

SYLLABUS:
GLY 4930 and 6256 – Chemical Biomarkers in Aquatic Ecosystems
Fall 2024, Section 4455
Periods 4-5: T (10:40 AM - 12:35 PM) and Period 5: R (11:45 AM - 12:35 PM)

INSTRUCTOR

Lead Instructor: Dr Thomas S. Bianchi, Distinguished Professor, Department of Geological Sciences
Office: 205 Williamson Hall Ph# 352-392-6138 e-mail: tbianchi@ufl.edu Office meeting: by appointment

COURSE DESCRIPTION

Origins, fates, and distribution of organic compounds in contemporary marine pelagic 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 that are currently used in measuring chemical biomarkers.

Prerequisites: none

Course Objectives

This course will cover general concepts of chemical biomarkers in sediments and natural waters from around the world. The overall aim of the course is that students will have:

- 1) acquired an understanding of the basics of organic geochemical reactions in natural sediments and waters.
- 2) an ability to characterize and potentially utilize individual classes of chemical biomarkers
- 3) an understanding of biomarker structures, biosynthesis, reactivity, and relevant analytical techniques and instrumentation.

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 <http://lss.at.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.

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 Biomarkers in Aquatic Ecosystems, T.S. Bianchi and E.A. Canuel 2011, Princeton University Press (about \$65 to \$85, depending on Amazon prices).
Echoes of Life. What fossils reveal about Earth History, S.M. Gaines, G. Eglinton, and K. Rullkotter (2009) Oxford Univ. Press, New York. (ca. \$35 on Amazon).

ASSESSMENTS AND GRADING

Final Grade Calculation

- 10% Homework (problems sets, paper questions, and paper reviews)
- 30% In-class Activities (presentations and participation in class discussions)
- 30% Term Paper or NSF Proposal
- 30% Mid-term and Final Exams

Final Grade Scale

A = ≥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 1) writing a review (approximately 200 words), 2) answering questions about on assigned peer-reviewed papers and 3) assigned problem sets.

In-class activities will involve reading assignments of 1 to 2 published scientific papers each week along with readings from *Echoes of Life*. You will be responsible for reading these papers, some of which you will lead group discussions on throughout the semester - total number to be determined by class size. Each person will also be required to write a review (approximately 200 words) on each paper assigned to them. In-Class activities will involve reading assignments of 1 to 2 recently published scientific papers each week. You will be responsible for reading these papers, some of which you will lead group discussions on throughout the semester - total number to be determined by class size. The oral presentation (60% on your in-class grade) will be evaluated based on clarity and comprehensiveness, the remaining 40% will be based on your participation in all class discussions. Students will be expected to lead discussion on numerous (depending on size of class) peer-reviewed papers assigned by the instructor. 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 exams all of which will be taken in the classroom. Each will be in the format of approximately 6 to 7 essay questions. The same exam will be administered to students enrolled in the 4000 and 6000 sections. Consideration of the depth of each answer will be factored in when grading the exam with more emphasis on the broader scope of the field expected for graduate students. The final exam will NOT be cumulative.

Term Paper/NSF Proposal

Semester Paper (4000-level students)

Term Paper

First Assignment:

1) 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:

An annotated bibliography with 20 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 15 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.

Semester Proposal (6000-level students)

NSF Proposal

First Assignment:

1) 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.

2) On a separate page, you need to provide a list of five references and your hypotheses and objectives. All citations in the references will be properly cited in the format of the journal Limnology and Oceanography (L&O). The format of the term paper and proposal must strictly follow that of L&O. Please consult the L&O (<http://www.aslo.org/>). For the NSF graduate fellowship format please refer to https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=6201 for guidelines.

