GEOG*2420 The Earth from Space (0.5 CR)

University of Guelph (Main Campus),
Department of Geography, Environment & Geomatics, CSAHS,
Fall 2025

Instructor: Dr. John Lindsay
Office: Hutt Rm. 346
Email: jlindsay@uoguelph.ca
Phone: 519-824-4120 ext. 56074
Office hours: Mon. 12:00 - 1:00PM (unless otherwise stated)
Lectures: M/W/F 1:30 - 2:20PM, Landscape Architecture 204

Prerequisite 0.50 credits in Geography and/or Earth Science

Overview

This course is one of two foundational courses (the other being GEOG*2480 *Mapping and GIS*) in the Geomatics stream of courses offered by Geography. *The Earth from Space* provides an introduction to the fields of remote sensing and photogrammetry, focusing on the history of the disciplines and the basic data sources, techniques, and fields of application. It provides the necessary background for GEOG*3420 *Remote Sensing of the Environment*, which itself, along with GEOG*3480 *GIS and Spatial Analysis*, provide the analytical background necessary for the thematic capstone course, GEOG*4480 *Applied Geomatics*.

Course Description

This course provides an introduction to the principles and techniques of air photo and satellite image interpretation. Topics include stereoscopic viewing, parallax, flightline planning, and mapping from air photos. Lab exercises focus on specific applications in natural habitats and in rural and urban settings.

Learning Outcomes

By the end of the course, you should be able to:

- Understand the history and foundational theories behind the field of Earth Observation.

- Gained a basic knowledge of the main Earth Observation systems, technologies and data sets.
- Analyze imagery data using Earth Observation software.
- Understand photogrammetric techniques and practices and the method of formal image interpretation.
- Identify the key application areas in Earth Observation.
- Practice communicating concepts through formal written and visual forms.

Course Organization

There will be two lectures per week, Mondays and Wednesdays 12:30-1:20 in John T. Powell Building, Room 2266. In addition, each student must attend one three-hour lab per week. Labs will be held in Hutt 236.

Text and Other Resources

Campbell, James B., Wynne, Randolph H., Thomas, Valerie A. (2022) *Introduction to Remote Sensing 6th Ed.* Guilford Publications, ISBN: 978-1462549405.

This book can be purchased from the University bookstore or Amazon for around $150. I have also requested a copy of this book be placed on reserve in the library.

Method of Evaluation

The lab material constitutes an integral part of this course, since this is where students receive hands on work with photographs, and must apply the techniques they have learned. Labs must be handed in to the teaching assistant at the beginning of lab section in the week they are due, with a late penalty of 10% of the total assignment grade per day. Lab material will be covered on both the mid-term and final exams. *Students must have a passing average on the combination of the mid-term and final exams to pass this course*.

Grade Distribution

- Lab Assignments: 40%
- Mid Term Exam: 30%
- Final Exam: 30%

Office Hours

If you are having difficulties with the lab, please see one of the course TAs during lab times. TA will hold office hours during regular lab times. For any other matters, please feel free to visit me during my office hours (Stated above) or e-mail me.

Import Dates

Monday September 9 - First lecture
Monday October 13 — Thanksgiving (no classes)
Friday October 17 — Mid-term examination (in class; worth 30%)
Friday Nov. 29 — Lecture to make up for lost Thanksgiving Monday
Wednesday December 10 2:30PM-4:30PM — Final exam (worth 30%)

Lecture Topics and Lab Schedule

Week	Date	Topic[1]	Lab Schedule[2]
0-F	Sept 5	Introduction to remote sensing	
1-M	Sept 8	History of Earth Observation	
1-W	Sept 10	Electromagnetic radiation	
1-F	Sept 12	Electromagnetic radiation	
2-M	Sept 15	Electromagnetic radiation	Lab 0 assigned
2-W	Sept 17	Image resolution and data	
2-F	Sept 19	Remote sensing platforms	
3-M	Sept 22	Remote sensing platforms	
3-W	Sept 24	Flight planning	
3-F	Sept 26	Photographic filtration and film	
4-M	Sept 29	Principles of image interpretation	Lab 1 assigned
4-W	Oct 1	Principles of image interpretation	
4-F	Oct 3	Principles of image interpretation	
5-M	Oct 6	Photogrammetry	
5-W	Oct 8	Photogrammetry	
5-F	Oct 10	Photogrammetry	
6-M	Oct 13	**Thanksgiving—No classes**	
6-W	Oct 15	No lecture; prep for exam	
6-F	Oct 17	Mid-term exam	
7-M	Oct 20	Multi/hyper-spectral remote sensing	Lab 2 assigned Lab 1 due
7-W	Oct 22	Multi/hyper-spectral remote sensing	
7-F	Oct 24	Multi/hyper-spectral remote sensing	
8-M	Oct 27	Thermal remote sensing	
8-W	Oct 29	Thermal remote sensing	
8-F	Oct 31	Thermal remote sensing	

9-M	Nov 3	Microwave remote sensing and radar	Lab 3 assigned Lab 2 due
9-W	Nov 5	Microwave remote sensing and radar	
9-F	Nov 7	Microwave remote sensing and radar	
10-M	Nov 10	LiDAR remote sensing	
10-W	Nov 12	LiDAR remote sensing	
10-F	Nov 14	LiDAR remote sensing	
11-M	Nov 17	Applications of remote sensing	Lab 4 assigned Lab 3 due
11-W	Nov 19	Applications of remote sensing	
11-F	Nov 21	Applications of remote sensing	
12-M	Nov 24	Applications of remote sensing	
12-W	Nov 26	Applications of remote sensing	
12-F	Nov 28	Course review	Lab 4 is due
	Dec 10	Final exam 2:30PM-4:30PM; Room TBA	

Notes: 1. The sequence and topics of lectures is subject to change depending on progression.
2. All labs are assigned and due on the day of the week during which your regularly scheduled lab occurs.

Please note that the readings provided above are tentative and may change. Please check with the readings listed at the start of the lecture slides on the CourseLink site for a more accurate listing.

Laboratory Exercises

There are five equally-weighted laboratory exercises, worth a total of 40% of your final grade. Laboratory exercises will be assigned by your graduate teaching assistant (GTA) during your regular lab time. Your GTA will provide specific details about the timing and procedure for submitting each lab, but assignments are normally submitted on the due date at the start of your regular lab time. Late lab assignments will be penalized (see *When You Cannot Meet a Course Requirement*).

Lab attendance is mandatory and attendance will be recorded by the GTA each week. GTAs will not respond to the e-mail questions of students who fail to regularly attend a lab section. The discussion board on the CourseLink site dedicated to each lab assignment should be used to ask all general questions regarding the labs.

Laboratory Times

- 0101 Mon 08:30AM – 10:20AM, Hutt 236
- 0102 Wed 03:30PM – 05:20PM, Hutt 236
- 0103 Tue 02:30PM – 04:20PM, Hutt 236
- 0104 Mon 02:30PM – 04:30PM, Hutt 236

If you are unable to attend your regular scheduled laboratory time due to illness, you are responsible for attending one of the alternate times throughout the week. Also, be sure to let both your GTA and the GTA of the lab that you attend know about your situation.

Disclaimer

Please note that unforeseen circumstances (e.g., a pandemic) may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g. final exam or major assignment).
For information on current safety protocols, follow these links: https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/
https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces
Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives

E-mail Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.

Copies of out-of-class assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student. When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.
Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.
Use of the SAS Exam Centre requires students to make a booking at least 7 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.
More information: www.uoguelph.ca/sas

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University

community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.
Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.
The Academic Misconduct Policy is detailed in the Undergraduate Calendar.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.