

# **STRUCTURAL GEOLOGY – GEOL341-0101**

## **Syllabus for Fall 2012**

**Class goals:** Have fun exploring the tectonics and structure of the Earth. Practice skills you will need after graduation. Develop your thinking in three dimensions. Improve your scientific writing.

**Overview:** Geologists divide tectonically active regions into three broad tectonic regimes: divergent, convergent, and transform settings. This class will be divided into these same three parts. Within the context of these tectonic regimes we will explore important aspects of structure and tectonics including: the mechanical behavior of the lithosphere, brittle and ductile structures, the relationships among stress, rheology, and strain, and the relationships among description, kinematics, and dynamics. We also will learn some of the techniques that geologists use to find out information about deformation of the lithosphere.

**Instructor:** Dr. Aaron J. Martin  
Chemistry Building (CHM), Room 1217A  
martinaj@geol.umd.edu (By far the best way to reach me)  
301-405-5352

**Teaching Assistant:** Lisa S. Walsh  
Chemistry Building (CHM), Room 1225B  
lsschlei@umd.edu

**Office hours:**

*Martin:* Tuesday and Thursday, 11:00am-12:00pm, CHM 1217A  
Other meetings by appointment, or you may try to find me in my office without an appointment.

*Walsh:* Monday, 9:00-10:00am, CHM 1225B.

**Prerequisites:** Required prerequisite courses are GEOL100 or 120, GEOL110, and GEOL 102. Please see me immediately if you have not taken these courses.

**Class meeting times and places:**

Tuesday and Thursday, 9:30am-10:45am in Plant Sciences 1172  
Monday, 10am-1pm in Geology 2107

Note that some Tuesday and Thursday classes will be used for hands-on “labs,” and some Monday classes will be used for discussions and “lectures.”

**General course outline (dates subject to change):**

8/30-10/15: Divergent settings, structures often found there, and fundamentals.  
10/16-11/12: Convergent settings, structures often found there, and fundamentals.  
11/13-12/14: Transform settings, structures often found there, and fundamentals.

**Partial list of important dates:**

- 9/15: SATURDAY field trip to Great Falls, VA.
- 9/27: Annotated bibliography with three references for paper 1 due.
- 10/6-10/7: SATURDAY and SUNDAY field trip to western Maryland.
- 10/9: Paper 1, draft 1 due.
- 10/15: Exam 1.
- 10/30: Paper 1, draft 2 due.
- 11/8: Annotated bibliography with three references for paper 2 due.
- 11/12: Exam 2.
- 11/20: Paper 2, draft 1 due.
- 12/11: Paper 2, draft 2 due.
- 12/14: Exam 3 on FRIDAY during final exams, 8am-10am.

**Assessment:**

Exam 1:	10%	October 15
Exam 2:	10%	November 12
Exam 3:	10%	December 14
Research paper 1:	15%	Draft 1 October 9
Research paper 2:	15%	Draft 1 November 20
All labs:	30%	(Passing grade on labs <b>required</b> to pass course)
<u>Class participation:</u>	<u>10%</u>	
Total:	100%	

*Exams (30%):* There will be three exams, on October 15, November 12, and December 14. Exams will be cumulative in the sense that they build on material learned throughout the semester, however the exams will focus on material covered since the previous exam. Exams will include material covered in the labs. I will provide more information about exam format a few weeks prior to the first exam.

*Research papers (30%):* We will focus much attention on scientific writing in this class, and one of the most important means by which you will demonstrate mastery of structural geology and tectonics is through two research papers. Two drafts of each paper will be graded, and you will review your peers' papers. Papers must be turned in electronically; I will not accept printed copies. I will provide much more information about the research papers when we begin work on them.

