

## **SYLLABUS: Organic Geochemistry and Geobiology (Spring 2021)**

**GLY 5255 (sec 8569 and 8570) and Special Topics GLY4930 (sec 1589 and 1590)**

**Instructor:** Dr. Andrew Zimmerman

**e-mail:** [azimmer@ufl.edu](mailto:azimmer@ufl.edu) (contact through Canvas messaging system is preferred for course related issues)

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**Meeting time:** Tues, Thurs. 12:50 pm - 2:45 pm (6<sup>th</sup> - 7<sup>th</sup>)

**Meeting place:** WM 218 (or on zoom)

**Course Objectives:** Introduce students to the theory, practice and methods of organic geochemistry, organic biogeochemistry, and geomicrobiology. Students will be made aware of a wide variety of subdisciplines. The primary focus of the class will be on the sources, distributions and fates of organic matter in geological environments (sediments, waters and soils). Further topics of discussion will include the applications of these distributions to paleoenvironmental reconstructions, the biogeochemistry of carbon and geomicrobial processes effecting organic matter distributions in these environments and the analytical techniques currently employed in these fields.

**Class Readings:** All will be posted on Canvas.

**Textbook:** Killops and Killops, 2005 (Introduction to Organic Geochemistry, 2<sup>nd</sup> Ed.; Blackwell Publishing). Can be ordered on-line for about \$62

**Office Hours:** meeting by arrangement but feel free to knock on my door any time

**Grading:** Course grade will be based on the following components of the course:

30% **midterm exam:** 1 exam to help you solidify your understanding of basic concepts discussed in lectures and readings. You will be allowed one side of an 8.5x11 page of notes to use during exam. No final exam.

25% **literature critiques**

5% **discussion/participation** (including attendance which is required)

40% **term project:**

5% **annotated bibliography** related to your topic

15% **in-class presentation** of topic review

20% **written presentation** of topic review

### **Literature Critiques**

I will assign about 5 - 8 research papers for us to discuss/critique during the semester. For each paper, I would like you to have prepared (about 1 pg., no longer than 2 pages, typed, 1.5 spaced, 1" margins, 12 point font to hand in):

1) half page summary of the justification, methods, and findings of the paper

2) two questions on an aspect that you didn't understand (OR 2 points/findings that you found

interesting and why).

3) Criticism: what could have been done better either in the method, analysis or presentation of the research?

ALSO: be ready to explain the meaning of any graph or figure in the paper

Example Questions to Answer:

- Did they present clear justification for the work?
- Is there a clear hypothesis? Is the hypothesis tested? Is the test appropriate?
- What are the strengths or limitations of the sample selection and/or methods employed?
- Did they discuss their findings fully, and comment on any problems or unusual observations?
- Was the discussion logical and well organized?
- Were additional, interesting questions raised by this work?
- What are the important and broader implications of the work?

Most of us find scientific papers hard to read! In fact, you should expect to read a paper several times before you begin to get a strong grasp of its contents. You often may need to refer to (and discuss) other papers, especially those cited in the paper. Your grade on this will be based upon your ability to synthesize and grasp the methods, meaning and importance of the results i.e. thoughtfulness (not completeness) of your evaluation.

### **Term Project: Organic Geochemistry Topic Review**

A goal of this course is to help you along in your chosen research field and explore possible cross-overs and applications of organic geochemistry into your research. You are, therefore, given the flexibility to choose a research topic that will best serve your interests. However, ALL TOPICS MUST BE APPROVED BY AZ.

First, for the **Annotated Project Bibliography and Summary**, compile a minimum of 10 peer-reviewed, recent (post-2000) most-important publications on the topic of your project and provide at least two sentences describing the subject and findings of each paper.

In addition, you should also include an abstract for the whole annotated bibliography. The abstract can be short (1-2 paragraphs) and it should identify the major research questions/problems addressed by the 10 publications listed in your bibliography. **I'd like everyone to begin using 'Endnotes' (or other bibliography software).** Use the reference style of *Geochimica et Cosmochimica Acta*.

