GEOG*3420 REMOTE SENSING OF THE ENVIRONMENT

The University of Guelph, Department of Geography, Environment and Geomatics
Winter 2019, 0.5 Credits

Instructor: Dr. John Lindsay
Email: jlindsay@uoguelph.ca
Office: Hutt Rm. 346
Office Hours: Wed. 10:00AM-12:00PM

COURSE DESCRIPTION

This course explores the nature and acquisition of remotely sensed imagery, and provides students with the technical expertise required to process and interpret this type of digital data. The application of digital image processing techniques to analyzing geographic problems is stressed, and its integration in a Geographic Information Systems (GIS) environment is demonstrated.

This course is part of the geomatics sequence of courses offered by the Geography Department. The required prerequisite course (10.00 credits including GEOG*2420) laid the foundations with an introduction to the processes necessary for an understanding of the physical basis for remote sensing (i.e. energy and the atmosphere). The second year course (GEOG*2420) introduced basic concepts in earth imaging, focusing more on image interpretation, aerial photography, and photogrammetry. This course (GEOG*3420) provides a more detailed overview of remote sensing, focusing on the processing of satellite imagery and their applications. The final course in the sequence in the geomatics sequence of courses is GEOG*4480 Applied Geomatic, which allows students to further refine their geomatics (GIS and remote sensing) skill through a student-led project.

Topics include:

- Energy-Atmosphere-Earth surface interactions
- Examination of Earth-observation systems and platforms
- Characteristics of data from multi-spectral scanners, thermal and radar sensors
- Digital image processing techniques for manipulating and interpreting imagery
- Change detection
- Point-cloud processing
See the *Schedule of Lectures and Labs* for a more detailed listing of topics. By the end of this course, each of you should have a working knowledge of remote sensing data and related digital image processing techniques.

**COURSE SCHEDULE**

The course involves lectures and weekly hands-on computer exercises. The practical exercises provide an applied context to demonstrate the theory and concepts developed in lecture. For a detailed schedule of lecture and lab topics, please see the schedule in the *General Materials* section of the CourseLink page.

**LECTURES AND LABS**

Monday, Wednesday 01:30PM – 02:20PM MCKN, Room 231

Lab times:
Tues 11:30AM - 02:20PM (Hutt 236)
Mon 02:30PM - 05:20PM (Hutt 236)
You may not change your lab period without the permission of the instructor.

**RECOMMENDED TEXT BOOK**


**METHOD OF EVALUATION**

Laboratory exercises: 40%
Mid-term examination (Mon. March 4; in class): 30%
Final examination (April 22 Mon. 8:30AM - 10:30AM, Rm TBA): 30%

**LABORATORY EXERCISES**

The labs are designed to facilitate the application of digital image processing techniques to practical real-world problems. All labs take place in Room 236 Hutt. This lab is open daily from 8:30AM–4:30PM and during evenings and weekends (see posted schedule for hours). All students will be assigned a user name and password that will allow access to
the Department of Geography’s GIS Lab. In addition, students will be allocated file storage space on the Department’s file server for saving their exercises between sessions. It would be advisable to use a USB pen drive for additional storage, mobility, and back-up needs. The TAs will have access to students’ directories for grading purposes. All labs require that students submit their own work, although students are encouraged to work with their colleagues to learn the software. **There is a $10.00 lab fee associated with this course.** This covers the cost of handouts, printer paper, and ink cartridges. Students must supply their media for file back-up. Labs begin in the second week of the semester. Note: Material from all lab exercises will be covered on the final exam.

**Office Hours**

If you are having difficulties with the lab, please see the course TA. 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 or e-mail me.

**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.

**Note Taking**

Students are responsible for taking their own notes during lectures. Materials provided on the course blackboard page are incomplete and are not intended to replace student notes. I am not responsible for providing lecture material for missed lectures.

**E-mail Communication**

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

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.

**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.

**DROP DATE**

The last date to drop one-semester courses, without academic penalty, is March 8, 2019. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar.

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**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 book their exams at least 7 days in advance, and not later than the 40th Class Day. More information: Student Accessibility Services 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. 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.