*Labs (30%):* Laboratory assignments will provide hands-on experience with tectonics and structural geology. There will be 15 labs this semester. Some of the labs will be field trips to locations in the Appalachians (see below). A short pre-laboratory assignment will be due at the beginning of most labs, and most labs will be due at the end of the laboratory period. You are responsible for downloading the pre-laboratory assignment from ELMS, printing and completing it, and bringing it to lab. Laboratory sessions missed without prior approval cannot be made up without a valid, documented excuse (see below). **A passing grade in the laboratory section of the class is required to pass this course.**

*Field trips (part of labs):* We will take two **MANDATORY** field trips this semester. The first is a half-day trip to Great Falls, Virginia on Saturday, September 15. The second is an all-weekend trip to western Maryland and West Virginia on October 6 and 7. We will camp out on the night of October 6. A report on the first trip will count as one lab, and a report on the second field trip will count as two labs. Field trips will run regardless of the weather.

*Class participation (10%):* Discussion between classmates, with the TA, and with me is an important part of learning tectonics and structural geology. At several unannounced times during the semester, you will be required to turn in the written results of your class participation for that day. There will be no make-up for missed assignments. There also will be several homework assignments that count toward your class participation grade.

**Extra credit:** Find one or two peer-reviewed articles about some aspect of the structure or tectonics (broadly defined) of anywhere on Earth or other rocky planets or moons. You should check with me to see whether the candidate article(s) are appropriate prior to continuing. Read the article, and write a summary that is 5 full pages minimum (double-spaced, 12 point Times New Roman font, 1" bottom and top margins, 1.25" side margins). You will receive points equal to up to 5% of your final grade, less for a poor quality paper. You may write one extra credit paper during the semester. Papers are due by e-mail by the beginning of the final exam. I will not accept printed copies.

How to find a topic for your extra credit paper: Begin by thinking about one or two aspects of structural geology or tectonics that most interest you. You should use one of these aspects as the topic of your paper. Then search GeoRef for one or two peer-reviewed articles about this topic.

**Collaborative work:** I encourage you to work together in class, on homework, labs, field trips, and on parts of research papers. However, **all graded work must represent your own efforts.**

**Grades:** With diligent work it is possible for each student to attain an A in this class. Grading will be based on points gained from the assignments and examinations listed above, as follows:

100-97% = A+	96-94% = A	93-90% = A-
89-87% = B+	86-84% = B	83-80% = B-
79-77% = C+	76-74% = C	73-70% = C-
69-67% = D+	66-64% = D	63-60% = D-
<60% = F		

Grades will not be curved but will be rounded to the nearest integer following standard rounding rules. Thus an 89.4% will receive a grade of B+ and an 89.5% an A-, for example.

**Attendance:** Attendance will not be taken. However, class participation and discussion are important parts of learning, and they count as 10% of your grade. Regular attendance accompanied by active participation is the best way to grasp the concepts we discuss.

The following rules apply if you must miss a class for a medical reason:

1. For each medically necessary absence from lecture, a reasonable effort should be made to notify me in advance. It is your responsibility to make up the work on your time, not mine or the TA's.
2. If you are absent from lecture on the day of an exam, or if you are absent from lab, you are required to notify me in advance, and at the next class meeting you must provide documentation of the illness signed by a health care professional. Again, it is your responsibility to make up the work on your time, not mine or the TA's. All work must be completed within one week of your return to classes.
3. If you are ill the day before the due date for any of the assignments for the research papers you must notify me that day, not after the assignment was due. You also must provide documentation of the illness signed by a health care professional. Again, all work must be completed within one week of your return to classes.

**Late work and missed labs and exams:** I do not accept late work; **work turned in late will be given a 0** unless previous arrangements were made or unless accompanied by a documented, valid excuse. Likewise, **missed labs and exams may not be retaken** unless previous arrangements were made or unless you provide a documented, valid excuse. Valid excuses include, but are not limited to: documented personal illness, documented family medical emergency, and religious observations (see below).

**Additional expectations:** In addition to the academic expectations listed in this document, you are expected to treat your classmates, the TA, and me with respect. You are also expected to behave in a safe and legal manner at all times – particularly important during field trips. Failure to meet these expectations may result in your dismissal from class or the field trips.

**Use of laptops and mobile devices during class:** You are welcome to use a laptop to take notes or for other class purposes. You may not use a laptop or another mobile device during class for any other purpose. Not only is using such a device during class disrespectful to the instructor (and yourself), it is disrespectful to your classmates because it distracts them.