The **final term presentation and paper**: Think of this as a class lecture on an organic geochemistry sub-topic. Outline of what is currently known about the topic and what major questions remain.

First, you will present your topic/proposed project to the class, at a level appropriate to the students in the class, in a 30 minute talk. Second, you will write a short (10-15 page, 1.5 line-spaced). Ideally, you will build on your annotated bibliography.

## TENTATIVE (Spring 2021) Organic Geochemistry and Geobiology Schedule

Topic	Date	LECTURE TOPIC	READING: Review (R)/Discussion (D)
<b><i>I. Introductory/Background</i></b>			
1	Jan 12	Intro. to Organic Geochemistry/BGC	D: Kvenvolden06 & Nealson01
2	Jan 14	Org. Chem. for Geochemists	R: Carey Ch 1,2,3
	Jan 19	Org. Chem. for Geochemists	
3	Jan 21	Organic Compound Classes	R: Killops Ch 2
	Jan 26	Organic Compound Classes	
<b><i>II. The Big Picture - Biogeochemistry</i></b>			
4	Jan 28	Origin of Life	R: Killops Ch 1
	Feb 2	Origin of Life	D: Bada04 & Chadwick05
5	Feb 4	Microbes Intro.	R: Kanhauser Ch.1
	Feb 9	Microbes/Metabolism	
	Feb 11	Microbes/Metabolism	
	Feb 16	Microbes/Biochemistry	
	Feb 18	Microbes/Biochemistry	D: Lowenstein11 & Wilfe10
6	Feb 23	Global C Cycle Intro./ Marine	R: Killops Ch 6
	Feb 25	Global C Cycle - Terrestrial	R: Killops Ch. 4: p.117-121
	Mar 2	Global C Cycle – Macromolec.	D: TBA
7	Mar 4	OM Degradation 1	R: Killops Ch 3 <b>*Bibliography Due</b>
	Mar 9	OM Degradation 2	R: E&M Ch 4, Ch. 11,
	Mar 11	OM Diagenesis	D: Cowie92 & Hulthe98
	Mar 16	<b>Midterm Exam</b>	(1 pg. notes allowed)
<b><i>III. Tools of Organic Geochemistry</i></b>			
8	Mar 18	Molecular Biomarkers	R: Killops Ch 5 (p.166-207)
	Mar 23	Molecular Biomarkers 2	
	Mar 25	Stable Isotopes	R: Killops Ch 5 (p.234-245)
9	Mar 30	Petroleum and Black Carbon	R: Killops Ch. 4: p.132-165
	Apl 1	Petroleum and Black Carbon	
	Apl 1	Environmental Org. Geochem.	R: Killops Ch. 7: p.295-321
10	Apl 6	Organic Geochem. Methods	
	Apl 8	Organic Geochem. Methods	
	Apl 13	Student Presentations	
	Apl 15	Student Presentations	
	Apl 20	Student Presentations	<b>Final Term Paper Due April 26</b>

## **Additional Information**

### **Late Policy**

- Students are expected to complete all activities on the specified dates and will not be granted an alternate date unless they have an acceptable reason (e.g., medical emergency, military obligation) and pre-arranged consent of the instructor. These requests must be timely and accompanied by all necessary written documentation. This policy is accordance with UF's policies:

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

### **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. Such violations are also against University policies so disciplinary action may be taken.

### **Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [dso.ufl.edu/drc](http://dso.ufl.edu/drc) ) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### **Health and Wellness**

U Matter, We Care: If you or someone you know is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu), 352-392-1575, or visit [umatter.ufl.edu/](http://umatter.ufl.edu/) to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit [counseling.ufl.edu/](http://counseling.ufl.edu/) or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit [shcc.ufl.edu/](http://shcc.ufl.edu/).

University Police Department: Visit [police.ufl.edu/](http://police.ufl.edu/) or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; [ufhealth.org/emergency-room-trauma-center](http://ufhealth.org/emergency-room-trauma-center).

### **Course Evaluation**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at [gatorevals.aa.ufl.edu/students/](http://gatorevals.aa.ufl.edu/students/). 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/).