

# **GEOS120: Glaciers, Volcanoes and Earthquakes**

## **Part B: Glaciers**

**Lectures** Tuesdays/Thursdays 11:30 pm – 1:00 pm, 2/21/13 through 4/2/13

**Instructor:** Timothy Bartholomaus, Geophysical Institute and Dept. of Geology and Geophysics

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### **Course description:**

Alaska is one of the most glacierized areas in the world outside Greenland and Antarctica. This section of the course provides a descriptive overview of what glaciers are, their significance for water resources, global sea-level and climate, how they move, grow or retreat, how they have fluctuated in the recent and geological history of the Earth, what they can tell us about former climates, and the present frontiers of research in Greenland, Antarctica and Alaska. The quizzes and final exam will be based entirely on lectures and lecture notes. All lectures will be made available on blackboard directly after class.

### **Textbook:**

There will be no textbook for the class. The material covered in class will be made available through handouts and pdfs of the class presentations on blackboard. However, the following books are recommended as complementary reading:

*Hambrey, M. and J. Alean (2004): Glaciers. Cambridge University Press. Cambridge, 375 pp.*

*Post and Chapelle (2000): Glacier ice, University of Washington Press, 145 pp.*

If you're interested in complimentary reading, I recommend:

*Smith, Z. D. (1999): Glaciers, climate, and the landscape. The Wright Center for Innovative Science Education, 75 pp.*

downloadable at

[http://www2.gi.alaska.edu/~tbartholomaus/papers/Smith\\_2000-Glaciers\\_Climate\\_and\\_the\\_Landscape.pdf](http://www2.gi.alaska.edu/~tbartholomaus/papers/Smith_2000-Glaciers_Climate_and_the_Landscape.pdf)

### **Grading criteria:**

Quizzes (Thursdays, 5 minutes each): 15%

Final exam: 50%

Labs\*: 35%

\*Attendance of labs is mandatory. Lab exercises are to be completed and handed in by the end of each lab session. TA's will not accept labs from students not attending lab.

*Make up quizzes and exams will not be offered unless permission from the instructor has been granted in advance.*

**Disability Services:** Students with disabilities are welcome in this class. I will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation for students with disabilities. Students with disabilities may be required

to provide a written statement indicating any special requirements that will be necessary, as early in the semester as possible.

### Support Services

Student support services are available in computing through the Help Desk, mathematics through the Math Lab, and writing through the Writing Lab.

### Course Policies

All quizzes and the final exam are individual efforts, and to be taken closed note, closed book, without use of electronics such as phones, tablets or computers. No discussion is permitted during examinations. Violation of these policies or the UAF Student Code of Conduct may result in penalties at least equivalent to the value of the graded assignment.

Plagiarism is a serious offense and will not be tolerated. Further discussion on this matter can be found at <http://www.uaf.edu/library/instruction/handouts/Plagiarism.html>.

### COURSE OUTLINE

*(Note, schedule may change during the course of the class).*

	Date	Topic
1	Th 21 Feb	a) Introduction, Glacier types b) Significance of glaciers
2	Tu 26 Feb	a) Basic concepts: accumulation/ablation area, equilibrium line, features b) How do glaciers form, snow crystals c) Glacier mass balance
3	Th 28 Feb	a) Ice flow ---- Quiz 1 ----- b) Ice flow group exercise
4	Tu 5 Mar	a) Water movement through glaciers b) Glaciers as a water resource, Glacier hazards c) Glacier surges
5	Th 7 Mar	a) Glacier erosion and landforms ---- Quiz 2 ----- b) Ice temperatures: How cold are glaciers?
	Tu 12 Mar	Spring Break, no class
	Th 14 Mar	Spring Break, no class
6	Tu 19 Mar	a) Tidewater glaciers b) Greenland and Antarctica
7	Th 21 Mar	a) Ice cores, ice ages ---- Quiz 3 ----- b) The scientific process and methods for glaciology
8	Tu 26 Mar	a) Glacier variations b) Glacier variations
9	Th 28 Mar	a) Recent and future glacier fluctuations, permafrost, sea-ice b) Summary / Review
10	Tu 2 Apr	Final exam