Marine Geology
GLY 5736/GLY4930
Fall 2015

Ellen Martin eemartin@ufl.edu
362 Williamson Hall
Office Hours: M,W 4:00-5:00, or by appointment

Class: MWF, 3rd (10:40-11:30), 210 Williamson Hall

Guest lecturers: Mike Perfit (mperfit@ufl.edu), John Jaeger (jmjaeger@ufl.edu), Nadrea Dutton (adutton@ufl.edu) and Liz Screaton (screaton@ufl.edu), have all kindly agreed to lecture on topics related to their areas of expertise.

Objectives: Marine Geology is a very broad topic that essentially encompasses all studies of the character and history of the part of the earth within the oceans. To highlight its relevance, that means it is concerned with the geology of approximately three-quarters of the surface of earth today, and an even larger fraction of the earth's surface at times in the past. The diversity of topics that fall within Marine Geology cover processes occurring in the atmosphere to the core, shallow to deep water, and within igneous and sedimentary domains. The plan for this course is to first build the ocean basins, which couples tectonic evolution with igneous petrology. Then we will add seawater and study the flow patterns that are critical to nutrient distributions, sediment patterns and climate. Next we will add the sediments and discuss methods for dating these materials, as well as alteration by fluids. We will end the course by looking at the history of oceanography that is preserved in the marine sedimentary record.

Because Marine Geology covers a diverse array of topics, I am not an expert on much of the material we will be discussing. For some topics other faculty members will cover their areas of expertise, for others we will need to work through the material together; many of you have expertise in areas that will be covered in the course and your input will be valuable and appreciated.

Required Texts:
The Ocean Basins: Their Structure and Evolution, 1998, (Second Edition), Open University Course Team, Butterworth-Heinemann, 184pp.
Marine Biogeochemical Cycles, 2005, (Second Edition) Open University Course Team, Butterworth-Heinemann, 130pp. (This is out of print apparently, but it is still available at Amazon)

The Open University books are essentially textbooks that provide details about the basic information we will cover in the course. I will supplement these texts with additional readings, but most of the additional reading will be for class discussions.

Course Plan: The course is going to be composed of a mixture of standard lectures, group learning, literature discussions, and student presentations. I think everyone learns

best when they are responsible for some of the learning and when they teach concepts to others; therefore, you will all be responsible for helping me teach some of the material.

Discussions: You will be graded on your preparation and participation in discussions of the literature. I'm going to provide you with some tools to help you learn to read and evaluate publications. Everyone will be expected to read the paper(s) carefully and be prepared to answer questions and discuss the material in the paper(s). I will assign a score of 0-3 to each person for each discussion. 0 = could not answer questions/did not participate; 3 = was knowledgeable about the material in the papers/engaged in the discussion, while 1 and 2 fall in between. I do not expect everyone to understand all of the complexities of all of the papers, but I do expect you to understand what the authors were trying to accomplish, what they did, what the figures illustrate, and have an opinion about whether they achieved their goal.

Exams: Exams are useful tools to force people to review and synthesize material presented in class. There will be two exams. Each will focus on the material presented in the preceding classes and consist of ~5 short essay questions. The first is scheduled for Oct. 12. The second will be during finals, although it will not cover material from the first half of the course. The class final is scheduled for 10:00 – 12:00 on Dec. 18th, but we can set up an alternative time and date if we can get a class consensus.

Problem Sets: There are 4 problem sets due over the semester. The first is simply an isostacy problem. The others are bit more detailed. One allows you to work with seafloor subsidence and basin geometry, another uses an online database to study deep ocean circulation patterns and processes, and the third works through carbonate systematics.

Dating Techniques: A critical aspect of studying Marine Geology is the ability to date sediments and rocks. You will each work with a partner to present the details of a dating method to the class. We will cover some combination of: biostratigraphy, chemostratigraphy, magnetostratigraphy, radiometric dating, 14C, and U-disequilibrium. Following the presentation there will be an exercise designed to allow you to apply some of these techniques to a sedimentary sequence.

Review Papers (undergraduate students): Because this is a survey course, we will tend to focus on the classic information and interpretations about each of the topics; however, there are new and exciting discoveries and theories that are beyond the level of detail that I will present in lectures or that we will cover in discussions. Each student will pick a current idea, controversy, or debate in Marine Geology- something that goes beyond the material presented in the course. You will then write an 8 page (1.5 spacing) review paper on the concept and present it to the class.

The plan is to have one student present during the beginning of each class over approximately the last month of the semester (Nov. and Dec.). You will each provide an abstract of your topic to the class two days in advance of your presentation. You will then give a 12 minute, AGU style presentation about the topic at the beginning of class, followed by a 10 minute discussion with the class. Every student in the course will be

responsible for understanding the basic information (in otherwords, the general concepts are fair game for the exam), therefore, it will be important to use the discussion time effectively to insure that you understand the material.

You will need to select a topic by **Sept. 9**. This will require talking to me about your idea and how that will fit into the material that will be presented, since you won't know what I am planning to cover. It may also be helpful to talk to the experts in the department, since they can help guide you to new break throughs or new controversial ideas. This is an excellent opportunity to explore a side topic related to your research in detail. You will need to turn in a short paragraph about the topic you have chosen (what will your paper be about?) and an annotated bibliography including 5 references on **Oct. 7**.

