans.
3. Define the environmental factors and processes that control the abundance and distributions of marine organisms in space and time on a variety of scales.
4. Describe approaches for evaluating the biomass, growth, metabolism, and mortality of plankton and other marine organisms, including their strengths and weaknesses.
5. Explain how marine organisms have influenced the biogeochemical history of the Earth and predict how ocean biota will be affected by future climate changes and human impacts.

**COURSE TEXT:**

Lalli, CM & TR Parsons (1997) Biological Oceanography, An Introduction, (Second Edition), Elsevier Butterworth-Heinemann Publishing.

Readings will be assigned from the textbook as well as from primary scientific literature made available on Canvas by the instructor.

**COURSE POLICIES:****Attendance and Make-Up Work Policy:**

Requirements for class attendance and make-up work in this course are consistent with university policies. Please see the UF policy for attendance and excused absences here:

<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Attendance is mandatory, and students are expected to arrive on time to class. This is a small class, and if you are not attending class and completing assignments on time, your instructor will worry, especially during the COVID-19 pandemic. If you have a planned conflict, discuss it with the instructor in advance. Late work will only be accepted under exceptional circumstances. If there is an unforeseen circumstance, please let the instructor know at your earliest convenience. The earlier you contact the instructor to request a late submission the better. Requests will be considered on a case-by-case basis. Special circumstances may come up during this challenging time, so stay in communication with the instructor to ensure your success.

In case of illness or emergency, students must submit documentation to the Dean of Students Office here: <https://care.dso.ufl.edu/instructor-notifications/> and request a letter be sent to the instructor.

**In-class Recording Policy:**

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class

section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

### **Grade Disputes & Procedure for Conflict Resolution:**

Should a student wish to dispute a grade received in this class (other than simple addition errors), the dispute must be in writing and be submitted to the instructor within a week of receiving the grade. The dispute should set out very clearly, the grade that the student believes the assignment should have received as well as why they believe that they should have received such a grade.

Any classroom issues, disagreements or grade disputes should be discussed first between the instructor and the student. If the problem cannot be resolved, please contact the Undergraduate Coordinator or the Department Chair. Be prepared to provide documentation of the problem, as well as all graded materials for the semester. Issues that cannot be resolved departmentally will be referred to the University Ombuds Office (<http://www.ombuds.ufl.edu>; 392-1308) or the Dean of Students Office (<http://www.dso.ufl.edu>; 392-1261). For further information refer to [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

### **Cell Phone Policy:**

Cell phones must be turned to silent or, for emergencies only, be set to “vibrate” during class. In the event of an emergency (and in order to keep from disturbing others), you must leave the classroom to accept an emergency call. You may not answer a call in the classroom. Disregard for these guidelines may result in disciplinary action, which could include the student being excused from class and marked absent for that day.

### **COVID-Related Considerations:**

Masks are optional at UF. However, masks are always acceptable for those who wish to wear them. The CDC recommends that those not fully vaccinated for COVID-19 continue to wear masks, particularly indoors; and even those who are fully vaccinated may choose to wear masks for a variety of reasons. Thank you for supporting your fellow Gators as they balance health, comfort, and other considerations in their decision to wear or not to wear a mask.

If you are experiencing COVID-19 symptoms (CDC guidance on symptoms can be found here: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>), please use the UF Health screening system and follow the instructions on whether you are able to attend class. You can find UF Health guidance on what do if you have been exposed of experiencing COVID-19 symptoms here: <https://coronavirus.ufhealth.org/screen-test-protect-2/frequently-asked-questions/covid-19-exposure-and-symptoms-who-do-i-call-if/>. Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

### Conduct in Class:

In our classroom, all students will be included, heard, and treated with respect. We will promote a safe, healthy, and fair learning environment where all individuals are provided with equitable opportunity to participate, contribute, and succeed. Student success is enhanced by innovation and creativity of thought that inclusive classrooms facilitate. The success of an inclusive classroom relies on the support and understanding of you and your peers.

- **Participation:** Students are encouraged to speak up and share their views while also engaging respectfully with others. Ask questions. Connect with one another during group discussions in class. Meet with your instructor by scheduling office hours. We are a community of learners, and we will all benefit in the learning process through active participation.
- **Diversity:** Diversity, equity, inclusion, and intersectionality have a place in every classroom, just as they have a place in the study of biology. We need diversity of opinion, social class, culture, religion, sexual orientation, gender, race, ethnicity, and ability in science. Maintain an environment of respect and inclusion at all times. Listen and learn.

### CORRESPONDANCE WITH INSTRUCTOR:

Students may contact the instructor through Canvas or by email. Students can expect a response within 24 hrs during the week. After 5pm on Friday, students may not receive a response until the following Monday. Be professional in tone and expectations.

