

## SYLLABUS

GEOL725 - Solid Earth Processes

Tue-Thu 9:30-10:45 in PHRC113

Fri 9:30-10:30 in EWSC208

### Instructors

Gene Yogodzinski

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### Course Description

Solid-Earth Processes focuses on the genesis, structure and evolution of the solid earth, and on the dynamics of the earth's interior and the lithospheric cycle. The course is primarily intended for graduate students in the earth, ocean and environmental sciences. The prerequisite is graduate standing. Solid-Earth Processes is normally offered in the spring semester of even-numbered years.

### Learning Outcomes

The overall goal of this course is to provide the students with an understanding of the processes occurring inside the Earth, and the skills necessary to evaluate the feedbacks that control these processes. The measurable learning outcomes will be the following.

- \* Students will learn to analyze seismic wave records and gravity data to model the physical structure of the Earth's interior
- \* Students will use models of mantle melting and elastic flexure to explain how oceanic lithosphere forms, grows and is subducted back into the mantle
- \* Students will learn to evaluate mineralogical control over trace element partitioning during melting and crystallization processes
- \* Students will learn to evaluate models of mass transfer within the earth and over time using radiogenic isotope data
- \* Students will critically evaluate current literature on the mantle plume hypothesis
- \* Students will explain the formation of continental crust in a geochemical and geophysical context
- \* Students will compare the models for mantle layering

Grading: Grades will be based on a curve with the conditions that at least 85% of the total points are necessary for a grade of A and at least 50% of the total points are necessary to pass the course.

Midterm Exam	50%
Final Exam	50%

### Required Reading

Required reading material will be distributed in class or via Blackboard. Students are encouraged to consider the purchase of optional textbooks relevant to the topics of this class.

Philpotts AR and Ague, JJ, *Principles of Igneous and Metamorphic Petrology*, 2009, Second Edition, Cambridge University Press, New York, 667 p.

Fowler, CMR, *The Solid Earth: An Introduction to Global Geophysics*, 2004, Second Edition, Cambridge University Press, New York, 704 p.

Turcotte, DL and Schubert, G, *Geodynamics*, 2002, Second Edition, Cambridge University Press, New York, 456 p.