Topic due:	**Sept. 9**
Annotated bibliography:	**Oct. 7**
Review paper due:	**Nov. 4**
Presentations:	**Nov. 4- Dec. 7**
Critique due:	**Nov. 23**

Evaluations and reviews: As a scientist, it is important to learn to critically evaluate scientific ideas and presentations. Therefore, everyone will contribute to the evaluation process. Each of you will be responsible for filling out *constructive* evaluations for each presentation (including comments and feedback for the presenter). These are due the day of the presentation. In addition, you will be assigned to read and critique one review paper. You will evaluate it anonymously, but your comments will be passed on to the author.

Grading:

Problem sets	15%
Participation in discussions (0-3 rating)	10%
First exam (Oct. 12)	20%
Dating Presentation and exercise	5%
Review paper and class presentation	25% (15%/10%)
Evaluations	5%
Second Exam (Dec. 18, or negotiable)	20%

Grading scheme:

Percentage earned	**93%-100%**	**90%-92%**	**87%-89%**	**83%-86%**	**80%-82%**	**77%-79%**	**73%-76%**	**70%-72%**	
Letter Grade	A	A-	B+	B	B-	C+	C	C-	etc.
GPA Equiv	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	

Below 60% = F (0 GPA)

Assignments: Please turn in hard copies of all assignments. I DO NOT what to receive them as electronic files that I need to print out. If something is due on a particular day you need to plan enough time to print a hard copy. The review papers will be turned in as both a hard copy and online so they can be run through 'Turnitin."

Website: There is an e-learning (Canvas) site for this course that includes the syllabus, reading assignments, messages, and copies of my Powerpoint presentations. My intention is to have lecture material posted by 6:00 the night before class.

Accommodations:
Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation.

Academic Integrity: Students are expected to act in accordance with the University of Florida policy on academic integrity (see Student Conduct Code, the Graduate Student Handbook or this web site for more details: www.dso.ufl.edu/judicial/procedures/academicguide.php). Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior that will result in a failing grade.
We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

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Date	General Topic	Readings
Aug. 24	Introduction and Overview	OB Ch 1 (Intro)
Aug. 26	Ocean Basins and Provinces	OB Ch 2 minus 2.3
Aug. 28	Ocean Basins and Provinces	
Aug. 31	Crust/Lithosphere	OB Ch. 4 Isostacy Prob.
Sept 2	**Discussion- *Ocean Crust***	
Sept. 4	Mid Ocean Ridges (Perfit)	OB sec 2.3, Perfit, 2001
Sept. 7	LABOR DAY	
Sept. 9	**Discussion- *LIPs and Hotspots***	(review paper topics)
Sept.11	Mid Ocean Ridges (Perfit)	Oceanus articles
Sept. 14	Convergent Margins	Keary and Vine (online)
Sept. 16	Convergent Margins	
Sept. 18	Passive Margins	OB Ch. 3
Sept. 21	Surface Ocean Circulation	Any intro text/ Seafloor Problem Set
Sept. 23	Ocean Circulation	MBC section 2.4
Sept. 25	Deep Ocean Circulation	
Sept. 28	Ocean Geochemical Cycles	MBC Ch 2.1-2.2; OB Ch. 7
Sept. 30	Ocean Geochemical Cycles	MBC Ch. 2.2-2.6 Ocean Circ Exercise
Oct. 2	**Discussion- *Ocean Conveyor***	
Oct. 5	Marine Sediments	MBC Ch 1; OB sec. 6.1
Oct. 7	Marine Sediments	Annotated Bibliography due
Oct. 9	Catch up/ Dating- organization	
Oct. 12	**EXAM 1**	
Oct. 14	Carbonate Systematics	MBC Ch. 3.1, 4.3.3
Oct. 16	Carbonate Systematics	
Oct. 19	**Discussion- *Carbonate Systematics***	
Oct. 21	Continental Margin Sedimentation (Jaeger)	MBC Ch. 3.
Oct. 23	Continental Margin Sedimentation (Jaeger)	CCD Problems Due

Oct. 26	**Discussion- *Continental Margin Sedimentation***	
Oct. 28	Sea level (Dutton)	OB 6.2
Oct. 30	Dating- presentations	
Nov. 2	Dating- presentations	
Nov. 4	1. Early Diagenesis	MBC Ch. 5 review paper due
Nov. 6	HOMECOMING (Nov. 6)	
Nov.9	2.Early Diagenesis	
Nov. 11	VETERAN'S DAY (Nov. 11)	
Nov. 13	3. Interstitial Fluids	MBC Ch. 5
Nov. 16	4. Interstitial Fluids	
Nov. 18	Fluid Flow (Screaton)	EOS Article
Nov. 20	***Discussion- Deep Biosphere***	
Nov. 23	5. Paleoceanography- Goals and Methods	critique due
Nov. 25	Day before Tgiving (Nov 25)	
Nov. 27	**THANKSGIVING – (Nov. 27)**	
Nov. 30	6. Paleoceanography- Goals and Methods	MBC Ch. 4
Dec. 2	7. Paleoceanography- the Past 100 m.y.	OB Ch. 6
Dec. 4	8. Paleoceanography- Pleistocene	
Dec. 7	9. Paleoceanography	
Dec. 9	**Discussion- *Paleoceanography***	

FINAL- Dec. 18th, 10:00-12:00 (or at a time and day agreed upon by the class)

Red = no class
Blue= Guest Lecturer
OB = The Ocean Basins: Their Structure and Evolution
MBC = Marine Biogeochemical Cycles