**UNIVERSITY OF CALGARY**

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# GEOG 633
Winter 2024
## Research and Applications Remote Sensing

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| Section | Days | Time | Location |
|---|---|---|---|
| Lec 01 | We | 9:00AM – 11:45AM | ES 342 |
| Lab 01 | Mo | 9:00AM – 11:45AM | ES 415 |

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|---|---|
| Instructor: Greg McDermid | Office: ES 910 |
| Telephone: 403-220-4780 | Email: mcdermid@ucalgary.ca |
| Email communication will be through your UCalgary email address. | Office hours: By Appointment |

*The **Department of Geography** condemns the longstanding and continued injustices against those marginalized by racism, sexism, homophobia, transphobia, classism, xenophobia, able-bodied normativity, mental health profiling, and other forms of prejudice. We are pained by the fact that injustices are unevenly borne.* https://arts.ucalgary.ca/news/anti-racism-statement

### Territorial Acknowledgement
*The Department of Geography would also like to acknowledge the traditional territories of the people of the Treaty 7 region in southern Alberta. The City of Calgary is also home to Métis Nation of Alberta, Region III.* https://www.ucalgary.ca/indigenous/cultural-protocol

### Official Course Description
Review of basic and advanced principles of image analysis. Includes advanced laboratory techniques, integration of remote sensing with GIS, current research in remote sensing, project organization, and data sources for remote sensing.

### Course Objectives
This course explores intermediate and advanced topics in remote sensing. Topics and techniques will be examined through instructor- and student-led lectures, lab assignments, and critical discussions. Laboratory assignments will focus on hands-on workflows related to LiDAR, cloud computing, remotely piloted aircraft systems, and other relevant topics. Students will develop term projects, which will culminate in a report submitted at the end of term.

### Course Learning Outcomes
The Department of Geography is committed to student knowledge and skill development. The table below lists the key learning outcomes for this course, the program-learning outcomes to which they contribute, and the expected level of achievement.

| Course Learning Outcomes | PLO(s)* | Level(s)** |
|---|---|---|
| Explain and perform appropriate geometric and radiometric transformations for given applications | 3, 6 | 3 |
| Explain Transport Canada regulations surrounding remotely piloted aircraft systems | 3 | 2 |
| Use JavaScript for image acquisition and analysis | 6 | 1 |
| Use Google Earth Engine, LAS Tools, and other image-processing platforms | 5, 6 | 3 |
| Perform and evaluate workflows for generating orthomosaics, digital surface models, digital terrain models, and canopy height models from LiDAR and | 6 | 3 |

| | | |
|---|---|---|
| digital photogrammetric point clouds | | |
| Explain and perform flight-planning procedures for remotely piloted aircraft systems | **3, 6** | **2** |
| Identify, prepare, and present a remote sensing topic-of-interest lecture to the class | **5, 7** | **2** |
| Explain the peer-review process and critically evaluate peer-reviewed journal articles from remote-sensing journals | **7, 8** | **3** |
| Report and communicate technical procedures performed in the computer lab | **7, 8** | **3** |

*\*PLOs = Program Learning Outcomes: 1 = reflect and communicate diverse human-environment perspectives, 2 = identify and explain human-environment processes, 3 = implement sampling, data collection, analyses and communication methods, 4 = analyze spatial and temporal aspects of human-environment systems, 5 = employ knowledge, arguments, and methodologies for solving human-environment problems, 6 = evaluate geospatial data and manipulate it to create cartographic products, 7 = communicate geographic concepts using oral, written, graphic, and cartographic modes, and 8 = demonstrate literacy skills.*
*\*\*Levels: 1 = Introductory, 2 = Intermediate, and 3 = Advanced.*

## Prerequisites
Consent of the Department

## Course Format
Unless government- and university-imposed public health measures are reintroduced, ALL classes and tutorials will be offered synchronously.

## Learning Resources
There is no required textbook for this course. There are, however, several textbooks that make for good general reference material. It would be advantageous for students to own or gain access to one or more of the following texts:
- Jensen, J.E., 2016. Introductory Digital Image Processing: A Remote Sensing Perspective, 4th Edition. Pearson.
- Campbell, J.B., 2022. Introduction to Remote Sensing, 6th Edition. Guilford Press
- Lillesand, T. M, Keifer, R. W., and Chipman, J. W., 2015: Remote Sensing and Image Interpretation. 7th Edition. Wiley.

