Remote Sensing of the Environment GEOM 4003 – Winter 2021

Department of Geography and Environmental Studies
Instructor: Evan Seed
Email: evanseed@cmail.carleton.ca
Office hours: TBD
TA: TBD

Course website: we will use cuLearn (GEOM 4003)

Lecture: Monday 14:35 – 16:25 (Asynchronous)
Labs: Monday 18:05 – 19:25 (Synchronous)

Course description: Advanced image enhancement; land cover classification for thematic mapping; biophysical modeling; applications in resources, environment, and urban mapping.

Prerequisite(s): Prerequisite(s): GEOM 3002 and Honours standing, or permission of the Department.

Course learning objectives:

(i) To explore digital image analysis, quantitative modelling, mapping and temporal analysis techniques for major applications of remote sensing with topics that include:

a. Advanced image enhancement for visual analysis: colour space transformation, multi-resolution data fusion, and principal components analysis.

b. Information extraction from remotely sensed imagery: image classification for thematic land cover mapping, temporal change detection and mapping, and biophysical modeling.

c. Techniques to improved data quality and information content: spectral transformations e.g. vegetation and soil indices, spatial transformations e.g. image texture algorithms, data calibration, and reduction of effects caused by atmosphere, sun-sensor-view angle geometry, and topography.

(ii) To develop technical skills and understanding of quantitative methods of remote sensing image data acquisition and analysis. There is a component of independent learning in this class that will allow you to develop and explore how to problem solve new concepts and problems in geomatics.

Evaluation:	Lab assignments	60%
	Project	40%

Labs: four lab assignments worth 15% each. Labs will require multiple weeks to complete.[1]

Project: an independent project to explore a topic in remote sensing image processing will be evaluated in stages: 10% project proposal, 10% literature review; 20% final poster submission.[1]

[1]Detailed schedule will be developed over the first few weeks of class and adjusted accordingly. Lecture time maybe used for additional one-on-one help for labs and project as the course progresses.

Remote Sensing of the Environment GEOM 4003 – Winter 2021

Assignments: All assignments must be produced on computer are to be digitally submitted to cuLearn by 23:59 EST on the assignment due date. Try to keep up with assignment due dates so as not to fall behind in your learning. It is the most common reason for grades that don't reflect a student's capabilities.

Software Access: this course will require access to image processing software available in a virtual environment. We will use installed software including PCI Geomatica, but may also use additional software e.g. ArcGIS, QGIS on a Windows platform. Use of other software may be possible and you may wish to explore learning different software as part of your independent project. You will be learning software both via tutorials and independently.

Please take this opportunity to configure your remote desktop computing environment either in Windows or MacOS so you are able to remote in and use the Geomatics Lab. Follow the link provided here and watch the video: https://carleton.ca/geography/remote-desktop-access-for-geomatics-software/

Text and Readings:

There is no defined course text i.e. concepts taught in class are covered in many books. I will provide readings and other material as required. A few recommended reference texts are:

1. Lillesand, T., R. Kiefer, and J. Chipman. 2015. Remote sensing and image interpretation. 7th edition. John Wiley and Sons. Toronto. Available in e-book version. https://www.wiley.com/enca/Remote+Sensing+and+Image+Interpretation%2C+7th+Edition-p-9781118919477

2. Jensen, J. R. 2015. Introductory digital image processing: A remote sensing perspective, 4th edition. Prentice-Hall. Available in e-book version. https://www.pearson.com/store/p/introductory-digital-image-processing-a-remote-sensing-perspective/P100000196639?viewAll=true

3. NRCAN Remote Sensing Tutorials. Available as a free downloaded PDF.

http://www.nrcan.gc.ca/earth-sciences/geography-boundary/remote-sensing/fundamentals/1430

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.

Collaborating: You may collaborate with others in working through the assignments, as peer-to-peer learning is encouraged and can be highly effective; however, you must prepare and submit your own separate lab assignments, written in your own words, which clearly demonstrates your understanding, interpretation and analysis unless otherwise stated on the assignment.

Remote Sensing of the Environment GEOM 4003 – Winter 2021

Statement on Plagiarism: 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:

- 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;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- 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;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- 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 that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They include sanctions ranges from a grade of zero for the assignment to suspension from your program of study and include a final grade of "F" for the course.

Requests for 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.
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.

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 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 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