SYLLABUS: PCB4460 Microbial Life in the Oceans (4 credits)
Class number: 26561
Section: 2889
MTWRF Periods 3-8; 9:35am-3:50pm
CGRC Room 436; CGRC Lab 415
Course website: https://gomicrobes.org/

INSTRUCTIONAL TEAM:

Instructors:
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COURSE DESCRIPTION:
Marine microbes form the base of the ocean food web and carry out vital ecosystem services. Microbial oceanography is a scientific discipline that focuses on the biology and ecology of microorganisms that inhabit the sea, their quantitative distributions in time and space, and their interactions with each other and their ocean environment. Our understanding of the marine microbial world has rapidly expanded with the use of innovative molecular and chemical tools to uncover previously hidden taxonomic diversity, spatiotemporal distributions, and novel metabolic functions. In this course, students will gain exposure to emerging research tools and investigate marine microbes from molecular to ecosystem scales. The course will focus on diversity and dynamics of phytoplankton and bacterial metabolism in the surface ocean. This interdisciplinary course offers a combination of laboratory, fieldwork (multi-day research cruise), and data analysis opportunities. Students will gain research exposure in a variety of microbial oceanography topics that include marine biogeochemistry (e.g., primary production, organic matter, nutrients), marine microbe classification (e.g., microscopy, DNA sequencing), and metabolite identification (e.g., liquid chromatography). Students will take part in an authentic research expedition and perform wet bench techniques and data analysis at UF.

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

COURSE GOALS & STUDENT LEARNING OUTCOMES:
Through attending in-class lectures, completing a variety of written, oral, laboratory, and field assignments, and participating in group activities and discussions, you will achieve a variety of learning goals aimed at gaining hands-on research experience, building professional skills, and learning fundamental concepts in microbial oceanography.

You will gain experience with the scientific process, technical methods, and protocols through the following learning outcomes:

1. Carry out research procedures and operate specialized equipment while maintaining laboratory and shipboard safety.
2. Use quantitative and qualitative research approaches and choose appropriate parameters to investigate microbial diversity.
3. Implement data collection activities at sea using specialized seaboard equipment.
4. Integrate the scientific method into the acquisition (inquiry-based learning), processing, and analysis of samples.
5. Maintain careful records of methods, data collection, and analysis.

You will build professional skills through the following learning outcomes:

1. Collaborate with peers and instructors by performing sample collections/analyses that are directly related to an active research program at the university.
2. Equitably participate in classroom exercises, group discussions, and various aspects of carrying out research (e.g., note taking, cleaning up, data analysis).
3. Think logically, analytically, and independently.
4. Communicate clearly and effectively, both orally and in writing, in both informal and formal settings.
5. Learn on one's own and as part of a diverse group of scientists.
6. Provide constructive feedback to classmates and share ideas openly to challenge interpretations and build collective knowledge.

You will learn core concepts in microbial oceanography through the following learning outcomes:

1. Define the major microbial life forms in the ocean and explain how marine organisms influence the flow of energy and cycling of elements in the oceans.
2. Describe approaches for evaluating the biomass, growth, metabolism of marine microorganisms.
3. Express a general understanding of marine microbial diversity & chemistry measurements, verbally and in writing.
4. Identify groups of ocean microbes and speculate about function using a combination of optical, molecular, and chemical measurements.

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

COURSE POLICIES:
This course follows all UF academic policies outlined below and published here:
https://go.ufl.edu/syllabuspolicies

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 instructors 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 instructors know at your earliest convenience. The earlier you contact the instructors the better. Requests will be considered on a case-by-case basis. Please stay in communication with the instructors 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 education 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 deliver by an 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 presentation 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 guest 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.

Media Consent:
Photographs will be taken during course activities. Please print and sign the photo release form (uploaded to Canvas) indicating that you consent to having your photograph taken and agree to the usage of photographs outlined in this section.

- Photographs will be available to all classmates and instructional staff on OneDrive for use in the creative writing assignments (see Graded Assignments below)
- Selected photographs may be posted on the course and lab websites
- Selected photographs may be posted on the lab social media accounts
- You maintain the freedom to download the photographs for personal use

Should you have any concerns about the usage of photographs, please raise the issue with the course instructors and we will work with you to make accommodations.

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 instructors 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 instructors 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.sfa.ufl.edu/pub/StudentComplaintPolicy.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.

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 instructors 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. 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 instructors through Canvas or by email. Students can expect a response within 48 hours 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:

Homework assignments	
Safety training	10
Creative writing assignments	20
Class participation	
Attendance & in-class participation	10
Group discussions & in-class activities	20
Lab notebooks	10
Final Project	
Final presentation	10
Final presentation peer evaluation	10
Final paper	10
TOTAL	100

GRADED ASSESSMENTS:

Safety training: Students will complete on-line and in-person safety trainings during the first week of class. Shipboard safety training will occur on board the research vessel and students will be graded based on attendance.

