Oceanography GEOS/MAST/ENVI 103

Spring, 2014

Instructor: Mea S. Cook
Office: Bronfman 162
Phone: 413-597-4541
Email: Mea.S.Cook@williams.edu

Office hours are by appointment, I am in the office 8AM to 5PM on weekdays. If you would like to meet, email me **with your availability**, and I will tell you what time works for both of us.

Course description
The oceans cover about 72% of Earth's surface, yet we know the surface of Venus better than our own ocean floors. Why is that? This integrated introduction to the oceans covers formation and history of the ocean basins; the composition and origin of seawater; currents, tides, and waves; ocean-atmosphere interactions; oceans and climate; deep-marine environments; coastal processes; productivity in the oceans; and marine resources. Coastal oceanography will be investigated on an all-day field trip, hosted by the Williams-Mystic program in Connecticut.

Course format
Lecture MWF 11:00–11:50AM. Lab M or T 1:00–3:00PM every other week. Evaluation is based on labs (30%), presentation (5%) and three exams (65%).

Textbook
In addition to the textbook, there will be readings about current ocean science research distributed during the semester.

Moran, JM, 2011. Ocean Studies: Introduction to Oceanography. American Meteorological Society, Boston, MA. 3rd edition.

Presentation
These 5-minute presentations will be made at the beginning of class. You will present a portrait of an oceanographer and their research, or a portrait of an ocean invertebrate and their lifestyle.

Field trip
We will go to the coast of Connecticut and Rhode Island on an all-day field on Friday, 2 May, 7AM–8PM. Attendance is mandatory, and no makeup is possible. Clear this date with your other professors, and any other sports/extracurricular obligations now. If you cannot go on the field trip, take this class another year.

Honor code
The Williams College Honor Code applies to all written work in this course. I encourage you to discuss the labs with me and with each other, but ***I expect each student to independently complete each part of each lab in their own words and relying on their own understanding***. Since each class is different, if you have questions about how the Honor Code applies in this class, let me know.

Syllabus

Date	Lecture topic	Textbook reading	Lab topic
7-Feb	Introduction	TBA	
10-Feb	Coordinates and navigation: where am I?	TBA	Mapping the seafloor
12-Feb	The seafloor: what's down there?	TBA	
14-Feb	**No class, Winter Carnival**	TBA	
17-Feb	Seawater: where did it come from?	TBA	
19-Feb	Ocean basins: why are they so low?	Ch. 2	
21-Feb	Plate tectonics: how oceans evolve	Ch. 2	
24-Feb	Water: a portrait	Ch. 3	Plate tectonics
26-Feb	What's in seawater?	Ch. 3	
28-Feb	Seafloor sediments: whence comes it?	Ch. 4	
3-Mar	Seafloor sediments: what is it?	Ch. 4	
5-Mar	Two fluids: atmosphere and ocean	Ch. 5	
7-Mar	Hydrological cycle: mass exchange	Ch. 5	
10-Mar	**Exam 1 (on material through 3 March)**		Sediment transport
12-Mar	Wind-driven circ: momentum exchange	Ch. 6	
14-Mar	Deep-cean circ: density rules	Ch. 6	
17-Mar	Waves: surf's up!	Ch. 7	
19-Mar	Tides: the pull of the moon and sun	Ch. 7	
21-Mar	Where ocean and land meet	Ch. 8	
	Spring Break		
7-Apr	The dynamic coasts	Ch. 8	Ocean circulation
9-Apr	Life in the sea: where it starts?	Ch. 9	
11-Apr	Productivity: where when and why?	Ch. 9	
14-Apr	Who lives in the ocean?	Ch. 10	
16-Apr	Marine ecosystems	Ch. 10	
18-Apr	*Ocean impacts*: People eat fish	TBA	
21-Apr	**Exam 2 (on material through 14 April)**		Fisheries
23-Apr	*Ocean impacts*: Fish and the future	TBA	
25-Apr	Oceans and climate	Ch. 11	
28-Apr	Climate variability	Ch. 12	
30-Apr	*Ocean impacts*: Warming, acidification, deoxygenation	TBA	
2-May	**Field trip**		
5-May	*Ocean impacts*: The ocean in the future	TBA	Pollution
7-May	Marine mineral resources, the Arctic frontier	TBA	
9-May	*Ocean impacts*: Drilling and mining	TBA	
12-May	Ocean stewardship	TBA	
14-May	*Ocean impacts*: Trash and noise	TBA	
16-May	Sum up	TBA	
TBA	**Exam 3 (cumulative)**		