### GRADING POLICY:

Information on current UF grading policies for assigning grade points can be found here:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

### GRADE SCALE:

| A     | A-     | B+     | B     | B-     | C+     | C     | C-     | D+     | D     | D-     | E     |
|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|--------|-------|
| 100-  | 92.9-  | 89.9-  | 86.9- | 82.9-  | 79.9-  | 76.9- | 72.9-  | 69.9-  | 63.9- | 62.9-  | 59.9- |
| 93.0  | 90.0   | 87.0   | 83.0  | 80.0   | 77.0   | 73.0  | 70.0   | 67.0   | 66.0  | 60.0   | (0)   |
| (4.0) | (3.67) | (3.33) | (3.0) | (2.67) | (2.33) | (2.0) | (1.67) | (1.33) | (1.0) | (0.67) |       |

### GRADING EVALUATION OF STUDENT PERFORMANCE:

|   |           |
|---|-----------|
| Weekly Canvas quizzes (6 total; 4 pts each)             | 20        |
| In-class discussions/breakouts (12 total; 1.5 pts each) | 15        |
| In-class discussion lead                                | 10        |
| In-class participation                                  | 10        |
| Final Project   |           |
| Bibliography  | 5         |
| One-slide overview                                      | 5         |
| One-slide peer evaluation                               | 5         |
| Paper outline   | 5         |
| Final presentation                                      | 10        |
| Final presentation peer evaluation                      | 5         |
| Final paper   | 10        |
| <hr/> TOTAL   | <hr/> 100 |

## **GRADED ASSESSMENTS:**

Weekly Canvas quizzes: Students will complete 6 quizzes on Canvas, approximately bi-weekly, that are based on readings, discussions, and lecture material from that week. Each quiz is worth 4 points of the final grade. The lowest quiz grade will be dropped, for a total of 20 points from the 5 highest-scoring quizzes.

In-class discussions/breakouts: Students will participate in group discussions of an assigned scientific article, video, guest lecture, or combination of these (total 7) and taxonomy breakout sessions (total of 5), approximately once per week. Student attendance and active participation in each discussion is worth 1.5 points. To facilitate discussion, students will post questions/comments through Canvas prior to in-class discussions. Missed in-class discussions will not be made-up. In order to accommodate up to two excused or unexcused absences, students will participate in 10 of the 12 in-class discussions/breakouts for a total of 15 points. Students will sign up to co-lead approximately 4 class discussions/breakouts over the course of the semester, for a total of 10 points. Students will work together to provide a brief overview of the assigned material and encourage class discussion through open-ended questions. Students are encouraged to be creative and may use power-point, videos, activities, or other means of generating class discussion. Students will be assigned dates and topics to lead following the drop/add date once the number of students in the class is finalized. During discussions, students are expected to follow the “Conduct in Class” policy with these points in mind:

- Listen actively and attentively
- Do not interrupt one another
- Critique ideas, not people
- Do not monopolize the discussion

In-class participation: Attendance and participation during class is required. You will earn credit for each class session that you attend from beginning to end and in which you actively participate in a constructive and professional manner. The grade is determined by tardiness, absenteeism, participation in group discussions, asking questions, engagement, and prior preparation. In order to accommodate a reasonable number excused or unexcused absences, students must participate in >85% of the class periods to receive full credit. The instructor will provide feedback on student participation after the first five weeks of class to ensure student participation success.

Final Project: Each student will choose a research topic under guidance from the instructor. 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 proposed “next steps” for a research study or experiment that would address unanswered questions related to the topic. Stages of project development will be graded and returned to the student to ensure progress. The final project will be evaluated through both an in-class presentation and written paper. Student peer-evaluations are also included in the grading scheme. Further details of expectations regarding the final project will be discussed in class and posted on Canvas.

*Required Final Project Products:*

- Paper selection and bibliography (due week 6)
  - Students will select the peer-reviewed study for their project and turn in a

- bibliography of accompanying reference materials.
  - The peer-reviewed study must be approved by the instructor prior to the deadline.
- One-slide overview (due week 9)
  - Students will present a one-slide powerpoint overview of their project topic during class.
- One-slide peer-evaluation (due week 9)
  - Students will submit constructive peer-evaluations of others' one-slide presentations.
- Project outline (due week 13)
  - Students will provide an outline of their final paper. An outline will help to arrange and develop ideas to guide student final presentations and papers. The outline should contain the following sections:
    - Introduction, background, and significance of the study
    - Study area/subjects
    - Methods
    - Results and discussion
    - Proposed “next steps” to address unanswered questions on the topic
- In-class presentation (due week 15-16)
  - In-class presentations will focus on the interpretation of the peer-reviewed study. Students should consider the following in their presentations, guided by their outlines:
    - Background and significance of the study
    - Summary of key findings including facts, inferences, and conclusions
    - Outstanding questions and “next steps” for future research
- Student presentation peer-evaluation (due week 15-16)
  - Students will submit constructive peer-evaluations of others' final presentations.
- Final paper (due Finals week)
  - Final paper will be based off previous project outline and in class presentations
  - Be sure to cite all sources!

