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DEPARTMENT OF
GEOGRAPHY AND PLANNING

GPHY 313: Glaciers Processes and Dynamics

Contact Time	2 x 1.5 hour lectures 1 x 3 hour labs (weekly)	
Format	Lectures, laboratory and practical exercises, independent project	
Class Assessment	Lab Assignments and Activities Regional Project (individual components developed over semester)	40% 60%

COURSE OVERVIEW

The fluctuations glaciers, and the landscapes they leave behind, have been key in forming our current understanding of Earth's climate history. This course examines the central processes controlling glacier systems, including the energy and mass exchanges that drive glacier response, the mechanics and dynamics of ice flow, and characteristic features that result from these processes. The course uses case-studies to introduce a wide range of approaches in glacier monitoring, including field studies and remote sensing methods, and examines the impact of glacier response on human activities. Laboratory and practical exercises will focus on virtual investigations of glacier surface features, field-based monitoring of glacier mass balance and ice dynamics, and discussions on social perceptions of glacier response. In the Regional Project, each student is responsible for reporting on a unique glacier-covered region in the world (e.g. The Rockies, Patagonia, Himalayas). This approach aims to build our collective insight of how glaciers, glacial landscapes, and their response to climate change vary globally.

LEARNING OUTCOMES

Students will gain the knowledge and skills required to:

- Identify key features of glaciers and glaciated landscapes, and explain the process of formation using real-world examples;
- Explain the key processes responsible for observed glacier fluctuations including: surface energy exchanges, mass exchanges, and the mechanics of ice flow;
- Identify and describe the appropriate field- and remote-sensing based methods used to observe and quantify glacier fluctuations on range of spatial and temporal scales
- Critically discuss and communicate/advocate the role of glaciers in society, including as water resources, geohazards, and in contribution to sea level rise

COURSE TOPICS

Glaciology; Earth System Science; Climate; Earth Surface Processes

COURSE READINGS

Reading materials will be provided in class and online through eReserves.