

**SYLLABUS:  
CHEMICAL OCEANOGRAPHY — GLY 4726  
Spring 2024, Section 4444**

**INSTRUCTOR**

**Lead Instructor:** Dr Thomas S. Bianchi, Department of Geological Sciences  
Office: 205 Williamson Hall; Ph# 352-392-6138; e-mail: [tbianchi@ufl.edu](mailto:tbianchi@ufl.edu); Office meeting: by appointment

**Teaching Assistant:** Emily Watts, Office: 272 Williamson Hall, [emilygwatts@ufl.edu](mailto:emilygwatts@ufl.edu), Office Hours: by appointment

**Lectures:** T (Period 6 – 7) (12:50 PM - 1:40 PM); TR (Period 6 – 7) 12:50 PM - 2:45 PM); Room 210, Williamson Hall

**COURSE DESCRIPTION**

Origins, fates, and distribution of organic compounds in contemporary marine environments as well as in recent and ancient sediments. Applications and biosynthetic pathways of key chemical biomarkers across a diversity of organic compound classes. New approaches in analytical chemistry and instrumentation currently used in measuring chemical biomarkers.

**Prerequisites:** none

**Course Objectives**

1. To understand the biogeochemistry of the oceans, what controls it, how and when it changes, how this knowledge can be transferred to the study of past and future oceans.
2. To acquire skills in critical thinking through oral, visual, and written formats.

**Course Structure**

The course will require in-class participation. Prior to class each week, students will be expected to keep up with the assigned readings.

**COURSE WEBSITE and COMMUNICATION**

**Course Website**

The course will run via **Canvas** through the UF e-learning website; go to <https://elearning.ufl.edu/> and click on the Canvas Login button. The course site will be used to post relevant announcements, reading, lecture materials, links, assignments and quizzes, etc. Students are responsible for checking this site for announcements and to verify that your grades are recorded correctly. **You are responsible for checking this site for announcements and to see that your grades are being correctly recorded.** Do not send me e-mail through this site; use [tbianchi@ufl.edu](mailto:tbianchi@ufl.edu) instead.

Questions and Comments on course logistics (e.g. assignments, grading etc.) and on content (e.g. science or policy questions directed toward any of the course instructors) should be posted in two respective discussion boards within the course website. Questions of a personal nature (e.g. medical emergency, legal, documented disability accommodation, etc.) should be sent to the appropriate faculty instructor as necessary.

**Required Textbooks**

*Chemical Oceanography and the Marine Carbon Cycle*, Emerson & Hedges, Cambridge University Press, 2008. Amazon Books from \$16 to \$113, see link below.

[https://www.amazon.com/s?k=Chemical+Oceanography+and+the+Marine+Carbon+Cycle%2C+Emerson+%26+Hedges%2C+Cambridge+University+Press%2C+2008.&i=stripbooks&ref=nb\\_sb\\_noss](https://www.amazon.com/s?k=Chemical+Oceanography+and+the+Marine+Carbon+Cycle%2C+Emerson+%26+Hedges%2C+Cambridge+University+Press%2C+2008.&i=stripbooks&ref=nb_sb_noss)

## ASSESSMENTS AND GRADING

### Final Grade Calculation

10%	Attendance and Participation
30%	Homework and In-class Activities (problems sets and paper questions)
30%	Final Project (Paper/Poster)
30%	Exams (3 total)

### Final Grade Scale

A =  $\geq 93\%$ , A- = 90-92.99, B+ = 87-89.99, B = 83-86.99, B- = 80-82.99, C+ = 77-79.99, C = 73-76.99, C- = 70-72.99, D+ = 67-69.99, D = 63-66.99, D- = 60-62.99, E < 60

**\*Note:** An earned grade of 'C-' grade or below does not qualify for major, minor, Gen Ed, or college basic distribution credit.

For further information on UF's Grading Policy, consult:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### Homework and In-class Activities

*Homework* will consist of answering questions on weekly-assigned peer-reviewed paper, and occasionally assigned problem sets.

*In-class* activities – each student will lead a ca. 15 min. PowerPoint presentation on one of more of the weekly assigned peer-reviewed papers - total number of presentations per student to be determined by class size. In-Class activities will involve reading assignments of 1 to 2 recently published scientific papers each week. During student presentations all students are expected to have read the assigned paper(s) and to participate in critiquing and assessing the results and impact of the paper.

