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GEO 433.01: Global Tectonics

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Geology 433: Global Tectonics
MWF 2:10-3:00
CHCB 304

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

31 August-4 September: Introduction; Overview of basic tectonics
 READ: Chapters 3 & 4.1
7 September: no class (Labor Day)
9-11 September: Montana tectonics: a case study of expression and implications
 READ: handouts from the regional literature
14-18 September: Earth's condensation and differentiation: mechanical variation with depth (rigid plate approximation)
 READ: Chapter 2.3-2.13
19-20 September: field trip option 1
21-25 September: stress and strain in elastic media
 READ: Supplemental readings
26-27 September field trip option 2
28 September-2 October: seismology
 READ: Chapter 2.1-2.2 and supplemental readings
5-9 October: gravity and flexure
 READ: Chapter 2.11 and supplemental readings
12-16 October: mantle convection and tectonic driving forces
 READ: Chapter 12
19 October: review session
21 October: EXAM 1-individual
23 October: EXAM 1-group exercise
26-30 October: oceanic convergent boundaries
 READ: Chapter 9
2-6 November: continental convergent boundaries
 READ: Chapter 10

9-13 November: oceanic divergent boundaries
 READ: Chapter 6
16-20 November: continental divergent boundaries
 READ: Chapter 7
23 November: oceanic transform boundaries
 READ: Chapters 4.2 and 8
30 November-4 December: continental transform boundaries
7 December: review session
9 December: EXAM 2-individual
11 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 25% 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 25% of your grade.

Field trip and report: We will go on a two-day field trip. We will set the dates and location for the field trip based on student schedules and your particular interests, but it will be in September or early October. You are responsible for a field report after 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. Graduate students enrolled in the course are expected to include primary research in support of their interpretation in addition to the basic report requirements. This report will constitute 25% 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 an emphasis on practical problems and case studies. The final will constitute 25% 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>.*