

GGR317F

MODERN GLACIOLOGY

Fall 2007

Instructor: Professor D. Scott Munro
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Office Hours: MW9-10,4-5; T12-2
Meeting Times: Lectures M14-16; Labs T16-17
Meeting Places: Lectures SE1153; Lab. SE1150
Course Text: Knight, P.G. 1999: *Glaciers*, Thornes, 261 pp.

Synopsis

The classical tradition in glaciology is to relate the physics of glacier flow to the annual gains and losses of snow and ice over the glacier area. In this course, we explore an evolving modern tradition, in which the emphasis is to relate changing snow and ice conditions to glacier hydrology, its contribution to local water supply and how all this relates to climate change. The tools of investigation include field measurement, geographic information systems and mass balance theory, where research skills are developed in practical exercises, one of which includes the option to visit a glacier research site.

Noting that we live in times of changing glacier cover, we first consider the field problem of measuring glacier change, by looking through the eyes of others or by visiting an active research site ourselves. Secondly, we examine how weather and climate control glacier change throughout each year. Thirdly comes the hydrological importance of glaciers to regional streams and water resources. Finally, we explore glacier variations in the context of global change generally: are they agents of change, or merely messengers?

Knowledge – This course is taught in the physical science tradition, with all that it implies by way of quantitative analysis and problem solving. Therefore, in addition to second year climatology, hydrology or the equivalent, you should have a working knowledge of computer spreadsheet calculation and graphing.

Skills – You must be an effective writer and skilled in the use of simple mathematics in order to succeed in this course. Basic mathematical skills are a necessity for data analysis and problem solving. Assuming that these skills are already developed within you to a certain degree, the practical sessions in this course will help you develop your skills further, to the point where you could actually assist a glaciologist in research work.

Attitudes – You are expected to have an attitude of active participation in which you are willing to try out new ideas and to develop academic independence. An important part of the process is to work with your instructor to improve your academic skills. The key to improvement is to insist upon being an independent producer of your own original work, specifically directed to the task at hand.

Schedule

Lectures are two hours, once weekly. We begin with the obvious questions: what are glaciers, how have they changed and why is it important to know? Then we look at the concept of glacier mass balance, what it tells us about change, how to evaluate its components. Near the end we explore glacier hydrology, its relationship to glacier mass balance and how glacier water supply to rivers may be affected by global warming. Your term test will be a one hour, in-class exam that covers all material up to that point in the course. The test format is a combination of short answer and essay questions. Three laboratory assignments are designed to get you started as a potential *ice scientist*.

Deadlines

25 September -	Begin Lab. 1.
5 October -	Hand in Lab. 1 by 1700.
16 October -	TERM TEST
23 October -	Begin Lab. 2.
2 November -	Hand in Lab. 2 by 1700.
13 November -	Begin Lab. 3.
23 November -	Hand in Lab. 3 by 1700.

Note: Hand in Lab. 1/2/3 by 1700 means placing the Lab. report in a drop box outside Professor Munro's office at the end of the work day. Assignments received after 1700 count as late submissions. Please do not ask for exemptions or extensions.

Penalties

- *for late work:* A late submission of work loses 10% of its full value for each day that it is late, until date of return to class. Then late work is assigned a grade of zero.

Allowances or alternatives will be arranged in cases where dire personal or medical circumstances have arisen, if appropriate documentation is given to Professor Munro.

- *for non-original work:* Your work must be entirely original and relevant in order to be evaluated. If any part of your work is found to be deficient in this regard, it will be investigated as a potential academic offence and, pending the outcome of consultation with you, referred to the Chair of Geography for further action. Refer to the Code of Behaviour on Academic Matters, in the Calendar, for details.

Mark Distribution

Laboratory Assignment 1	12
Laboratory Assignment 2	18
Laboratory Assignment 3	25
Mid-term Test	10
Final Examination	35
TOTAL	<hr/> 100