

# GEOGRAPHY AND PLANNING

## GPHY 242: Remote Sensing I: Remote Sensing of the Environment



<b>Contact Time</b>	2x 1.5 hour lectures per week 1x 3 hour laboratory per week	
<b>Format</b>	Lectures and Labs	
<b>Class Assessment</b>	Lab Assignments (4)	50%
	Quizzes (4)	20%
	Final Exam	30%

### COURSE OVERVIEW

This course represents an introduction to the methods in which remote sensing data are collected, processed and analysed. Upon completion, students are able to advise on the various types of remote sensing data that are available for environmental applications and on various processing procedures for extracting information from remote sensing data. The relationships between the technologies of remote sensing and GIS are also emphasized, particularly with respect to how remote sensing data can generate information layers for spatial modeling within a GIS.

The course is divided into a series of units; each composed of lectures, laboratories, readings and demonstrations. Topics covered in lecture include the principles of electromagnetic radiation, airborne and satellite remote sensing systems, digital image data and digital image processing, thermal, radar and lidar remote sensing systems and applications of remote sensing for environmental analysis. Laboratory sessions involve interpretation of remote sensing data and application of digital image processing techniques for information extraction from remote sensing data.

### LEARNING OUTCOMES

- To obtain a critical understanding of key concepts and laws governing electromagnetic radiation.
- To explain how electromagnetic energy across the spectrum can be used to extract information about objects and surfaces on the earth's surface from field-based, airborne and satellite sensors.
- To acquire basic image processing skills to view, analyze and interpret remote sensing data (using industry standard software).
- To be able to discuss how remote sensing data can be used to examine the earth system across spatial and temporal scales.
- To explain how remote sensing derivatives can be used to map or model a range of biogeophysical processes.

### COURSE TOPICS

Since the course is organized around the electromagnetic spectrum, topics will include applications specific to visible, near, middle and far infrared, and microwave remote sensing. The physical principles of electromagnetic radiation will be covered as well as remote sensing system design for capturing remote sensing data across a range of spatial and temporal scales. Image processing techniques will be introduced. The students will obtain a suitable understanding of electromagnetic radiation and image processing in order to be able to take Remote Sensing II – Digital Image Processing.

**This course is a core course for the Certificate in Geographic Information Science.**

### COURSE READINGS

No textbook required. Any recommended readings will be provided through Queen's eReserves.