

# GEOGRAPHY AND PLANNING

## GPHY 305 – Applied Cold Regions Science



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<b>Office</b>	D129 Macintosh-Corry Hall	
<b>Contact Time</b>	Weekly 3-hour lectures Weekly 2-hour practicums	
<b>Format</b>	Lectures and lab assignments	
<b>Class Assessment</b>	Assignments	5 X 14% each
	Quizzes	3 X 10% each
	No Final Exam	

### COURSE OVERVIEW

Cold regions are defined as areas which experience freezing conditions seasonally or perennially and are found across most mid-to-high latitudes on Earth. This course will aim to enhance student knowledge about cold regions science and processes with the goal of bridging the divide from theoretical to applied cold regions science. This course builds upon knowledge and skills gained in introductory courses to enable application of physical geography principles to field data collection, geospatial analysis, remote sensing and environmental modelling in the context of northern environments. Students will learn theory and applied concepts as they relate to characterizing and modelling the evolution of various elements of the climatology, hydrology and the cryosphere. Students will also gain an in-depth understanding of practical realities in conducting analyses in northern environments using modern scientific techniques. Case studies of real-world applications will be used to explore major themes related to cold region climates, glaciology, hydrology, permafrost science, snow science, resource development and other areas. The hands-on activities in this course will require that students apply their skills to real-world applications in Canadian and/or international contexts. This course will include field excursions that will require collection of environmental data in the general vicinity of Kingston.

### LEARNING OUTCOMES

- Students will identify fundamental principles in cold regions science
- Students will evaluate indicators of climate change in cold regions
- Students will apply theoretical principles of cold regions science to field-based activities
- Students will develop independent research skills in applied cold regions science
- Students will formulate solutions to applied cold regions geospatial and modelling problems
- Students will synthesize and communicate outputs of applied classroom and field activities

### COURSE TOPICS

1. People of the North
2. Introduction to cold regions science
3. Cold regions climatology
4. Cold regions hydrology
5. Terrestrial systems and the cryosphere
6. The marine cryosphere

### COURSE READINGS

**Required:** French H. & Slaymaker, O. 2012. Changing Cold Environments: A Canadian Perspective. 1st Edition, Wiley-Blackwell, 340 pp. Paperback.