

EARTH AND SPACE SCIENCES 431 *PRINCIPLES OF GLACIOLOGY* Autumn 2009

4 Credits, SLN 13570

Lectures Monday and Wednesday, 1:30 - 2:50 pm. **Room:** JHN 026

Lab-Discussion Friday 1:30 – 2:20 **Room:** JHN 026

Class web page: <http://courses.washington.edu/ess431/>

Instructors: Conway, Hallet, Joughin, Light, Roe, Steig, Stone, Waddington, Warren

Coordinating Instructor:

Ed Waddington
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T.A.

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Room 336 JHN Hall
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Office Hours: drop in, or by arrangement

This course is taught by a group of UW faculty who all have active research interests in *Glaciology*, defined in a broad sense as *ice in the environment*. The course covers ice in clouds, frozen ground and permafrost, seasonal snow, sea ice, and glaciers and polar ice sheets. Instructors relate the various forms of ice to other processes such as climate change, avalanches, and landform evolution. The course achieves the advanced standards expected of a 400 level course by challenging students to critically understand concepts such as conservation laws and how to deduce behaviors of macroscopic systems from knowledge of microscopic properties, rather than by introducing advanced mathematical or physical complexity.

The **format** of this course is two 80-minute lectures each week, and a Lab/Discussion section on Fridays.

Optional books:

Glacial Geologic Processes by D.J. Drewry
Physics of Glaciers by W.S.B. Paterson
Glaciers of North America by S. Ferguson
Avalanche Handbook by D. McClung & P. Schaerer

Grades: will be based on

- (a) problems assigned by instructors during the quarter (25% of total grade)
- (b) a mid-term exam (30%)
- (c) a final exam (30%)
- (d) class participation (15%)

The exams will include questions written by all the instructors.

The course is designed for seniors with some math and science background, such as Physics 121/122. It should be well-suited for ESS Majors in Geology who have fulfilled their physics requirements, and for Atmospheric Sciences students pursuing the Climate track.

Other undergraduates can do well in the class if they are comfortable with basic physics ideas such as heat conduction, vapor pressure, and forces. Please talk with me if you do not have the PHYS 121/122 prerequisites.

Some graduate students take ESS431 because of an interest in ice in their research. For these students, ESS431 is a way to get a first impression of the range of faculty research interests in glaciology.

We plan a field trip to Easton Glacier on Mt. Baker on Saturday October 10. There will be a writing assignment associated with the field trip. If you are unable to go on the trip, it will be possible to do an alternative assignment; however, if you can possibly go on the field trip, this should be your preferred option.

If you feel that you are not equipped to take ESS431, but you have an interest in glaciers and ice, you should consider two other courses:

ESS 203, Glaciers and a Changing World

Instructor: Ed Waddington, Earth and Space Sciences.

This course is designed for students without a science background who are interested in glaciers, how glaciers flow, how they advance and retreat as climate changes, and how information about past climates is recorded within the layers of polar glaciers and ice sheets.

ESS203 qualifies as a “Natural World” course.

ESS 302, Great Ice Age

Instructor: Terry Swanson, Earth and Space Sciences

This course is designed for students with at least one basic geology class in their background. It focuses on geological changes and the continental-scale ice sheets associated with the Pleistocene Ice Ages of the past 2 million years. ESS302 also qualifies as a “Natural World” course.