

FCH496/796 Marine Biogeochemistry

Instructor: Mark A. Teece

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Course website: www.esf.edu/chemistry/teece/marinebiogeochemistry

MW 1.50 – 3.10 Jahn 122

General description

Biogeochemical processes in the ocean control the Earth's climate and the impact of human changes on the global environment. This course will focus on the application of biogeochemistry to a range of issues from global to local scales. This course will focus on the biogeochemistry of marine ecosystems including coral reefs, mangroves, near shore, open-ocean, and deep ocean environments. Topics covered will include sequestration of fossil fuel carbon dioxide in the oceans, the controlling factors of ocean productivity, analytical techniques in biogeochemistry, and the formation and fate of organic carbon in the marine environment. Through discussions and a presentation of a topic, we will learn several aspects of the scientific method. The course will enhance students understanding of different research approaches and methods and also the importance of clear presentation of information to a broader audience.

Useful Background

There are no pre-requisites for this course, however a knowledge of basic undergraduate level physical chemistry, organic chemistry, and biology is desirable. Basic knowledge of calculus will be assumed.

Format

We will use a lecture –discussion format, where instructor and students both present and discuss topics and papers on marine biogeochemistry.

Schedule

You are expected to attend all classes and hand in all assignments on time. We will meet on Mondays and Wednesdays at 1.50 – 3.10 in Jahn 122. This is a 3-credit course, and you will be expected to spend time outside the classroom on this course. The time spent outside the classroom will include interpretation of data, reading of scientific papers, preparation of a seminar and associated materials.

Assignments and Expectations

You are expected to read and understand papers that I will provide and check the course website for updates and/or assignments. All students are expected to be involved in discussions of weekly topics, and you will be graded on this participation. The assignments for the class will include:

- i) Mid-term exam (Feb. 16)
- ii) Outline of presentation including literature review (March 4)
- iii) Development and presentation of a 30 minute presentation on the biogeochemistry of a specific ecosystem (assigned in week 2). You will also provide the class with handouts to understand the topic and lead a discussion for the class period.

Graduate students will prepare a paper (10 pages) on a topic in marine biogeochemistry (in conjunction with the instructor).

You must contact me before class if you are unable to attend for a reason.

Grading (%)

The format of this class is dominated by discussion and you are expected to both attend and participate in each class discussion.

Participation in discussions	25%	DUE:
Exam	25%	Feb 16
Outline of presentation	5%	March 4
In class presentation and discussion	45%	April 6 onwards

This syllabus may change at my discretion, but I will give you adequate notice.

Preliminary Schedule

Week	Date	Topic	Assignments
1	Jan 12 Jan 14	Introduction to the ocean Language of biogeochemistry	
2	Jan 19 Jan 21	NO CLASS Carbon cycle	Martin Luther King Jr. Day
3	Jan 26 Jan 28	Primary productivity in the ocean	9am - 1 paragraph outlining ecosystem
4	Feb 2 Feb 4	Organic matter in the ocean	
5	Feb 9 Feb 11	Organic biogeochemistry Stable isotopes	
6	Feb 16 Feb 18	Fate of organic matter in the ocean	Mid-term Exam
7	Feb 23 Feb 25	Biogeochemistry of coral reefs	
8	March 2 March 4	Biogeochemistry of near shore environments	DUE: Outline of presentation
9	March 9 March 11	NO CLASS SPRING BREAK	
10	March 16 March 18	NO CLASS - TBA TBA	
11	March 23 March 25	Human influences on ecosystem cycling – CO ₂ sequestration	
12	March 30 April 1	Deep ocean environments	
13	April 6 April 8	Student presentations of biogeochemistry of ecosystems	Presentations
14	April 13 April 15	Student presentations of biogeochemistry of ecosystems	Presentations
15	April 20 April 22	Student presentations of biogeochemistry of ecosystems	Presentations
16	April 27	Last day of class	