Required readings from other sources will be assigned – notifications will be posted online, and additional readings will not require purchase and be available through the UofC Library.

## Important Dates
The last day to drop this course and receive a tuition fee refund is **January 18, 2024**. The last day to add or swap a course for Winter 2024 is **January 19, 2024**. The last day to withdraw from this course is **April 9, 2024**. Please note that the University is closed on **February 19**, **March 29**, and **April 1, 2024**.

> For additional detailed course information posted by the instructor, visit the course Desire2Learn page online at
> https://d2l.ucalgary.ca/d2l/home.

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## Grading (Weighting)

| | | |
|---|---|---|
| 1. Laboratory Assignments | 30% | Three assignments, tentatively due Feb 5, Mar 4, and Mar 25 |
| 2. Presentations | | |
| Remote Sensing Topic of Interest | 10% | To be scheduled |
| Critical Review of Journal Article | 10% | To be scheduled |
| 3. Two Term Tests (12.5% each) | 25% | Tentatively scheduled Feb 14 and April 8 |
| 4. Term Project | | |
| Project Proposal | 5% | Feb 28 |
| Project Report | 15% | April 9 |
| 5. Class Participation | 5% | N/A |

There is no final examination for this course.

It is not essential to pass all components to pass the course as whole

Only pens, pencils and erasers are allowed in exams.  No other materials or devices are allowed.

Without prior arrangements, late assignments will be assessed a 10% penalty per day.

## Grading System

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 96 – 100 | A+ | 77 – 80 | B | 59 – 61 | C- | | |
| 90 – 95 | A | 71 – 76 | B- | 55 – 58 | D+ | | |
| 86 – 89 | A- | 65 – 70 | C+ | 50 – 54 | D | | |
| 81 – 85 | B+ | 62 – 64 | C | 0 – 49 | F | | |

## Flexible Grade Option (CG Grade)
https://www.ucalgary.ca/pubs/calendar/current/f-1-3.html

## Missed Assignment or Assessments
A student who misses an assignment or assessment will receive a grade of zero. If a student communicates with the instructor and explains the circumstances around the absence or missed assignment, the instructor may set another assessment or make other alternative arrangements. An instructor will normally make this decision based on the information provided by the student.

In the event that a student misses an assignment or in-person assessment due to illness, supporting documentation, such as a medical note or a statutory declaration will be required see: https://www.ucalgary.ca/pubs/calendar/current/m-1.html
Please refer to https://www.ucalgary.ca/registrar/registration/appeals/student-faq for frequently asked questions concerning the provision of a medical note/statutory declaration.

## Supplementary Fees
Not applicable.

***For additional detailed course information posted by the instructor, visit the course Desire2Learn page online at https://d2l.ucalgary.ca/d2l/home.***

**UNIVERSITY OF CALGARY**

*SUPPLEMENTAL INFORMATION*

**University of Calgary Academic Integrity Policy**
Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. The University Calendar includes a statement on the principles of conduct expected of all members of the university community (including students, faculty, administrators, any category of staff, practicum supervisors, and volunteers), whether on or off university property. This statement applies in all situations where members of the university community are acting in their university capacities. All members of the university community have a responsibility to familiarize themselves with the principles of conduct statement, which is available at: www.ucalgary.ca/pubs/calendar/current/k.html.

**Plagiarism, Cheating, and Student Misconduct**
The University of Calgary is committed to the highest standards of academic integrity and honesty.  Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect.

Academic dishonesty is not an acceptable activity at the University of Calgary, and students are **strongly advised** to read the Student Misconduct section in the University Calendar at: www.ucalgary.ca/pubs/calendar/current/k-3.html. Often, students are unaware of what constitutes academic dishonesty or plagiarism. The most common are (1) presenting another student's work as your own, (2) presenting an author's work or ideas as your own without adequate citation, and (3) using work completed for another course. Such activities will not be tolerated in this course, and students suspected of academic misconduct will be dealt with according to the procedures outlined in the calendar at: https://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-procedure

For students wishing to know more about what constitutes plagiarism and how to properly cite the work of others, the Department of Geography recommends that they attend Academic Integrity workshops offered through the Student Success Centre:  https://www.ucalgary.ca/student-services/student-success/learning/academic-integrity

**Instructor Intellectual Property**
Information on Instructor Intellectual Property can be found at https://www.ucalgary.ca/legal-services/university-policies-procedures/intellectual-property-policy

**Freedom of Information and Protection of Privacy**
Freedom of Information and Protection of Privacy (FOIP) legislation in Alberta disallows the practice of having students retrieve assignments from a public place, such as outside an instructor's office, the department office, etc. Term assignments will be returned to students individually, during class or during the instructor's office hours; if students are unable to pick up their assignments from the instructor, they must provide the instructor with a stamped, self-addressed envelope to be used for the return of the assignment.

