GEOG*2420 The Earth from Space (0.5 CR)

University of Guelph (Main Campus),
Department. of Geography, CSAHS,
Fall 2019 (draft)

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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 Calendar 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 Richards Building Rm. 2529. In addition, each student must attend one three-hour lab per week.

Text and Other Resources

The main recommended text for this class is:


Note that there is a softcover version of this book for less than $50 (ISBN: 9789332518940) that you can order on Amazon. Although purchase of the text is optional, it is strongly recommended that you use this text as a study aid. I have placed a copy of it on reserve in the library, but you should consider purchasing your own copy. A worthwhile alternative study resource is:


I have also placed a copy of this book 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.
Grade Distribution

- Lab Assignments: 40%
- Mid Term Exam: 25%
- Final Exam: 35%

Office Hours

If you are having difficulties with the lab, please see one of the course TAs. TA office hours are to be scheduled and will be announced upon first meeting. For any other matters, please feel free to visit me during my office hours (Stated above) or e-mail me.

Import Dates

Monday September 11 - First class
Monday October 9 — Thanksgiving holiday (no class)
Wednesday October 11 — Mid-term examination (in class; worth 25%)
Friday December 1 - lecture to make up for lost Thanksgiving Monday
Thursday December 7 — Final examination 11:30AM-1:30PM, location to be announced (worth 35%)

Lecture Topics and Readings (DRAFT)

Block 1: Introduction to Earth Observation

- Course Introduction (Chapter 1 pg. 1-8)
- History of aerial photography and remote sensing (Chapter 3)
- Electromagnetic radiation and the spectrum (Chapter 2)
- Colour theory (Chapter 4 pg. 104-106)
- Image resolution (Chapter 1 pg. 14-20)

Block 2: Earth Observation Technologies and Techniques

- Airborne and spaceborne imaging systems (Chapter 4 pg. 91-104; Chapter 7)
- Photographic filtration and film (Chapter 4 pg. 104-124)
- Flight planning (Chapter 4 pg. 124-125)
- Photogrammetry and photogrammetric products (Chapter 6)

Block 3: Image Interpretation
• Principles and techniques of image interpretation (Chapter 5)
• Remote sensing of vegetation (Chapter 11)
• Remote sensing of water (Chapter 12)
• Remote sensing of soils, landforms, and geology (Chapter 14)

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. (DRAFT)

- Lab 1 starts week of Sept. 18 (due week of Oct. 2)
- Lab 2 starts week of Oct. 2 (due week of Oct. 16)
- Lab 3 starts week of Oct. 16 (due week of Oct. 30)
- Lab 4 starts week of Oct. 30 (due week of Nov. 13)
- Lab 5 starts week of Nov. 13 (due week of Nov. 27)

**Laboratory Times**

- 0101 Mon 02:30PM – 05:20PM
- 0102 Wed 02:30PM – 05:20PM
- 0103 Wed 07:00PM – 09:50PM
- 0104 Thur 07:00PM – 09:50PM

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 TA and the TA of the lab that you attend know about your situation.

**Laboratory Fee**

There is a $10.00 lab fee associated with this course, which will be added to students’ printing credits to cover the cost of print course materials (e.g. lab assignments). This lab fee is optional; if you recognize that you will not be using departmental printing services throughout the semester, you need not pay this fee. However, printing credits cannot be added to your account at a later time. Please pay the lab fee during your first lab session. Students must provide their own USB memory sticks or CDs to backup lab data.

**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 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 November 29, 2019. 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.

**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.