**Keys for success:**

- 1) **Attend** all classes, labs, and field trips, and **participate actively** – MOST IMPORTANT.
- 2) **Take good notes** in class and on field trips. If you don't understand something, ask immediately.
- 3) **Keep up** with reading, homework, and other assignments. If you feel that you don't understand the material, ask for help right away. Partial list of sources of help: classmates, the book, the supplementary structure software, the TA, me, other students and faculty in the department.

**Required textbook:** Structural Geology of Rocks and Regions, 3<sup>rd</sup> edition, 2012, Davis, Reynolds, and Kluth, John Wiley & Sons, ISBN 9780471152316.

**Brunton compasses:** On the second day of class the department will loan you a Brunton compass. You must bring this compass with you to class when so instructed, and on all field trips. You must return the compass in good working condition after the last field trip. If you fail to return the compass in good working condition, **the department will charge your university account for replacement or repair. We will also report the matter as a theft to the appropriate authorities on campus.** A new Brunton compass costs approximately \$300.

**Additional materials:** Please bring the following to each lab. All are available at the bookstore. You may share these materials with a classmate.

- 1) The textbook
- 2) Colored pencils (at least 5 different colors)
- 3) Metric ruler (~30 centimeters)
- 4) Protractor
- 5) Compass

**ELMS:** As part of my drive toward paperless classes, most class material only will be available on ELMS, not as in-class handouts. You are responsible for retrieving the necessary course material from ELMS. The html address is [www.elms.umd.edu](http://www.elms.umd.edu).

**E-mail and ELMS:** I mostly will communicate with you during class. However, if necessary to communicate with you between classes or to distribute electronic copies of documents, I will post to ELMS or send e-mail to your university account. Other students also will send you email. Please make sure both your ELMS account and your university email account function and that you check them regularly.

**Supplementary software:** Copies of instructional software called “An introduction to structural methods” have been installed on the computers in the undergraduate computer laboratory in the Geology Building. We will review use of the software in the next two weeks. I encourage, but do not require, you to use the software to supplement your understanding of concepts in this class. You will be given access to the computer lab.

**CORE:** This course is not part of the CORE Physical Science course requirement.

**Academic integrity:** The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.studenthonorcouncil.umd.edu>.

**Learning assistance service:** If you are experiencing difficulties in keeping up with the academic demands of this course, contact the Learning Assistance Service, 2202 Shoemaker Building, 301-314-7693. Their educational counselors can help with time management, reading, math learning skills, note-taking, and exam preparation skills. All their services are free to UMD students.

**Special academic accommodations:** If you have a documented disability you should contact Disability Support Services in room 0106 of the Shoemaker Building. Students with documented disabilities should apply to DSS for an accommodation request form that can be provided to me as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site at <http://www.counseling.umd.edu/DSS/index.html>.

**Religious observances:** University System of Maryland policy provides that students not be penalized because of observances of their religious beliefs and that students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. It is **your responsibility to inform me** of any intended absences for religious observances **in advance**. Notice should be provided as soon as possible, but no later than September 12, 2012. Prior notification is especially important in connection with final exams because failure to reschedule a final exam before the conclusion of the final examination period may result in loss of credits for the semester.

**Course evaluation:** CourseEvalUM will be open for students to complete their evaluations for Fall 2012 courses between Monday, November 26 and Wednesday, December 12. You can go directly to the website ([www.courseevalum.umd.edu](http://www.courseevalum.umd.edu)) to complete your evaluations. You will be alerted about these dates and provided more information closer to that time; students will be alerted via their official University e-mail account.

Students who complete evaluations for all of their courses in the previous semester (excluding summer), can access the posted results via Testudo's CourseEvalUM Reporting link for any course on campus that has at least a 70% response rate. You can find more information, including periodic updates, at the IRPA course evaluation website: [https://www.irpa.umd.edu/Assessment/crs\\_eval.shtml](https://www.irpa.umd.edu/Assessment/crs_eval.shtml). The expectation is that all students will complete these assessments. This is your chance to improve teaching and learning at Maryland – please use this opportunity.

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