Marine Geology
GLY 5736/GLY4930
Fall 2015

Ellen Martin eemartin@ufl.edu
362 Williamson Hall
Office Hours: TBA, 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), Liz Screaton (screaton@ufl.edu), and Tom Williams (thomas.williams@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, meaning this course covers 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.

Learning Outcomes: With completion of this course you should have a better understanding of:

1) the formation and evolution of the ocean basins and margins
2) investigations of parts of the earth system that are difficult to access
3) the interdisciplinary nature of marine sciences
4) ocean chemistry and processes of nutrient cycling
5) processes leading to the distribution of different types of sediment on the sea floor
6) development of age models for marine sediment
7) the role the oceans play in forcing and recording global climate change

In addition, you should improve your ability to:

1) read, understand, and discuss scientific literature
2) communicate scientific concepts and work in a team
3) articulate the importance of oceans in the climate system and as a resource
4) assess current impacts on the ocean associated with environmental and climate change

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 with Team Based Learning, 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: We will be reading a number of papers in the peer-reviewed literature. Because this is a survey course, many of these papers present a broad overview of a key topic rather than exciting, new results. I will be using a team Based Learning (TBL) approach for the discussion. This means that I will break you up into teams of 4-5 students. I will assign teams with the goal of making them diverse, balanced, and permanent.

Each discussion class will start with an individual Readiness Assurance Test (iRAT) that is composed of 10 multiple choice questions related to the paper(s). These questions are generally designed to be challenging and lead to discussion. Immediately following the iRAT, students will retake the test working with their team. This portion is referred to as the Team Readiness Assurance Test (tRAT). Both the iRAT and tRAT will be closed notes, books, internet etc. The iRATs will be graded while the teams take the tRAT, and the results of the iRAT will focus the discussion and potential exercises that occur during the remainder of the class period. Following the tRAT, I will lead a general discussion of the paper(s) which is likely to include presentations and analysis of selected figures/diagrams from the papers and, in some cases, I will add exercises or questions for groups to work on to insure that everyone understands the key points of the paper(s).

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. 11. The second is scheduled for Dec. 2.

Problem Sets: There are 4 problem sets due over the semester. The first is 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 presentations there will be an exercise designed to allow you to apply some of these techniques to a sedimentary sequence.

Presentations (optional for 4930 students): Throughout the course I will try to touch on some of the major controversies or new findings, but we will largely be focusing on the basic, classic information and interpretations. To provide opportunities to learn about some of the newer results and controversies, each student in GLY5736 will give a 10 minute, AGU style presentation about a topic of their choice based on a recent publication. The subject may include a topic we are not covering in the course or a new twist on some of the classic ideas. The presentation should focus on one new, interesting paper, but will also need to include some of the background necessary to understand the controversy and results.

Everyone will need to decide if they are giving a presentation (only optional for GLY4930 students) and select a paper to discuss by Oct 30th. By that date, each student who is planning to present must turn in a typed, hard copy assignment that includes 1) the citation for the paper they will discuss, and 2) a paragraph explaining the topic.

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. I will compile the feedback for the presenter.

Grading:

Problem sets	20%
iRATS ($\geq$ 5%) and tRATS ($\leq$ 15%)	20%
First exam (Oct. 12)	20%
Dating Presentation and exercise	7%
Second Exam (Dec. 2)	20%
Topic Presentation (required for 5763, optional for 4930)	10%
Evaluations of Presentations	3%

4930 students can chose to have each exam count 25% rather than giving a presentation.

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 want 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.

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.

Accommodation for Students with Disabilities
Students who will require a classroom accommodation for a disability must contact the Dean of Students Office of Disability Resources, in Peabody 202 (phone: 352-392-1261). Please see the University of Florida Disability Resources website for more information at: http://www.dso.ufl.edu/drp/services/.
It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed. Once notification is complete, the Dean of Students Office of Disability Resources will work with the instructor to accommodate the student.

UF Counseling Services
Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.

Many students experience test anxiety and other stress related problems. "A Self Help Guide for Students" is available through the Counseling Center (301 Peabody Hall, 392-1575) and at their web site: http://www.counsel.ufl.edu/.

Academic Honesty Policy
All students registered at the University of Florida have agreed to comply with the following statement: *"I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."*
In addition, on all work submitted for credit the following pledge is either required or implied: *"On my honor I have neither given nor received unauthorized aid in doing this assignment."*
If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at:
http://www.dso.ufl.edu/judicial/procedures/academicguide.html.