Creative writing assignments: Students will complete creative writing assignments, submitted on Canvas. These homework assignments require that you review photographs of yourself taken in-class in the previous weeks and write creatively to narrate the photographs and describe the research being conducted in the course. Detailed instructions and grading criteria will be made available on Canvas. If you did not sign the photo release form, you will be asked to narrate photographs of your classmates. We do highly encourage you to sign the photo release form, as we hope that your participation in this course will be a fun memory in your undergraduate experience that we document with photographs.

Attendance & in-class participation: Attendance and participation during class is required. You will earn credit for class sessions 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.

Group discussions and in-class activities: Students will participate in group discussions of scientific articles and participate in in-class activities led by instructors and/or teaching assistants. Student attendance and active participation in each discussion and activity is graded. We will accommodate one excused or unexcused absence during discussions and activities within the grade scheme. To facilitate discussions of scientific articles, students may be asked to post questions/comments through Canvas prior to in-class discussions. During all discussions and in-class activities, 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

Lab notebooks: Keeping clear, detailed records of your lab and field work is essential. Your notebooks will be checked approximately weekly to ensure you are keeping accurate records of your work.

Final project:

- Final report
  - Students will submit concise reports of data they generated during the course.
  - Reports will include data generated from the in-class portion of the course and data collected and synthesized from the cruise. A draft of the final report will be submitted for review by the class to aid in synthesis of ideas in preparation for final presentations.
- Final presentation
  - Presentations will highlight student-generated data and synthesis based on the review of the final reports. Students should consider highlighting their key findings and their interpretations of the data, including facts, inferences, and conclusions. Students will also pick one of their creative writing assignments to share with the group.
- Final presentation peer-evaluation
  - Students will submit constructive peer-evaluations of others' final presentations.

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

Date	Topics and Labs	Activities/homework
WEEK 1		
Thursday February 12	Introduction to course; Lab: safety, microbial culturing	
Friday February 13	Microbial diversity; Lab: microbial culturing, microscopy	Safety trainings & forms due
WEEK 2		
Monday February 16	Microbial ocean trends; Lab: CTD demo, algal/microbial isolations	
Tuesday February 17	Microbial trophic modes; Lab: mixotrophy exp. 1	Discussion/Activity #1
Wednesday February 18	Microbial identification & PCR; Lab: mixotrophy exp. 1, PCR	
Thursday February 19	Microbial interactions; Lab: PCR gels & sequencing	Discussion/Activity #2
Friday February 20	Microbial chemistry; Lab: chlorophyll, stage cruise equipment	Creative writing assignment #1 due
WEEK 3		
Monday February 23	Rest; Lab: packing for cruise	
Tuesday February 24	CRUISE (tentative); mixotrophy exp. 2; microbial culturing	
Wednesday February 25	Rest; Lab: algal isolations	
Thursday February 26	Microbial interactions; Lab: mixotrophy exp. 2	Discussion/Activity #3
Friday February 27	Microbial interactions; Lab: microbial isolations	Creative writing assignment #2 due
WEEK 4		
Monday March 2	Lab: PCR from isolates	
Tuesday March 3	Lab: mixotrophy exp. 3; PCR gels & sequencing	
Wednesday March 4	Microbial trophic modes; Lab: mixotrophy exp. 3	Discussion/Activity #4
Thursday March 5	Data analysis & preparing poster	
Friday March 6		
Saturday March 7	Science by the Shore Symposium	
WEEK 5		
Monday March 9	Data analysis continued; Preparing final reports & presentations	
Tuesday March 10		
Wednesday March 11		Creative writing assignment #3 due
Thursday March 12		Final report due
Friday March 13	Final presentations	Peer evaluation of Final presentations due

COURSE ROOM & LAB SPACE AVAILABILITY:

	Monday	Tuesday	Wednesday	Thursday	Friday
09:30 – 10:45	CGRC 436	CGRC 436	CGRC 436	CGRC 436	CGRC 436
10:45 – 11:00	*Coffee/snack break (436)*				
11:00 – 12:00	CGRC 436/ 415 lab	CGRC 436/ 415 lab	CGRC 436/ 415 lab	CGRC 436/ 415 lab	CGRC 436/ 415 lab
12:00 – 1:00	*Lunch break (atrium, breezeway, picnic tables)*				
1:00 – 3:00	CGRC 415 lab	CGRC 415 lab	CGRC 415 lab	CGRC 415 lab	CGRC 415 lab

blue	CGRC 436 (conference room) is reserved for class during these times; We will also use CGRC 415 lab as needed
yellow	We will use only CGRC 415 lab space; CGRC 436 is not available

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/. Nighttime and weekend counselors are 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 resources found here: https://go.ufl.edu/syllabuspolicies