GEOG*2420 The Earth from Space (0.5 CR)

University of Guelph,
Department of Geography, Environment & Geomatics, CSAHS,
Fall 2020 PROVISIONAL OUTLINE

Instructor: Dr. Ben DeVries
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Office hours: TBA

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 the Department of Geography, Environment and Geomatics. 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 airborne and satellite image interpretation and analysis. Topics include physical principles of remote sensing, air photo interpretation, photogrammetry, types of Earth Observation satellites and applications of remote sensing. 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 GIS software
• Understand photogrammetric techniques and practices
• Identify key application areas in Earth Observation
• Practice communicating concepts through formal written and visual forms.

Course Organization

Lectures and labs for the F20 semester are scheduled as “remote synchronous” (AD-S). Lectures will be held on Tuesdays and Thursdays from 2:30pm to 3:50pm via Zoom video conferencing. Some of the lectures will be pre-recorded and posted on the course’s Courselink page, and a more detailed schedule of synchronous sessions will be released at the beginning of the course. In addition, each student is registered for one remote three-hour lab per week. The format of the lab sessions will be announced at the beginning of the course.

Text and Other Resources

There is no required text for this course. One recommended text for this course is:


Method of Evaluation

The evaluation for this course will consist of periodic quizzes, a mid-term and final exam, and lab assignments. The number and frequency of the quizzes will be announced at the beginning of the course, as will the dates and formats of the exams. The lab material constitutes an integral part of this course, since this is where students receive hands on work with airborne and satellite imagery, and must apply the techniques they have learned in lectures. Labs must be submitted in to the teaching assistant by the beginning of the 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. Quizzes will only cover material discussed in lectures.

Grade Distribution

• Lab Assignments: 30%
• Quizzes: 10%
• Mid Term Exam: 30%
• Final Exam: 30%

Office Hours

The format of the lectures are still to be determined. Some of the synchronous sessions will be treated as Question and Answer periods related to pre-recorded lectures. In addition, I will announce regular “office hours” during which I will be available to answer your questions or discuss any issues via video conferencing.

Lecture Topics and Lab Schedule

A detailed schedule of lectures and labs in the course will be released during the first week. The tentative topics to be covered each week are as follows:

• Introduction to remote sensing and history of Earth Observation
• Physical principles of light and electromagnetic radiation
• Image resolution and data
• Remote sensing platforms and air photo interpretation
• Photogrammetry
• Optical and Hyperspectral remote sensing
• Microwave remote sensing
• Lidar remote sensing
• Thermal remote sensing
• Application of remote sensing: land cover change, geology, hazards

Laboratory Exercises

There are tentatively five equally-weighted laboratory exercises, worth a total of 30% 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).

The format of synchronous lab sessions will be announced by your GTA at the beginning of the course.


**Laboratory Times**

- 0101 Mon 02:30PM – 04:20PM
- 0102 Wed 02:30PM – 04:20PM
- 0103 Wed 11:30AM – 01:20PM
- 0104 Fri 09:00AM – 11:20AM

**Laboratory Fee**

There are no laboratory or printing fees associated with this course. All lab assignments are to be submitted in digital format to folders that will be set upon the Courselink page for this course.

**Territorial Acknowledgements**

We acknowledge that the University of Guelph resides on the ancestral lands of the Attawandaron people and more recently, the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer our respect to our Anishinaabe, Haudenosaunee and Métis neighbours as we strive to strengthen our relationships with them.

Today, this gathering place is home to many First Nations, Métis and Inuit peoples and acknowledging them reminds us of our important connection to this land where we learn and work.

**E-mail Communication**

As per university regulations, all students are required to check their 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**

Late assignments will be assessed a penalty of 10% per day (not including weekends). After the graded assignment has been handed back to the class no grade can be assigned on late work.
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**

The last date to drop one-semester courses, without academic penalty, is Friday, December 4th, 2020. For regulations and procedures for Dropping Courses, see 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 of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: [http://www.uoguelph.ca/csd/](http://www.uoguelph.ca/csd/)

**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. An example of academic misconduct that might occur in this course is a student copying an answer or using a map/image from another student. Students must create their own digital files for computer-based exercises. 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.