

GEOGRAPHY AND PLANNING

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



Course Instructor	Laura Thomson	Email: L.Thomson@queensu.ca
Office	Mac-Corry D128 / MS Teams	
Contact Time	Asynchronous Delivery (all course documents and lectures available through OnQ and MS Teams). Office hours will be held throughout the week on MS Teams (TBA)	
Format	Asynchronous/Fully Online	
Class Assessment	Lab Assignments: 50% - Grade based on your best 4 of 5 labs; 12.5% each Quizzes: 30% - Grade based on your best 4 of 5 quizzes; 7.5% each Course Project: 20% - May work in groups of 2-3 people; students investigate and report upon a real-world remote sensing application. Participation marks apply.	

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 highlighted, 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, lab exercises, quizzes, and supporting readings. Topics covered in lecture include the principles of electromagnetic radiation, airborne and satellite remote sensing systems, thermal, radar and lidar remote sensing systems and applications of remote sensing for environmental analysis. Lab exercises provide practical experience in image interpretation and digital image processing techniques for information extraction from remote sensing data. The Course Project aims to build community and focuses on the application of remote sensing approaches to detect and address real-world issues such as urbanization, deforestation, and natural disasters.

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 environmental 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. All recommended readings will be provided through Queen's eReserves.