

MGS 710, Spring 2024
Subduction Zone Geodynamics
N373, North Grosvenor, RSMAES

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Course Description:

This course is an overview of the dynamics of subduction zones based around the analysis of both classic and recent literature. A sampling of the fundamental topics we will cover include slab deformation, mantle flow and rheology, and subduction induced topography. We will mainly focus on subduction zone modeling but will also pay attention to the observational constraints. The goals of the class are for students to develop a well-rounded and contemporary background on subduction zone geodynamics. An auxiliary goal is the identification of collaborative and/or individual future research avenues. Grades will be based on class participation, paper presentations, and a term project.

Reading Materials:

None required, but the Subduction section (chapter 12) this textbook is highly recommended.

- Becker, T. W. & Faccenna, C.: Tectonic Geodynamics. https://www-udc.ig.utexas.edu/external/becker/preprints/tectonic_geodynamics_draft.pdf

The following special edition (collection of papers) is also very good, though now dated:

- Subduction Zone Geodynamics, Eds. Lallemand, S. and Funicello, F., Frontiers in Earth Sciences, Springer, 2009.

Grading Policy:

Class Participation and Student Presentations	66.66%
Term Project:	33.33%

Term project:

The term project will be the development and presentation of one component of a time-evolving analytical subduction model. We will attempt to develop the analytical model (essentially a time-evolving subduction zone force balance) as a group; each student will be responsible for one model component (e.g., bending stresses, pressure due to mantle flow, combining stresses into a force balance to compute velocity, time-evolving the slab shape). Upon completion, each student will give a short presentation at the end of class accompanied. There will be plenty of class time devoted to working on this as a group.

Honor Code & Class Policies: All students should read, understand, and uphold UM's Honor Code: http://www.miami.edu/sa/index.php/dean_of_students/undergraduate_honor_council/honor_code/

Attendance policy: Mandatory.