**COURSE SCHEDULE:** *Students should note that this is a tentative schedule that is subject to change.*

| Week | Date   | Topic  | Assignments Due | Reading & Other Assigned Materials  |
|------|--------|--|-----------------|---|
| 1    | 10-Jan | 1. Introduction to Biology Oceanography                        |                 | Ch. 1 Intro + 1.1 (p 1-2)<br>1.2-1.3 (p 2-6); 1.5 (p 13-14)   |
|      | 12-Jan | 3. Physical & geological ocean environment                     |                 | <a href="#">Nat Geo Earth the Biography: Oceans: Ted Ed: ocean currents; 2.6 (p 34-36)</a>                              |
| 2    | 17-Jan | 4. Chemical ocean environment<br>In-class Discussion (D1): GOE |                 | Ch. 2 Intro + 2.1-2.5 (p 16-34); 2.7 (p 36-37)<br><a href="#">Ted Ed: single-celled organism;</a><br>Rayner-Canham 2011 |
|      | 19-Jan | 5. Marine food webs; phototrophy & chemotrophy review          |                 | 3.2 (p 46-48); 5.1-5.2 (p 112-120),<br>5.4 (p 134-136)  |
| 3    | 24-Jan | 6. Phytoplankton<br><br>Taxonomy Breakout (B1)                 |                 | Ch. 3 Intro + 3.1 (p 39-46);<br>Karlusich et al., 2020  |
|      | 26-Jan | 7. Primary production  | Quiz 1          | <a href="#">3.2.1 (p 48-50); Chisholm Ted Talk</a>  |

|    |        |   |                             |   |
|----|--------|---|-----------------------------|---|
| 4  | 31-Jan | 8. Limiting factors; Macrotrients<br>In-class Discussion (D2): vitamins               |                             | 5.5 (p 136-143)   |
|    | 2-Feb  | 9. Limiting factors; Micronutrients   |                             | Grossman, 2016  |
| 5  | 7-Feb  | Bibliography work day<br>In-class Discussion (D3): metal deposition                   |                             | Pinedo-González et al., 2020  |
|    | 9-Feb  | Guest Lecture*  | Quiz 2                      |   |
| 6  | 14-Feb | 10. Zooplankton<br>Taxonomy Breakout (B2)   |                             | Ch. 4 Intro + 4.1-4.3 (p 74-89)   |
|    | 16-Feb | 11. Biological pump; vertical migration   | Bibliography                | 4.5 (p 94-97) + 4.9 (p 109-110; #1-7);<br><a href="#">Sosik Ted Talk</a>                        |
| 7  | 21-Feb | 12. Bacteria, archaea, & viruses<br>In-class Discussion (D4): microplastics & grazing |                             | 1.2.1 (p 121-123);<br><a href="#">Smithsonian video - microbial loop</a><br>Fulfer et al., 2021 |
|    | 23-Feb | Bibliography revisions work day   | Quiz 3                      |   |
| 8  | 28-Feb | 14. Marine invertebrates<br>Taxonomy Breakout (B3)                                    |                             | Ch 7 Intro (p177-178) + 7.2-7.2.1 (p180-191)  |
|    | 2-Mar  | 15. Nekton I<br>Taxonomy Breakout (B4)  |                             | Ch. 6 Intro + 6.1-6.6 (p 147-162);<br>6.9 (p 174-175; #1-9)                                     |
| 9  | 7-Mar  | Student Slide Presentations   | Slide +<br>Peer-evaluations | none  |
|    | 9-Mar  | 15. Nekton II<br>Taxonomy Breakout (B5)   | Quiz 4                      | Ch. 6 Intro + 6.1-6.6 (p 147-162);<br>6.9 (p 174-175; #1-9)                                     |
| 10 | 14-Mar | Spring Break  |                             |   |
|    | 16-Mar | Spring Break  |                             |   |
| 11 | 21-Mar | Watch recorded lectures*  |                             |   |
|    | 23-Mar | 16. Fisheries, migration, & navigation  |                             | 6.6.1-6.7 (p 162-169);<br>Ch. 9 Intro + 9.1 (p 247-251)   |
| 12 | 28-Mar | In-class Discussion (D5): Report on lectures<br>Project outline work day              |                             |   |
|    | 30-Mar | 17. Pelagic & Benthic deep sea; hydrothermal vents                                    |                             | <a href="#">8.9 (p238-243); 8.8 (p 226-238); Widder Ted Talk</a>                                |
|    |        |   | Quiz 5                      | Cavanaugh et al., 1981; Arp et al., 1983<br>NSIDC: Intro, Arctic v Antarctic, Global climate    |
| 13 | 4-Apr  | 18. Polar regions<br>In-class Discussion (D6): deep-sea mussels & symbionts           |                             | Duperron et al., 2006   |
|    | 6-Apr  | 19. Ocean warming & deoxygenation (OMZs)  | Project Outline             | <a href="#">White Ted Talk; Limburg et al., 2020</a>  |
| 14 | 11-Apr | 20. Ocean acidification<br>In-class Discussion (D7): ocean geoengineering             |                             | <a href="#">McGrath Ted Talk</a>  |
|    | 13-Apr | Student Presentation Preparation*   | Quiz 6                      |   |
| 15 | 18-Apr | Student Presentations   | Student Presentations       |   |
|    | 20-Apr | Student Presentations   |                             |   |
| 16 | 25-Apr | Student Presentations   |                             |   |
|    | 27-Apr | Reading Day   |                             |   |
| 17 | 2-May  | Finals  | Final Paper                 |   |

