Spring 2017 Syllabus
GEOL 309/L: Earth Tectonics and Structure

Course Structure
Location: LO 1205
Lecture: Monday, Wednesday 11:00am – 12:15pm
Lab: Wednesday 2:00pm – 4:45pm

GEOL 309/309L is a three-unit lecture and one-unit lab course; three hours of lecture and three hours of lab work a week. The field trip associated with the course (Friday-Sunday, May 4-6) is an essential learning experience.

General Management
Contact: Prof. Eileen Evans
Office: LO 1226
Phone: 818-677-5026
Email: eileen.evans@csun.edu

Office hours: Tuesdays 10 a.m. – 11:00 a.m.
or by appointment

Course Objectives
This course is an introductory-level class for students minoring in Geology, or majoring in the B.S. in Geology, or the B.S. in Geophysics. This course will introduce students to the forces that drive plate tectonics and the surface expressions of deformation structures associated with modern and ancient tectonic plate boundaries. Topics featured in the course include: Earth’s compositional and mechanical layers; the development of Plate Tectonics Theory; features of divergent, convergent and transform plate boundaries; patterns of folding and faulting, and earthquakes and associated hazards at plate boundaries and in intra-plate settings; geophysical techniques including seismology and geodesy, isostasy, and magnetism; tectonic stresses and the strength of the lithosphere; and orogenesis through geologic time.

Students will learn to:
1) Distinguish geophysical and geologic techniques that allow geoscientists to interpret the structure of Earth’s interior layers and the patterns of mantle convection.
2) Identify the distinctive geologic structures associated with the three types of plate boundaries.
3) Relate the driving forces of plate tectonics to the surface development of these distinctive features of plate boundaries.
4) Identify evidence for plate boundary interaction in the geologic past and interpret the evolution of plate movement through geologic time.
5) Examine the tectonic history of Western North America as a case study of plate boundary evolution through time.

Attendance: The amount of what you will learn, both in course material and in critical reasoning skills, depends upon your regular attendance, which includes attending for the entire class period, and keeping up with all assignments. The benefit and success of the group exercises depend on team efforts and require you to be in class. If you are absent and miss quizzes and exercises, there are no makeups. There is no makeup for the field trip. You must make arrangements to have this weekend free.

Grades: There are distinctions between lecture and laboratory work related to this course structure, so you will receive different grades for each. A plus/minus grading scale will be used.
Course Materials
Textbook: Earth Portrait of a Planet, by Steven Marshak, 5th edition, 981 pages. Additional articles and text chapters from other sources (see bibliography) will supplement this text:

Part I: Chapter 2, Journey to the Center of the Earth
Part I: Chapter 3, Drifting Continents and Spreading Seas
Part I: Chapter 4, The Way the Earth Works: Plate Tectonics
Part III: Chapter 10, A Violent Pulse: Earthquakes with Interlude D The Earth’s Interior (geophysics)
Part III: Chapter 11, Crags, Cracks and Crumples: Crustal Deformation and Mountain Building

NOTE: A significant amount of supplemental reading will be assigned weekly (see Bibliography).

Bibliography: (the following will be placed on reserve in the library)
The Solid Earth, C.M.R. Fowler, Published by Cambridge.
Regional Geology and Tectonics, 1st edition. Edited by D.G. Roberts and A.W. Bally. Published by Elsevier.
Folds and Faults—a mobile app and e-book by Dennis Tasa, Michael Collier, and Ed Tarbuck. Published by Tasa Graphic Arts, Inc. Available for iPad on the Apple App Store, Android devices via Google play, and on Amazon for the Kindle Fire.