### Exams

There will be 3 in-class exams. Each will be in the format of approximately 4 to 5 short essay questions. Make-ups for exams will only be given by pre-arrangement (before the exam) or under extraordinary circumstances.

### Final Project (paper and poster)

**You will write a 5-page paper and produce a scientific poster on the same topic for your final project. The posters will be presented (orally) to a group of judges on the last day of class.**

*First Assignment:*

A potential title and a 1-page abstract (single spaced) that clearly defines the topic you have chosen with a general outline of your proposed paper.

On a separate page, please list five references you used to put your abstract together. These references will be properly cited in the format of the journal *Limnology and Oceanography* (L&O). The format of the term paper and proposal will strictly follow that of L&O. Please consult the L&O (<http://www.aslo.org/>).

*Second Assignment (Peer-review):*

An annotated bibliography with 10 properly cited references in the L&O format. Each reference will have a 2 to 3-sentence summary of the important findings in the paper. At least 80% of these references must be from peer-reviewed literature.

*Final Submission:*

The final term paper will be 5 pages of double-spaced text (excluding title page, tables, figures, references, acknowledgements, and appendices). The term paper will be graded based on the quality of the writing, will be graded based on the quality of the writing, comprehensiveness of the cited literature and the overall synthesis of the main goals of the paper. Details on poster preparation will be provided in class and as a pdf file.

## Extra Credit

No mechanisms for extra credit are available.

## COURSE AND UNIVERSITY POLICIES

### Attendance and Absence

Students are expected to complete all requirements (exams, final paper, presentations) on the specified dates and will not be granted an alternate date unless they have an acceptable reason for their absence (e.g., absences due to medical emergency, observance of religious holidays, military obligation) or pre-arranged consent of the instructor. However, you may receive an extension on an assignment by pre-arranged consent of the instructor or in extraordinary circumstances. These requests must be timely and accompanied by all necessary written documentation.

'In-class activities' must be turned in by the end of the class period that the student had made a presentation. Students are expected to complete all requirements (exams, presentations, projects) on the specified dates. However, you may receive an extension on an assignment by pre-arranged consent of the instructor or in extraordinary circumstances. These requests must be timely and accompanied by all necessary written documentation. For further details on UF attendance policy please see <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>.

### Classroom policy and conduct

Students are required to bring to each class meeting a laptop or similar device for use in taking notes, summarizing in-class activities, and accessing the internet. However, use of mobile devices and computers during class for purposes other than viewing readings or conducting sanctioned research is not allowed. Cell phones must be turned off during class. Students who receive or make calls or text messages or engage in other disruptive behavior during class will be asked to leave and will not be allowed to turn in the assignment due on that day. Students should also bring pen/pencil and paper to each class. Please be courteous and do not talk or text during lecture. This can be distracting to other students and the instructor. Only approved electronic devices may be used in class. Approved electronic devices are laptop computers (when used to take notes or otherwise participate in classroom activities) and voice recording devices. Unapproved electronic devices include cell phones, video recorders, digital cameras and MP3 players.

### Covid-19 Policy

If you are experiencing COVID-19 symptoms ([Click here for guidance from the CDC on symptoms of coronavirus \(Links to an external site.\)](#)), please use the UF Health screening system and follow the instructions on whether you are able to attend class. [Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms \(Links to an external site.\)](#).

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. [Find more information in the university attendance policies \(Links to an external site.\)](#).

### Academic Honesty Policy

Students must conform to UF's academic honesty policy regarding plagiarism and other forms of cheating. This means that 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 university specifically prohibits cheating, plagiarism, misrepresentation, bribery, conspiracy, and fabrication. For more information about the definition of these terms and other aspects of the Honesty Guidelines, see <http://www.dso.ufl.edu/sccr/process/student---conduct---honor---code/>. All students found to have cheated, plagiarized, or otherwise violated the Honor Code in any assignment for this course will be prosecuted to the full extent of the university honor policy, including judicial action and the sanctions listed in paragraph XI of the Student Conduct Code. For serious violations, you will fail this course.

### Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

### Accommodations for Students with Disabilities

Please do not hesitate to ask for accommodation for a documented disability. Students requesting classroom accommodation must first register with the Dean of Students Office (<http://www.dso.ufl.edu/drp/>). The Dean of Students Office will provide documentation to the student, who must then provide this documentation to the Instructor when requesting accommodation. Please ask the instructor if you would like any assistance in this process. Please provide this information to your TA within the first two weeks of the semester.

### Instructor Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

### Drop/Add/Withdrawal

A student can drop/add during the drop add period with no penalty. After drop/add, a student who drops will receive a W until the date listed in the academic calendar. After that date, the student may be assigned an "E" (fail). Note: it is the responsibility of the STUDENT to withdraw from a course, not the instructor. Failure to participate/complete the class is NOT a drop.

### Additional Resources

Students facing difficulties completing the course or who are in need of counseling or urgent help may contact the Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; or the University Police Department: 392-1111 or 9-1-1 for emergencies.

Other Resources available on-campus for students include:

- a. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
- b. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling;
- c. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

## Course Schedule

### Date

1/9/24  
1/11/24  
1/16/24  
1/18/24  
1/23/24  
1/25/24  
1/30/24  
2/1/24  
2/6/24

### 1st Unit Theme: Composition of SW

- Salinity
- Constituents of Seawater
- Role of Ocean Circulation & biology
- Weathering & residence times
- Reverse weathering  
& hydrothermal circulation
- Simple Box Models

2/8/24

**Term Paper (First Draft Due)**

2/13/24

**EXAM 1**

2/15/24  
 2/20/24  
 2/22/24  
 2/27/24  
 2/29/24  
 3/5/24

**2nd Unit Theme: Isotope Geochemistry, Nutrients & Marine Biogeochemical Models**

- O, N, and C Stable Isotopes
- Radioactive Isotopes
- Primary Productivity/Export
- Oxygen
- Phosphorus
- Nitrogen
- Silicon

3/7/24  
 3/12/24– no class  
 3/14/24 – no class

**Term Paper Due (Second Draft)**

3/19/24  
 3/21/24

**EXAM 2**

3/26/24  
 3/28/24  
 4/2/24  
 4/4/24  
 4/9/24  
 4/11/24

**3rd Unit Theme: Carbon Cycle**

- Global Marine Carbon Cycle
- Ocean Acidification
- Water Column Flux and Organic Matter Sources
- Chemical Biomarkers
- Marine Sediments - Diagenesis

4/16/24  
 4/18/24  
 4/23/24

**Term Paper Due (Final)**

**EXAM 3**

**Poster Presentations**

\*This schedule does not include weekly homework assignments

Date	Key Assignments	Unit Theme
1/9/24		<b>1st Unit Theme: Composition of SW</b> • Salinity • Constituents of Seawater • Role of Ocean Circulation & biology • Weathering & residence times • Reverse weathering & hydrothermal circulation • Simple Box Models
1/11/24		
1/16/24		
1/18/24		
1/23/24		
1/25/24		
1/30/24		
2/1/24		
2/6/24		
2/8/24		
2/13/24	<b>Exam 1</b>	
2/15/24		<b>2nd Unit Theme: Isotope</b>

2/20/24		<b>Geochemistry, Nutrients &amp; Marine Biogeochemical Models</b> <ul style="list-style-type: none"> <li>• O, N, and C Stable Isotopes</li> <li>Radioactive Isotopes</li> <li>Primary Productivity/Export</li> <li>• Oxygen</li> <li>• Phosphorus</li> <li>• Nitrogen</li> <li>• Silicon</li> </ul>
2/22/24		
2/27/24		
2/29/24		
3/5/24		
3/7/24		
3/12/24—Spring Break	NO CLASS	
3/14/24—Spring Break	NO CLASS	
3/19/24	Term Paper 2 <sup>nd</sup> Assignment	
3/21/24	Exam 2	
3/26/24		<b>3rd Unit Theme: Carbon Cycle</b> <ul style="list-style-type: none"> <li>• Global Marine Carbon Cycle</li> <li>• Ocean Acidification</li> <li>• Water Column Flux and Organic Matter Sources</li> <li>• Chemical Biomarkers</li> <li>• Marine Sediments - Diagenesis</li> </ul>
3/28/24		
4/2/24		
4/4/24		
4/9/24		
4/11/24		
4/16/24	Term Paper due	
4/18/24	Exam 3	
4/23/24	Poster Presentations	