SYLLABUS: BOT4935/BOT6935 Special Topics in Biology: Microbial Oceanography
3 credits
Class number: 28977/23674
Section: 8470/8469
T Period 3 9:35am-10:25am; R Period 3-4 9:35am-11:30am
UFGI 436
Face-to-face instruction

INSTRUCTOR:
Bryndan P. Durham (she/her)
Office Hours: Thursday 11:30-1:30, or by appointment
Office: Cancer and Genetics Research Complex Rm 404
Phone: (352) 294-6312 (office)
Email: b.durham@ufl.edu

COURSE DESCRIPTION:
Microbial oceanography involves the study of microbial life in the oceans, their quantitative distributions and metabolic processes over time and space, and their interactions with each other and their ocean environment. In this course, we cover microbial processes in the oceans with an emphasis on how marine microbes influence biogeochemical, ecological, and climate-related dynamics. Specific topics include primary production by phytoplankton, bacterial production and remineralization, microbial metabolic interactions, and the energy and nutrient cycles driven by marine microbes. During the course, we will explore the impacts of human perturbations and global climate change on ocean ecosystems and their microbial inhabitants. We will also use existing molecular data, e.g., metatranscriptomes, metabolomes, to examine microbial diversity and metabolism through student-led research.

Pre-requisites: General Biology, General Chemistry, General Microbiology, Molecular Biology

COURSE GOALS & STUDENT LEARNING OUTCOMES:
Through reading assigned materials, attending 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 Microbial Oceanography, you will achieve the following learning outcomes:

1. Define the major forms of microbial life 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 microbes 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 microbes in space and time on a variety of scales.
4. Describe approaches for evaluating the biomass, growth, metabolism, and mortality of marine microbes, including their strengths and weaknesses.

5. Explain how marine microbes have influenced the biogeochemical history of the Earth and predict how ocean life will be affected by future climate changes and human impacts.

COURSE TEXT:
Readings will be assigned from primary scientific literature made available on Canvas.

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 strongly encouraged, and part of your grade is calculated based on class participation. This is a small class, and if you are not attending class and completing assignments on time, your instructor will worry. 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.

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:
In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit one.uf for screening / testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- As with any excused absence, you will be given a reasonable amount of time to make up missed 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. Always maintain an environment of respect and inclusion. 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**
100-93.0 (4.0)	92.9-90.0 (3.67)	89.9-87.0 (3.33)	86.9-83.0 (3.0)	82.9-80.0 (2.67)	79.9-77.0 (2.33)	76.9-73.0 (2.0)	72.9-70.0 (1.67)	69.9-67.0 (1.33)	63.9-66.0 (1.0)	62.9-60.0 (0.67)	59.9-(0)

GRADING EVALUATION OF STUDENT PERFORMANCE:

In-class discussions (6 total; 6 pts each)	30
In-class discussion lead (2 total; 5 pts each)	10
In-class participation	20
Final Project	
Project outline	10
Final presentation	20
Final paper	10
TOTAL	100

GRADED ASSESSMENTS:

In-class discussions: Students will participate in group discussion of assigned scientific article(s). Student attendance and active participation in expected to receive credit. To facilitate discussion, students will bring their own questions/comments to the in-class discussion. Missed in-class discussions will not be made-up. In order to accommodate one excused or unexcused absence, students will participate in 5 of the 6 in-class discussions.

Students will sign up to co-lead two class discussions over the course of the semester. Students will 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 >75% 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 analysis of existing molecular/chemical oceanographic data. Stages of project development will be discussed and returned to the student to ensure progress. The final project will be evaluated through both an in-class presentation and written paper. Students are encouraged to provide peer-feedback on projects as part of their class participation grade. Further details of expectations regarding the final project will be discussed in class and posted on Canvas.

Required Final Project Products:

- Project selection (week 5)
    - Students will select a targeted metabolic analysis for their project based on discussion with the instructor and class.
- Project outline (week 11)
    - Students will provide an outline of their final analysis. An outline will help to arrange and develop ideas to guide student final presentations and papers. The outline should contain the following sections:
        - Methods
        - Results + Figures
- In-class presentation (week 14)
    - In-class presentations will focus on the interpretation of data. Students should consider the following in their presentations, guided by their outlines:
        - Results + Figures
        - Summary of key findings including facts, inferences, and conclusions
        - Outstanding questions and "next steps" for future research
- Final paper (final week of class)
    - Final paper will be based off previous project outline and in-class presentations

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

Week	Date	Topic
1	22-Aug	1. Introduction to Microbial Oceanography
2	27-Aug	2. Physical & geological ocean environment
	29-Aug	Paper Discussion
3	3-Sep	3. Chemical ocean environment
	5-Sep	Paper Discussion
4	10-Sep	4. Marine food webs & Phytoplankton
	12-Sep	Project Work Day 1 - tree building pipeline
5	17-Sep	5. Primary production
	19-Sep	Paper Discussion, Project selection
6	24-Sep	6. Limiting factors; Macronutrients & Micronutrients
	26-Sep	Project Work Day 3 - metatranscriptome pipeline
7	1-Oct	Project Work Day 4
	3-Oct	Paper Discussion
8	8-Oct	7. Zooplankton; Biological Pump; Vertical Migration
	10-Oct	Project Work Day 5 - metabolome pipeline
9	15-Oct	8. Bacteria, archaea, & viruses
	17-Oct	Paper Discussion
10	22-Oct	9. Microbial loop; remineralization
	24-Oct	Paper Discussion
11	29-Oct	10. Pelagic & Benthic deep sea; hydrothermal vents
	31-Oct	Project Work Day 6, Project Outline
12	5-Nov	11. Polar regions
	7-Nov	Project Work Day 7 - NO CLASS
13	12-Nov	12. Ocean warming, acidification (OA) & deoxygenation (OMZs)
	14-Nov	Project Work Day 8
14	19-Nov	Project Work Day 9
	21-Nov	Project Final Presentations
15	26-Nov	Holiday Break - NO CLASS
	28-Nov	Holiday Break - NO CLASS
16	3-Dec	Submit Necessary Revisions to Final Project - NO CLASS
	5-Dec	Reading Day - NO CLASS

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/. 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. 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. 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 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

Sexual Harassment, Information on UF policies, awareness, reporting, and counseling at 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/