\*denotes a class period that may be held 100% online (by zoom)

### **ACADEMIC INTEGRITY:**

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions, here: <https://sccr.dso.ufl.edu/process/student-conduct-code/>. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

Any acts of cheating, plagiarism, or other forms of academic dishonesty will result in, at minimum, a 0 grade for the assignment. Sharing information about answers to assignments with students in current, future, or past classes, or posting on social media information about same, is a serious act of academic dishonesty. If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999).

### **STUDENTS REQUIRING ACCOMMODATIONS:**

Students who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester. Contact the Dean of Students Office of Disability Resources, Peabody Hall 202, 352-392-1261. The instructor will work with them to accommodate you. More info: <https://disability.ufl.edu/students/get-started/>

### **ONLINE COURSE EVALUATIONS:**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via [ufl.bluera.com/ufl/](http://ufl.bluera.com/ufl/). Evaluations are stored and reported in a completely anonymous manner. Summaries of course evaluation results are available to the public here: <https://gatorevals.aa.ufl.edu/public-results/>

### **UF SUPPORT RESOURCES:**

**ASKING FOR HELP IS A SIGN OF STRENGTH.** We are living through historical difficulty. If you or a friend is in distress, contact [umatter@ufl.edu](mailto:umatter@ufl.edu). The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. More info can be found here: <https://umatter.ufl.edu/>. A nighttime and weekend crisis counselor is available by phone at 352-392-1575.

Additional resources are available on campus to help students meet academic goals and solve personal problems that may interfere with their academic performance. If you find that you are having difficulty emotionally or academically, there is substantial support available including the following resources:



**Academic Resources:**

*E-learning technical support*, 352-392-4357 (select option 2) or email [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>

*Career Resource Center*, Reitz Union, 352-392-1601. Career assistance and counseling. <http://www.crc.ufl.edu>

*CLAS Academic Advising Center*, Farrior Hall, 352-392-1521. CLAS academic advising on course selection and course planning to meet graduation requirements.

*Library Support*, <http://cms.uflib.ufl.edu/ask> Various ways to receive assistance with respect to using the libraries or finding resources.

*Teaching Center*, Broward Hall, 352-392-2010 or 352-392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>

*Writing Studio*, 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>

*Student Complaints*, <https://registrar.ufl.edu/writtencomplaints>

**Health and Wellness Resources:**

*U Matter, We Care*, If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352-392-1575 so that a team member can reach out to the student.

*Counseling and Wellness Center*, <http://www.counseling.ufl.edu/cwc/Default.aspx>; 352-392-1575

*Field & Fork Food Pantry*, <https://pantry.fieldandfork.ufl.edu/>

*Sexual Assault Recovery Services (SARS)*, Student Health Care Center, 352-392-1161. More information on resources to help students with sexual violence issues at [www.umatter.ufl.edu/sexual\\_violence](http://www.umatter.ufl.edu/sexual_violence)

*Sexual Harassment*, Information on UF policies, awareness, reporting, and counseling at [www.hr.ufl.edu/managerresources/policies-2/sexual-harassment/](http://www.hr.ufl.edu/managerresources/policies-2/sexual-harassment/)

*University Police Department*, 352-392-1111 (or 9-1-1 for emergencies). <http://www.police.ufl.edu/>