

Marine Chemistry – Fall 2019
MIT/WHOI Joint Program - 12.742 (3-0-9 units)
Semester at WHOI - WH.431 (3 credits)

Instructors:

Elizabeth Kujawinski
Fye Laboratory 112
508-289-3493
ekujawinski@whoi.edu

Benjamin Van Mooy
Fye Laboratory 117
508-289-2322
bvanmooy@whoi.edu

Teaching Assistant:

Lecture times:

10:30 to 12:00, Tuesdays and Thursdays
WHOI Clark South 271
MIT 54-823

Recitation: This time is allotted for review of lectures, assistance with homework, and preparation for the exams. Time TBD.

Homework: Homework is worth 25 percent of your grade. There will be 6 problem sets, so each problem set will be worth about 4 percent of your grade. We prefer you try to do these problems by yourself.

Exam: There will be three 1.5-hour exams on October 10, November 7, and December 10 during regular lecture hours, which will each be worth 25 percent of your grade. All exams will be closed book but you are allowed to bring one handwritten sheet (both sides) of useful *formulas*; no other information is allowed on these sheets and they will be collected with the exams.

Lecture notes and course reading: Electronic copies of the TA's lecture notes and useful readings will be made available via the course web site (see below). Formal reading assignments for the course are based on the textbooks *Chemical Oceanography and the Marine Carbon Cycle* (Emerson and Hedges) and *Ocean Biogeochemical Dynamics* (Sarmiento and Gruber). You may also find the following books to be good references; many of these books are in the WHOI Student Center Book Collection; they are also on reserve at the MIT Lindgren Library:

- *An Introduction to the Chemistry of the Sea* (Pilson)
- *An Introduction to Marine Biogeochemistry* (Libes)
- *Ocean Dynamics and the Carbon Cycle* (Williams and Follows)
- *Ecological Geography of the Sea* (Longhurst)

12.742 Webpage: A class webpage is set up at MIT on the Stellar Course Management System:
<http://stellar.mit.edu/S/course/12/fa19/12.742/>

Calendar:

Lecture	Date	Inst.	Topic	Homework	Reading
1	9/5	BVM	Geochemical mass balance 1		
2	9/10	BVM	Geochemical mass balance 2		E&H 1,2; S&G 1
3	9/12	BVM	Seawater		E&H 3
4	9/17	EBK	Carbonate System 1		E&H 4; S&G 8.2
5	9/19	EBK	Carbonate system 2	PS 1 due	
6	9/24	BVM	Stable isotopes		E&H 5
7	9/26	BVM	Stable isotopes	PS 2 due	
8	10/1	BVM	Radioactive Isotopes		E&H 5
9	10/3	BVM	Gas Exchange		E&H 10; S&G 3
10	10/8	EBK	Ocean circulation	PS 3 due	E&H 1; S&G 2.2, 2.3, 2.4
	10/10		Exam (through lecture 9)		
	10/15		Holiday		
11	10/17	EBK	Primary production 1		E&H 6; S&G 4.1, 4.2, 4.4
12	10/22	EBK	Primary production 2		
13	10/24	EBK	Export and new production		S&G 5.1 5.2, 5.3, 5.4, 7.3, 9.3
14	10/29	EBK	Bio-organic cycles		
15	11/31	EBK	Remineralization 1	PS 4 due	
16	11/5	EBK	Remineralization 2		
	11/7		Exam (through lecture 16)		E&H 12; S&G 9.4, 7.4
17	11/12	BVM	Sediments 1		
18	11/14	BVM	Sediments 2		
19	11/19	EBK	Carbon cycle 1	PS 5 due	E&H 11, S&G 8, 10
20	11/21	EBK	Carbon cycle 2		
21	11/26	BVM	Nitrogen cycle		S&G 5.3
	11/28		Holiday		
22	12/3	BVM	Phosphorus cycle		
23	12/5	BVM	Oxygen/sulfur/iron cycles	PS 6 due	
	12/10		Exam (through lecture 23)		

Useful information:

As JP students, you are among a select group of highly qualified individuals with immense potential for scientific endeavors. Graduate school is an exciting and enlightening time and will challenge each of you to overcome hurdles and obstacles as they arise. However, you do not need to meet these challenges alone and we encourage you to reach out to your fellow students, your advisors and members of the broader MIT/WHOI community when you find yourselves in times of struggle. We hope to see each of you graduate from our program with a strong and balanced experience that enriches your career, your well-being and our entire community.

Resources for JP students:

Academic logistics: <http://mit.whoiedu/administration>

Program-specific information (handbooks): <http://mit.whoiedu/handbooks>

Health: <http://mit.whoiedu/health-resources>

Mental health: <http://mit.whoiedu/policies?tid=1423&cid=168129>

General guidelines on science rights and responsibilities:

We like the following guidelines for appropriate behavior and responsibilities of scientists at all career stages. The first link is a summary written by the American Geophysical Union and outlines principles of scientific conduct that are generally applicable in our program. The second link is more specific to the Joint Program, outlining the responsibilities of students and faculty.

<https://sciencepolicy.agu.org/files/2013/07/AGU-Responsibilities-and-Rights-of-Scientists-Position-Statement-Adopted-2017-1.pdf>

<http://mit.whoiedu/responsibilities-student-and-faculty>

Harassment policy statements:

The Woods Hole Oceanographic Institution is committed to maintaining a positive working and learning environment, and an environment free of illegal discrimination and harassment.

Institution scientists, administrators, managers and supervisors ashore and at sea are obligated to strongly support this effort; all shore-based and at-sea employees, postdocs and students of the Institution are expected to support this goal.

WHOI's policy: <http://www.whoiedu/HR/page.do?pid=21736&cid=842&c=39>

MIT's policy: <https://titleix.mit.edu/students/policies>