

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES
CARLETON UNIVERSITY

GEOM3002 – INTRODUCTION TO REMOTE SENSING – FALL 2022

Instructor: Dr. Andrew Davidson

Lectures: Wednesdays, 18.05 – 19.55, (Zoom).

Office Hours: Wednesdays after class and by appointment (Zoom)

Email: andrew.davidson@carleton.ca

TA: Samantha Schultz

Labs: Thursdays, 12:35 – 14.25, A200 Loeb Building, **from week 2.**

Office Hours: Mondays 5-6pm, A200 LA **from week 3.**

Email: SamanthaJSchultz@cmail.carleton.ca

Description: Principles and methods of remote sensing; visual interpretation of air photos and satellite imagery; digital image processing, analysis and classification for thematic mapping; introduction to various active and passive remote sensing imagery types such as optical, hyperspectral, RADAR and LiDAR. We will use a variety of software in the course. Google Earth Engine is an online free cloud processing software. Other software (QGIS, SNAP, Pix4D are all available in our lab through Virtual Machine access). You will require familiarity with the Windows operating system. A Virtual Machine is available through the department so Mac and Linux users can access a Windows environment. It is also assumed that students will be able to use word processors and other utilities (Acrobat Reader, Winzip/7Zip, Notepad, Explorer etc). No coding skills are required, but students should be ready to learn how to use and develop some basic scripts in the labs.

The learning outcomes of this course are to:

- Understand the conceptual and technical background related to image formation and spectral reflectance theory, types of remote sensors currently in use
- Use theoretical understanding to determine the appropriate sensor to observe specific geographic phenomenon
- Perform visual interpretation of images, image enhancement, thematic mapping using remotely sensed imagery
- Use theoretical understanding to determine the best workflow for processing and analyzing remotely sensed imagery

This course will run online using a blended approach. Lectures will be given live on zoom during lecture time slot. My office hours will also be online. The aim is to use this time for you to get extra help if needed. There will be components of the group project where you need to be present during the lecture or lab periods.

Labs will be demonstrated by the Teaching Assistant in the classroom and supplemented through pre-recorded videos, uploaded in advance of the lab time slots. The lab timeslots will be informal and allow you to ask questions and get technical help. All questions concerning labs should be directed to the TA.

Attendance: Lectures will cover theoretical components of remote sensing and may also include software demonstrations. Labs will include software demonstrations and one-on-one help will be available for software and practical related questions. Virtual attendance will be required to some group project meetings to facilitate group discussion and collaboration. The dates and times of these meetings can be scheduled by the group members, but should conform to the general requirements of the project.

Readings 1) Readings from the web + Remote Sensing, A. Knudby (2021) online (free and open access): <https://ecampusontario.pressbooks.pub/remotesensing/>
2) Lecture presentations will be made available online.

Program:

1. *Lectures.* Twelve (12) lectures will be given, as per the schedule.
2. *Lab exercises.* Five (5) exercises will be assigned, as per the schedule.
3. *Midterm examination.* A take-home midterm examination will be scheduled.

Evaluation:	Lab reports	50%
	Midterm examination	25%
	Final Project	25%
	<i>TOTAL</i>	<i>100%</i>

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Labs: The five lab assignments vary in size and the length of time given to complete them. All assignments must be submitted through the Brightspace dropbox by the due date and time. **No late assignments will be accepted**, with the exception of those cases where a student is sick or if you have already arranged for academic accommodation as described in subsequent sections of this syllabus. In the case of illness, you must make arrangements with the course instructor prior to the due date/time. In place of a doctor's note or medical certificate, students are advised to complete the [self-declaration form](#) available on the Registrar's Office website to request academic accommodation for missed coursework including exams and assignments.

Schedule: See Brightspace for week-to-week lab, lecture and readings schedules.

Resources: *Help with laboratory and lecture materials:*
There are a variety of ways to get help if you are having difficulties with any of the course materials. PASS (see below), informal study groups with other classmates, judicious use of the text, lab manual and a variety of websites listed on WebCT are valuable resources. The course instructor is there to facilitate your learning. Ask for help when you need it! The instructor will maintain office hours, where you can drop in for assistance. If you need help outside those times, arrange a meeting with them.

Peer Assisted Study Sessions (PASS):

Organized by the Centre for Student Academic Support, peer assisted study sessions are weekly study sessions led by trained students who have earned an A in this course in past years. PASS facilitators will work with small groups of students to review course content and develop

course-appropriate learning strategies. Sessions are entirely voluntary and anonymous and are intended to offer a safe, friendly place to help students develop strategies to be successful. Whether your aim is to survive GEOG1010 or maintain that A average, the PASS facilitator can help you achieve your goal. For more information go to www.carleton.ca/pass, email pass@carleton.ca or call (613) 520-2600 Ext. 1523. Further details about sessions will be provided during the lecture period.

Academic conduct:

The University Senate defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This can include:

- (a) reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- (b) submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- (c) using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment; using another's data or research findings;
- (d) failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- (e) handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.

Plagiarism is a serious offence which cannot be resolved directly with the course instructor. A rigorous investigation is conducted by the Office of the Faculty Dean, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial.

Students should consult the Student Conduct: Instructional Offenses and Offenses of Conduct – Discrimination and Harassment sections of the Undergraduate Calendar for details regarding policies on academic misconduct. For more information see: <https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy.pdf>.

Requests for Academic Accommodations For Students with Disabilities:

Students with disabilities needing academic accommodations are required to contact a coordinator at the Paul Menton Centre to complete the necessary letters of accommodation. The student must then make an appointment to discuss their needs with the instructor at least two weeks prior to the first class or ITV test. This is to ensure sufficient time is available to make the necessary accommodation arrangements.

For Religious Observance:

Students requesting academic accommodation on the basis of religious observance should make a formal, written request to their instructors for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory academic event. Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in a way that avoids academic disadvantage to the student.

Students or instructors who have questions or want to confirm accommodation eligibility of a religious event or practice may refer to the Department of Equity and Inclusive Communities website for a list of holy days and Carleton's Academic Accommodation policies, or may contact an Department of Equity and Inclusive Communities Advisor in the Department of Equity and Inclusive Communities Department for assistance.

For Pregnancy:

Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Department of Equity and Inclusive Communities to complete a letter of accommodation. The student must then make an appointment to discuss their needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required. Please visit: <https://carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf>.

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/equity/sexual-assault-support-services>.

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>.