

Course Information

Course Information

Remote Sensing Space 9006

List of Prerequisites

SPACE 9001

SPACE 9002

SPACE 9003

Instructor Information

Dr. Catherine Neish

Assistant Professor – Western University

Course Syllabus, Schedule, Delivery Mode

Course Objectives

The main objective of this course is to learn the technical and conceptual basis for applying remote sensing and image analysis to Earth and Planetary Science. During this course you will also:

- Learn how the various wavelength ranges of the electromagnetic spectrum interact with matter, specifically pertaining to terrestrial and planetary applications (i.e., geologic processes and materials) and what their basic sensitivities and limitations are.
- Learn how to find, process, visualize, analyze and synthesize remote sensing observations for a wide variety of datasets.
- Gain practical hands-on experience in applying the learned knowledge, methods and techniques to diverse terrestrial and planetary datasets.
- Learn how to utilize software packages commonly used in remote sensing studies (e.g., ArcGIS, QGIS, etc.).

Course Description

This is an intensive 5-day short course for undergraduate students, graduate students, researchers, industry, and government employees about remote sensing, image processing, and its applications in Earth and planetary science. The course will feature overview lectures on remote sensing, as well as hands-on exercises using remote sensing datasets and geological maps. Emphasis will be on the “core” remote sensing datasets, including visible to near-infrared, thermal infrared, and RADAR imagery, as well as elevation data (i.e., topography, morphometry and 3D analysis). This course is intended to provide the non-specialist with a working knowledge of the background and analytical tools needed when working with various types of remote sensing data. The labs will use software packages such as QGIS, JMARS and ArcGIS.

Date Day Topics/Modules

Session 1

- Welcome and Course Introduction
- Lecture 1: General Introduction to Remote Sensing
- Lab 1: Image Processing Techniques: Spectral Mapping in QGIS

Session 2

- Lecture 2: Remote Sensing: Reflectance and Emission Spectroscopy
- Lab 2: An Introduction to CRISM: Hyperspectral Analysis of Mars from Orbit

Session 3

- Lecture 3: Remote Sensing: Various topics
- Lab 3: JMARS and Lunar Case Study

Session 4

- Lecture 4: Remote Sensing: RADAR
- Lab 4: Radar remote sensing of the Earth and Moon

Session 5

- Lecture 5: Remote Sensing: Topography
- Lab 5: Topographic Processing Techniques: Impact Craters in ArcGIS