Evaluation And Grades
The proportion that each task will count toward your final grades in GEOL 309 is:
Three questions inspired by reading assignments (submitted by 11:59pm Tuesday night of week assigned unless otherwise instructed) in-class quizzes (announced or pop quizzes), and homework assignments. 10%

Signature assignment: 30%
Tectonics research report: written 10-page report (10%)
Tectonics research report: oral (last week of class) (10%)
Tectonics research report topic, list of papers (2%)
Tectonics research report abstract and detailed outline (3%)
Tectonics research report rough draft (5%)

Lecture Mid-terms (2) and Final Exam 50%
Professionalism in the classroom, online, and in the field 10%

The proportion that each task will count toward your final grades in GEOL 309/L is:
Quizzes on laboratory assignments 20%
Weekly laboratory exercises 60%
Field-trip exercise (‘Resident Expert’ poster) 20%
Policies
It is the student’s responsibility to know and follow the rules and policies that I have outlined in this syllabus. You agree to abide by these policies by accepting this syllabus and any subsequent updated syllabi. At times through the semester, it may become necessary for me to update the syllabus to match the topics and pace that we cover the material. Therefore, future syllabi may replace this version that you have received on the first day of class. You will find the updated syllabi on the Canvas page for this course.

No late work will be accepted or graded for feedback. An assignment is considered ‘late’ whether it is turned in one minute or one hour after a deadline. Pay close attention to due date instructions given orally in class, embedded within lectures, or noted in assignments.

I will often send important course information via email or Canvas. Check your account or Canvas for important ‘GEOL 309’ messages. University policy states that you are responsible for course information sent via email. Your responsibility includes understanding how to forward mail to an off-campus account (if you choose to do so), understanding how to download and save files sent via email and Canvas forum, and following instructions for assignments and deadlines sent via email and/or Canvas.

You can email me about course material or questions that you may have, but I will not be able to respond to your email immediately. I will respond to your email inquiry within 1 business day and during typical business hours, so keep this in mind when emailing me prior to a due date, an exam date, or on the weekend. I expect that you will write in a professional manner, which includes using standard salutations, professional titles, and formal language when corresponding via email.

You are required to take the exams as they are scheduled. Missing an exam will result in a “0” grade. Be sure to check the exam schedule immediately so that you avoid missing any exams. In the extremely rare event of an emergency, you must contact me within 24 hours of the exam date, and administration of make-up exams will be at my discretion.

Academic Honesty
I expect that all work that you turn in will be your own. Official California State University policy states: “The maintenance of academic integrity and quality education is the responsibility of each student within this university and the California State University system. Cheating or plagiarism in connection with an academic program at a campus is listed in Section 41301, Title 5, California Code of Regulations, as an offense for which a student may be expelled, suspended, or given a less severe disciplinary sanction. Academic dishonesty is an especially serious offense and diminishes the quality of scholarship and defrauds those who depend upon the integrity of the campus programs. Such dishonesty includes but is not limited to: cheating, fabrication, facilitating academic dishonesty, and plagiarism.”

Failure to uphold the integrity of the academic environment at CSUN will be reported to the Office of the Vice President for Student Affairs and recommend disciplinary action. This includes, but is not limited to, plagiarism, copying answers during an exam, facilitating cheating by another student, or lying about an excuse for missing an assignment deadline or exam. Plagiarism includes the use of paragraphs or even long phrases and diagrams or parts of diagrams from peer or former student reports/labs/maps in your own assignment without proper acknowledgement of the source.

Accommodations
If you have a disability and need accommodations, please register with the Disability Resources and Educational Services (DRES) office or the National Center on Deafness (NCOD). The DRES office is located in Bayramian Hall, room 110 and can be reached at 818.677.2684. NCOD is located on Bertrand Street in Jeanne Chisholm Hall and can be reached at 818.677.2611. If you would like to discuss your need for accommodations with me, please contact me to set up an appointment.
Lecture Topics and primary reading

3 questions based on the reading (which may include supplementary reading) should be submitted by email or Canvas by 11:59pm every Tuesday night (Sunday night in Week 1)