Second Assignment:

An annotated bibliography with 20 properly cited references in the L&O format, along with any revisions on your hypotheses, and an outline of the “experimental approach” you plan to use to test your hypotheses. 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 Assignment:

The final NSF proposal will be 15 pages of double-spaced text (excluding title page, tables, figures, references, acknowledgements, budget, and appendices). The NSF proposal will be graded based on the quality of the writing, comprehensiveness of the cited literature, and how effective the objectives and experimental approach adequately addressed the hypotheses stated in the proposal.

Grading Differences for 4000 and 6000 level students

In addition to the difference in term paper versus the NSF proposal for 4000 and 6000 level students in the class, respectively, there will be higher expectations for graduate in their in-class oral presentations, along with their overall contributions to class discussion.

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 (quizzes, exams, presentation) 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

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 will not be allowed to turn in the assignment due on that day. Students should also bring pen/pencil and paper to each class.

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 \(Links to an external site.\)](#).

Appropriate use of Artificial Intelligence

Students are free to use AI and natural language processing tools to enhance their understanding of the course content. Students should be aware of the potential biases and pitfalls of AI, and its potential to both aid and suppress learning. Students will not be penalized for using these tools. However, students are responsible for ensuring that they are providing assignment responses that are high-quality and correct. Simply put: if you write your term paper using ChatGPT you will not be marked down for using ChatGPT; you will be marked down because the ideas are generic and the writing is poor quality. AI programs are not a replacement for human creativity and critical thinking. It is the student's responsibility to review and ensure the appropriateness and accuracy of assignment submissions. Failure to cite and correctly edit work will result in a reduced grade and could be referred to Student Conduct and Conflict Resolution in consistent or severe cases. Students should consider the potential biases and implications of AI and make efforts to mitigate any discriminatory or harmful effects. When using AI tools, students should ensure that they comply with the respective licenses and terms of use set by the tool developers. Students should properly attribute any resources used from external sources, including AI libraries, frameworks, or pre-trained models.

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.

Class Recording

Our class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voice recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials by students or any other party is prohibited.

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	Topic	Required Text Reading	Instructor
8/22/22	Class Intro; Metabolic Synthesis	Chapter 1	Bianchi
8/27/24	Biomarker Applications in Ecol. and Paleontol.	Chapter 2	"
8/29/24	Bulk Carbon Meas.; Stable Isotopes	Chapter 3	"

9/3/24	Stable Isotopes & Radiocarbon	Chapter 3	“
9/5/24	Radiocarbon	Chapter 4	“
9/10/24	Analyt. Methods; Carbohydrates Sugars	Chapters 4,5	“
9/12/24	Simple Sugars	Chapter 5	
9/17/24	Proteins-Amino Acids	Chapters 5,6	“
9/19/24	Proteins-Amino Acids;	Chapters 6	“
9/24/24	Exam 1		
9/26/24	Nucleic Acids and Molecular Tools	Chapter 7	“
10/1/24	Molecular Tools	Chapter 7	
10/3/24	Lipids: Fatty Acids	Chapter 8	“
10/8/24	Fatty acids; Isoprenoid Lipids	Chapters 8,9	“
10/10/24	Isoprenoid Lipids	Chapters 9	“
10/15/24	Hydrocarbons	Chapter 10	“
10/17/24	Hydrocarbons; Alkenones, Polar & Ether Lipids	Chapters 10,11	“
10/22/24	Polar & Ether Lipids	Chapter 11	“
10/24/24	Exam 2		
10/29/24	Chlorophylls; Carotenoids and Phycobilins	Chapter 12	“
10/31/24	Carotenoids and Phycobilins; Lignins	Chapters 12,13	“
11/5/24	Lignins; Cutins & Suberins	Chapter 13	“
11/7/24	Cutins & Suberins; Anthropogenic Markers	Chapter 14	“
11/12/24	Anthropogenic Markers	“	“
11/14/24	Anthropogenic Markers	“	“
11/19/24			
11/21/24	Exam 3		
11/25/24-11/30/24		Thanksgiving Day Break - No Classes	
12/3/24	<i>Open Discussion</i>	Last day of Class	