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### GEO 433.01: Global Tectonics

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Geology 433: Global Tectonics  
MWF 1:10-2:00  
CHCB 348

Instructor

Rebecca Bendick, CHCB 331  
Office hours, MF 10-12, or by appointment  
bendick@mso.umt.edu

Prerequisites

GEOS315 (Structure), M172 (Calculus I)

Summary

This course investigates the dynamics of the earth at the largest scale, with emphasis on tectonic processes and their expression in the crust.

Texts

Global Tectonics, P. Kearey, K. Klepis, and F. Vine, Wiley-Blackwell. ISBN 978-1-4051-0777-8

Schedule

27-31 August: Introduction; Overview of basic tectonics

READ: Chapters 3 & 4.1

3 September: no class (Labor Day)

5-7 September: Montana tectonics: a case study of expression and implications

READ: handouts from the regional literature

10-14 September: Earth's condensation and differentiation: mechanical variation with depth (rigid plate approximation)

READ: Chapter 2.3-2.1

15-16 September: field trip

17-21 September: stress and strain in elastic media

READ: Supplemental readings

24-28 September: seismology

READ: Chapter 2.1-2.2 and supplemental readings

1-5 October: gravity and flexure

READ: Chapter 2.11 and supplemental readings

8-12 October: mantle convection and tectonic driving forces

READ: Chapter 12

15 October: review session

17 October: EXAM 1-individual

19 October: EXAM 1-group exercise

22-26 October: oceanic convergent boundaries

READ: Chapter 9

29 October-2 November: continental convergent boundaries

READ: Chapter 10

5-9 November: oceanic divergent boundaries

READ: Chapter 6  
12-16 November: continental divergent boundaries  
READ: Chapter 7  
19 November: oceanic transform boundaries  
READ: Chapters 4.2 and 8  
26-30 November: continental transform boundaries  
3 December: review session  
5 December: EXAM 2-individual  
7 December: EXAM 2-group exercise

### Grading and Requirements

**Problem sets:** Problem sets will be assigned each week, but for the most part, we will work on them together during Friday class meetings. Participation in these group efforts will be 33% of the problem set grade, the rest will be your final grade on turned-in work. The total problem set grade will constitute 30% of your final grade.

**Classroom exams:** Two exams will be administered during the semester. The first will test you on physical processes underlying tectonics; the second will test you on the characteristics of standard plate boundaries. Exams will always consist of short answer essay questions, sometimes with a mathematical component. I will always provide mathematical formulae with the exams. The mean of the classroom exams will constitute 30% of your grade.

**Field trip:** We will go on a two-day field trip. You are responsible for a special problem set related to the field trip, which will contain data collected by you in the field, along with analysis of those data, interpretation of their meaning, and other supplemental information from the course material. Participation in the field trip will constitute 10% of your grade.

**Final exam:** The final exam will be administered at the standard final time. It will include short questions including all of the class content, with and emphasis on practical problems and case studies. The final will constitute 30% of your grade.

### Graduate vs. undergraduate students

Because this is an UG class, the members of the class have different academic backgrounds and levels of prior training. Graduate and undergraduate work will be graded and scaled separately. I expect more thorough and advanced work from graduate students, although students of any level may work together on collaborative assignments.

*All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University.*

*All students need to be familiar with the Student Conduct Code. The Code is available for review online at <http://www.umt.edu/SA/VPSA/index.cfm/page/1321>.*