

Organic Geochemistry 2023
EARTH 314
CIV_ENV 314

Lectures: Tu-Th 9:30 -10:50 am Central

Prof. Neal Blair
n-blair@northwestern.edu
Phone: (847) 491-8970
Office: Tech A228
Office hours: arranged upon request

The primary objective of this course will be to investigate the sources and fates of organic matter in the natural environment. The implications of the cycling of organic matter for the earth system will be explored. How organic geochemistry can be applied to the study of modern and ancient environments will also be discussed.

Prerequisites: An earth or environmental science course and one quarter of chemistry, or consent of instructor

Course Operation: Lectures will be real time and recorded. Recording policies are provided at the end of this document.

Date Topic

1/5 Introduction and Overview
1/10 Analytical Methods
1/12 Analytical Methods
1/17 The Global Carbon Cycle: Budgets and Processes
1/19 The Global Carbon Cycle: (con't)
1/24 Amino acids
1/26 Carbohydrates
1/31 Lignin
2/2 Lipids
2/7 Lipids
2/9 Lipids
2/14 Misc. macromolecules
2/16 Humics
2/21 Kerogen
2/23 Fossil fuels
2/28 Fossil fuels
3/2 Undergraduate presentations
3/7 Undergraduate + graduate presentations
3/9 Graduate student presentations

Course Requirements

Progress in the course will be monitored by a series of problem sets/reports (4), a Notice of Intent (NOI) for a research proposal, and the research proposal. The grades will be weighted in the following manner:

Problem sets: 50%

Proposal Notice of Intent: 10%

Proposal: 30%

Oral presentation 10%

Late submittals of assignments will result in grade penalties.

Problem sets/reports

The problem sets/reports primarily will involve the interpretation of published scientific reports. Anticipated schedules are as follows:

<i>Assignment date</i>	<i>Due date</i>
1/12	1/19
1/19	2/2
2/2	2/9
2/9	2/16
Proposal NOI	2/20

Research Proposal (graduate students)

The research proposal is on a topic of your choice in organic geochemistry but cannot be on research with which you are involved. All topics should be cleared with me in advance.

The proposal should include:

1. Title page
2. Abstract
3. Introduction, Background
4. Proposed research
5. Methods
6. Significance of proposed research
7. References

Grades will be based on:

1. Originality of thought
2. Significance of proposed research (Will the results be broadly applicable, or do they only apply to a specific locality?)
3. Feasibility of the experimental design (Are the correct methods being employed? Is sample collection feasible? Are there environmental factors that would prevent the study?)

4. Clarity of writing (Are the objective/hypotheses, methods/approach, and data interpretation clearly explained?)
5. Literature-based justification of above.

Proposal length should not be in excess of 5 single spaced typed pages. The written proposal is due 3/2. The oral presentations will be given 3/7 and 3/9.

Research proposal (undergraduates)

The research proposal is on a topic of your choice in organic geochemistry but cannot be on research with which you are involved. All topics should be cleared with me in advance. The proposal should be prepared in the format of a summer Northwestern Undergraduate Research Grant (Details provided below, and also <https://undergradresearch.northwestern.edu/funding/surg/summer-urg-submission-checklist/>). The text of the proposal is a 2 page maximum document though an addendum may be added for figures if required, and a cover page with name and title can be included. Follow the URG instructions carefully.

Grades will be based on the following:

Oral presentation (organization, clarity, visual aids) - 10 pts

Written presentation - 90 pts

Appearance and adherence to the URG requirements (10)

Clarity (40) – Is the problem/hypothesis/objective clearly explained? Is the method/approach clear? How will the results be interpreted?

Content (40) – Literature support for the research question, the choice of methods, and interpretation of data.

Proposal is due 3/2. Presentations are due 3/2 and 3/7.

Note about literature citations: Information cited in all homework and the final assignment is to be from the refereed literature. Websites are to be avoided except for databases maintained by acceptable agencies. If in doubt about the suitability of a source, ask! Sources should be cited in acceptable formats. Formats can be found in all acceptable journals. *Failure to adhere to citation standards will result in loss of points.*

Final letter grade assignments for course

A = 93-100, A- = 90-92

B+ = 87-89, B = 83-86, B- = 80-82

C+ = 73-79, C = 67-72; C- = 60-66

D = 50-59

F < 50

URG requirements (modified from

<https://undergradresearch.northwestern.edu/funding/surg/summer-urg-submission-checklist/>):

PROPOSAL FORMATTING

- Two pages
- Single-spaced (NOT 1.15 spaced)
- 1-inch margins on all sides
- 12 point Times New Roman OR 11 point Arial font
- No space between paragraphs (see Line and Paragraph Spacing in Word)
- In order to save space, you may provide a cover page with your name and title of the proposal
- **Proposals that do not meet these formatting expectations may not be considered by the grader.**

PROPOSAL TOPICS

- You have introduced your project (not just its topic!) in the first paragraph.
- Your background and literature review covers what is known about your research topic and what you will contribute to the topic. It ends with your explicitly stated research question or research hypothesis.
- Your methodology describes how you are getting information or data.
- Your methodology describes how you will USE the information or data you gather to answer your question.
- You have a paragraph describing how you have (or will learn) the skills needed for your project.
- You end on a statement of how your research will help you with your academic or career goals.

Readings:

Text (no required purchase): Killips and Killips, An Introduction to Organic Geochemistry

Individual readings from the scientific literature (assigned as needed)

Collaborations and Academic Ethics

Discussion is encouraged between class participants however assignments turned in for grades should be the work of the individual. Sources of information for all work should be carefully cited.

Disability Accommodations

Any student with a documented disability needing accommodations is requested to speak directly to the Office of Services for Students with Disabilities (SSD) (847-467-

5530) and the instructor as early as possible in the quarter (preferably within the first two weeks of class). All discussions will remain confidential.

Lecture recordings

This class or portions of this class will be recorded by the instructor for educational purposes. These recordings will be shared only with students enrolled in the course and will be deleted at the end of the Winter Quarter. Links to the recordings will be posted on Canvas.

Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy and state law. Students requesting the use of assistive technology as an accommodation should contact [AccessibleNU](#). Unauthorized use of classroom recordings — including distributing or posting them — is also prohibited. Under the University's Copyright Policy, faculty own the copyright to instructional materials — including those resources created specifically for the purposes of instruction, such as syllabi, lectures and lecture notes, and presentations. Students cannot copy, reproduce, display or distribute these materials. Students who engage in unauthorized recording, unauthorized use of a recording or unauthorized distribution of instructional materials will be referred to the appropriate University office for follow-up.