1. Plate Tectonics - 4 weeks
   - Week 1 (Jan 22, Jan 24) Earth’s compositional and mechanical layers (Chapter 2, Marshak)
   - Week 2 (Jan 29, Jan 31) Drifting Continents and Spreading Seas (Chapter 3, Marshak)
   - Week 3 (Feb 5, 7) The Way the Earth Works: Plate Tectonics (Chapter 4, Marshak)
   - Feb 12 Deadline for selecting ‘Tectonics’ topic for written and oral research report
   - Week 4 (Feb 12, 14) Isostasy; Mountain Building (Chapter 11, Marshak)

2. Study Skills and Strategies for Success - 2 weeks
   - Feb 19 Deadline for list of 10 research papers on Tectonics topic
   - Week 5 (Feb 19, 21) Peer Mentoring, Strategies for Success, Create study guide
   - Week 6 (Feb. 26, 28) MIDTERM Feb. 26 (Covers material in weeks 1-4)
   - Feb. 28 Learning Resource Center visit; make writing appointments

3. Geophysics – 4 weeks
   - Mar 5 Deadline for Abstract draft
   - Week 7 (Mar 5, 7) Relative motions and Euler Poles (Chapter 2, Fowler)
   - Mar. 12 Deadline for term paper Outline
   - Week 8 (Mar 12, 14) Tectonics on a Globe: Euler poles (Chapter 2, Fowler)
   - Week 9 (Mar 19, 21) NO CLASS – Spring break recess
   - Week 10 (Mar 26, 28) Earthquakes: Focal Mechanisms & Plate Boundaries (Chapter 10, Marshak)
   - Rough draft of paper due April 2; make writing appointments at LRC
   - Week 11 (Apr 2, 4) Seismology, Geodesy, ETS (Chapter 4 in Fowler Text)
   - MIDTERM April 9 (Covers material in weeks 6-11)

4. Structural Geology - 3 weeks
   - Week 12 (April 11) Stress, Strain, and Plate Bending (Chapter 11, Marshak)
   - April 18 term paper due
   - Week 13 (April 16, 18) Lithospheric Strength Envelopes; Folds, Faults and Shear Zones (Chapter 11, Marshak)
   - Week 14 (April 23, 25) More Faults and Shear Zones (Chapter 11, Marshak)

5. Plate Boundaries and Orogenesis through Time (team research reports) – 3 weeks
• Week 15 (April 30, May 2) Tectonic History of North America (Chapter 11, supplementary reading)

• Week 16 (May 7, 9) ‘Tectonics’ oral presentations during class time

• Week 17 (May 16) – **Final Exam** 10:15 AM – 12:15 PM (50% on weeks 11-13, 50% comprehensive)

**Laboratory Exercises:**
1. **Week 1 (Jan 24)** – Earth composition and structure (Circumference, density and physical properties)
2. **Week 2 (Jan 31)** – Tracking tectonic plates (magnetic reversals, hot spot tracks, types of plate boundaries)
3. **Week 3 (Feb 7)** – Plate reconstructions
4. **Week 4 (Feb 14)** – Isostasy and Mountain Building
5. **Week 5 (Feb 21)** – Study Skills
6. **Week 6 (Feb 28)** – Plate Motion Project
7. **Week 7 (March 7)** – Relative Plate Motions, Velocity Diagrams and Triple Junctions
8. **Week 8 (March 14)** – Euler Poles on a Globe (Real World Globes)
9. **Week 9 (March 21)** – NO LAB, Spring Recess
10. **Week 10 (March 28)** – Earthquakes, focal mechanisms, paleoseismology, hazards, and plate boundaries
11. **Week 11 (April 4)** – Seismology and Geodesy
12. **Week 12 (April 11)** – Calculating stress, measuring strain, select ‘Resident Expert’ topic for poster presentation on field trip.
13. **Week 13 (April 18)** – Quantifying deformation via fold analysis (concentric vs similar folds)
14. **Week 14 (April 25)** – Determining fault displacements (fault separation vs fault slip)
15. **Week 15 (May 2)** – Reading geologic maps and cross sections, preparing for field trip
16. **Field Trip Weekend May 5 & 6** (‘Resident Expert’ poster presentations)
17. **Week 16 (May 9)** – No laboratory (in exchange for weekend field trip)