

**DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES  
CARLETON UNIVERSITY**

**GEOM4003 – REMOTE SENSING OF THE ENVIRONMENT**

**Instructor:** Dr. Andrew Davidson

Office Hours: Tuesday after class (or by appointment).

Lectures: Tuesday, 18.05 – 19.55, ONLINE (via ZOOM).

Email: [andrew.davidson@carleton.ca](mailto:andrew.davidson@carleton.ca)

**TA:** Samantha Schultz

Office Hours: TBD

Labs: Friday, 11.35 – 13.25, ONLINE (via ZOOM).

Email: [SamanthaJSchultz@cmail.carleton.ca](mailto:SamanthaJSchultz@cmail.carleton.ca)

**Prerequisite:** Geomatics 3002

**Objectives:** To develop skills and understanding of quantitative methods of remote sensing image data acquisition and analysis. To explore the use of remotely sensed information in a variety of applications.

**Topics:** Advanced image enhancement; land cover classification for thematic mapping; biophysical modeling; applications in resources, environment, and urban mapping. The focus of this course will be on analyzing environmental conditions and phenomenon using remotely-sensed imagery through spatial and statistical analysis. This course will use Google Earth Engine, a cloud based remote sensing progressing suite. Students will require access to the internet through a modern browser and a google account (i.e., Gmail, Google Drive). No coding skills are required but students will be expected to use and develop their own python scripts in the labs

**Readings** The following FREE and OPEN textbooks are made available via Brightspace:

- 1) A. Knudby 2021. *Remote Sensing*,
- 2) CEOS. 2018. *A Layman's Interpretation Guide To L-band and C-band SAR data*.
- 3) Various. 2022. *Cloud-based remote sensing with Google Earth Engine*.
- 4) Lecture presentations will be made available online.

**Program:**

1. *Lectures*. Thirteen (13) lectures will be given, as per the schedule.
2. *Lab exercises*. Ten (10) lab assignments will be assigned, as per the schedule.
3. *Final examination*. A final examination will be scheduled in the Final Exam period.

|                    |                                  |             |
|--------------------|----------------------------------|-------------|
| <b>Evaluation:</b> | Lab reports (10 labs at 6% each) | 60%         |
|                    | Final examination                | 40%         |
|                    | <b>TOTAL</b>                     | <b>100%</b> |

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.

**Final Exam:** A two-hour short-answer examination will be scheduled in the Final Examination period. Exam will be a combination of multiple choice, short answer, and long answer (synthesis) questions. No aids except calculator required.

**Labs:** All assignments must be submitted through Brightspace by the due date and time. The penalty for late labs is 10% per day unless accompanied by appropriate documentation, such as a medical certificate. Late labs will not be accepted more than two (2) days after their deadline. 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.

**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](http://www.carleton.ca/pass), email [pass@carleton.ca](mailto: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>.

Academic Accommodations : You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

*Pregnancy obligation:*

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. For accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form (click [here](#)).

*Religious obligation:*

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. For more details click [here](#).

*Academic Accommodations for Students with Disabilities:*

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or [pmc@carleton.ca](mailto:pmc@carleton.ca) for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the

first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).

*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 will 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>.