# The Lithosphere (GEOL 601/GGS 657/EOS 657)

Fall 2012

Wed. (4:30 to 7:10 p.m.) East 1222

Professor: Dr. Giuseppina Mattietti
gkysar@gmu.edu
Office Hours: After class and by appointment

**REQUIRED TEXTS**: Grotzinger, J. and Jordan, T., 2010. Understanding Earth, 6th Edition, Freeman and Company Publishers, New York, 654 p.

Note: Additional readings may be assigned and will be announced in class.

**COURSE DESCRIPTION:** A global-scale overview of the lithosphere; the solid, nonliving earth; its materials, cycles, plate tectonic and geomorphic processes; and history.

**GOAL:** Examine the geologic materials, processes, and dynamics of the Earth's lithosphere.

**PREREQUISITES:** Graduate student in good standing

**COURSE REQUIREMENTS:** Attendance is mandatory because participation to class discussion generates part of the grade for the course.

**METHOD OF INSTRUCTION:** Class consists of lectures given by instructor and student presentations and discussions in class of the assigned readings, some exercises based on case studies and some homework will be assigned. In class, each student will present 2 peer reviewed journal article on date of choice, instructor reserves the right to assign readings to students to ensure everybody presents two articles during the semester. Each class, 3 peer-reviewed publications will be discussed in class. Titles of papers for the following week will be made available the week in advance of the presentation.

**COURSE EVALUATION**: Each student will present 2 course readings during the semester (20%). Students will take a midterm exam (20%), in class exercises and homework (20%), and prepare a final presentation on a topic of tectonics of the lithosphere (30%) to be assigned after the midterm. A summary of the presentation with annotated bibliography is due on final exam date (10%). Format of paper presentations, project presentation and summary will be distributed during the semester

**GRADE SCALE**:
A+ = 97 - 100%
A = 93 - 96%
A- = 90 - 92%
B+ = 87 - 89%
B = 83 - 86%
B- = 80 - 82%
C = 70 - 79%
F = 0 - 69%
Adherence to The GMU Honor Code is expected of all students.

**COURSE CALENDAR***

| | Date | Topics |
|---|---|---|
| 1 | Aug 29 | Lithosphere & Plate Tectonics Overview (Ch 1, 2 and 21) |
| 2 | Sep 5 | Igneous lithosphere (Ch. 4 and 12 for background) |
| 3 | Sep 12 | Sedimentary sequences and plate boundaries (background readings Ch. 5) |
| 4 | Sep 19 | Metamorphism and plate boundaries (background readings - Ch. 6) |
| 5 | Sep 26 | Earthquakes and the structure of the lithosphere (Ch. 13) |
| 6 | Oct 3 | Kinematics of the lithosphere 1: Fluvial Processes & Landforms (Ch. 18) |
| 7 | Oct 10 | Kinematics of the lithosphere 2: Glacial Processes & Landforms (Ch. 21). Climate and the lithosphere |
| 8 | Oct 17 | EXAM 1 |
| 9 | Oct 24 | Lithosphere rheology 1: Oceanic lithosphere |
| 10 | Oct 31 | Lithosphere rheology 2: Continental lithosphere |
| 11 | Nov 7 | Heat and geotherms in the lithosphere. Deep time and the lithosphere |
| 12 | Nov 14 | Beyond Earth: lithosphere in the solar system? |
| 13 | Nov 28 | Project Presentations 1 |
| 14 | Dec 5 | Project Presentations 2 |
| | DEC 12 | Project presentation 3 - Submission of presentation outline and annotated bibliography |

* This is a tentative calendar, instructor reserves the right to change topics to best fit the class needs.

**Topics sign-up by week number:**

| Topic number | Student name 1 | Student name2 | Student name 3 |
|---|---|---|---|
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