**Human subjects**
Students in the course will not be expected to participate as human subjects or researchers.

**Internet and electronic communication device information**
There are no restrictions on the use of laptops and tablets in class if they are used to take notes or find information relevant to the class, and if there is no disturbance or distraction of other students or the instructor.  Phones must be turned off during class, unless you have previously identified yourself to the instructor as a health care or law enforcement professional.

**Referencing Standard**
In written work presented in this class, the two accepted methods for referencing the work of others will be (1) Chicago Manual of Style:  https://www.chicagomanualofstyle.org/home.html or (2) American Psychological Association: https://apastyle.apa.org/products/publication-manual-7th-edition .

**Resources and Writing Support**
Please note writing support resources provided by the Student Success Centre https://ucalgary.ca/ssc/resources/writing-support and the library https://libguides.ucalgary.ca/guides/

**Exams & Deferrals**
Exam deferrals are granted with a legitimate reason, e.g., illness and scheduling conflicts due to work and/or extra-curricular activities. Please inform the instructor in advance via e-mail or in person to reschedule.
https://www.ucalgary.ca/registrar/exams

**Posting of Grades and Picking-up of Assignments**
Graded assignments will be returned by the instructor or teaching assistant personally during scheduled lecture or laboratory periods, unless they are made available electronically through the course D2L webpage. Grades and assignments will not be available at the Department of Geography's main office and assignments cannot be dropped off at the Department Office.

**Academic Accommodations**
It is the student's responsibility to request academic accommodations, according to the university policies and procedures listed in the University Calendar.

The student accommodation policy can be found at: https://www.ucalgary.ca/pubs/calendar/current/b-6-1.html

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure

Students needing an accommodation based on a protected ground other than disability should communicate this need, preferably in writing to their instructor or the Department Head (email: freeman@ucalgary.ca).

**Copyright Legislation**
All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright https://ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy and requirements of the copyright act at (https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Act.

**Course evaluations and student feedback**
Student feedback will be sought at the end of the course through the standard University Student Ratings of Instruction (USRI) and Faculty course evaluation forms.

**Wellness and Mental Health Resources**

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness, and academic success and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support, or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, https://www.ucalgary.ca/wellnesscentre/services/mental-health-services) and the Campus Mental Health Strategy website (http://www.ucalgary.ca/mentalhealth/).

Students requiring assistance are encouraged to email the **Student at Risk line** if they or others appear to need wellness assistance:  sar@ucalgary.ca For more immediate response, please call: 403-210-9355 and select option #2.

**Sexual Violence Policy**

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. Please see the policy available at https://www.ucalgary.ca/legal-services/university-policies-procedures/sexual-and-gender-based-violence-policy

**Contact Information for Student and Faculty Representation**

- Student Union VP Academic 403-220-3911, suvpaca@ucalgary.ca
- Students Union Representatives for the Faculty of Arts – 403-220-3913, arts1@su.ucalgary.ca, arts2@su.ucalgary.ca, arts3@su.ucalgary.ca, arts4@su.ucalgary.ca
- Student Ombuds Office information can be found at: www.ucalgary.ca/ombuds/

**Emergency Evacuation/Assembly Points**

Assembly points for emergencies have been identified across campus. Assembly points are designed to establish a location for information updates from the emergency responders to the evacuees; from the evacuated population to the emergency responders. For more information, see the University of Calgary's Emergency Management website: https://www.ucalgary.ca/risk/emergency-management. In case of emergencies and fire drills, please note the ITC Food Court as the assembly/muster point.

**Campus Safewalk**

Campus Security, in partnership with the Students' Union, provides the Safewalk service, 24 hours a day, to any location on Campus, including the LRT station, parking lots, bus zones, and university residences.  Contact Campus Security at 220-5333 or use a help phone, and Safewalkers or a Campus Security officer will accompany you to your campus destination.