

GEOGRAPHY FINAL COURSE OUTLINE: FALL 2021

GEOGRAPHY 484 GFC HOURS (3-2) Remote Sensing Essentials

Section	Days	Time	Location
LEC 01	TBA		Web-based
LAB 01	TBA		Web-based

Instructor: Geoff Hay	Office: ES 304
Telephone: 403 220-4768	Email: gjhay@ucalgary.ca
Email communication will be through your UCalgary email address.	Office hours: By Appointment only

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>

Official Course Description

Instruction in the background, use and interpretation of remote sensing imagery. Labs and topics introduce fundamental principles of raster-based image analysis, visualization and classification. Labs will include identification, interpretation and mapping of both physical and cultural landscape features.

Course Objectives

The course will include instruction in theory, knowledge, use and interpretation of remote sensing imagery. Specific labs will engage students in the identification, interpretation and mapping of both physical and cultural landscape features, as well as multi-band land-cover/land-use classifications and multi-temporal analysis. Students will learn to use state-of-the-art digital image processing software to solve real-world processing challenges. They will also gain practical experience using remote sensing technologies for science/resource management and develop technical/scientific writing skills through formal lab reports.

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)
Identify characteristics of EMR production, transmission & reflection: use wavelength & frequency fluently.	2	1,2
Describe RS history of space and airborne technology @ its current influence.	2	1,2
Perform reflectance & radiance calibrations & correct for atmosphere influence.	3,4,6	2,3
Manipulate data layers, creating colour composites, enhance and visually evaluate satellite and airborne digital images.	3,4,6	1,2
Perform neighbourhood operations on digital images to exploit spatial structure.	4,5,6	1,2
Explain and critique the foundations of RS – including EMR spectrum, energy-matter interactions & the elements of image interpretation.	2,5,7	1,2
Explain and perform RGB colour theory and contrast-enhancements to display multi-band images.	4,5,6	1,2
Explain and perform methods of geometric and radiometric corrections and know when to apply them & to what kinds of data.	4,5,6	1,2

Explain & perform basic image transforms: PCA, Veg Indices, Image Algebra, etc.	4,5,6	1,2
Explain and perform all aspects of classification: supervised/unsupervised, including training and test class selection and accuracy assessments.	2,3,4,5,6	2,3
Explain/critique strengths/limitations of pixel/object-based processing & MAUP.	4,5,6,7	2,3
Write technical reports using standard formats and citation standards.	7,8	2,3

*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

3 units from Geography 231, 380.

Course Format

- This course format is based on a weekly asynchronous pre-recorded Zoom and PowerPoint lecture posted to D2L as well as accompanying recommended readings and related lab materials.
- Based on the course schedule (forthcoming) the TA will post (on D2L) a brief overview lecture of the lab materials and requirements, including supplementary learning materials (i.e., videos, tutorials, etc.), due dates and a lab rubric to assist students in understanding how the labs will be graded and the quality of work required.
- The instructor and TA will also provide (forthcoming) links to an online environment (i.e., MS Teams, Slack, etc.) for group support and discussion.
- Students are invited to participate in this online support/discussion environment – but it is not mandatory.
- Respectful dialogue is required to participate in this discussion group, and students should expect Instructor/TA feedback with 24 hrs of posting questions/concerns. This service is not required by the UC but is provided by the Instructor/TA to assist with challenges during this online transition.
- Midterm and Final exams will all be online using D2L (more information in classes).
- The TA is responsible for all grading of the Labs. Please contact the TA regarding Lab concerns.
- Only email sent to the instructor using the course D2L tools will be answered.
- Labs will be conducted online using a secure VPN to use UC software licences (i.e., ENVI), as well as using online tools such as Google Earth Engine.

Learning Resources

No textbook is required for this course. However, numerous related textbooks are available for overnight sign out from the Resource room. The Internet will serve as an invaluable resource for information in this course and a digital Remote Sensing Text created by CCRS will be provided (see link below). There are, however, several recommended 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:

- **Highly recommended:** Jensen, J. R., 2015: Introductory Digital Image Processing: A Remote Sensing Perspective. Prentice Hall. 4th Edition. pp 623.
- **(Free)** ****Fundamentals of Remote Sensing (CCRS - Tutorial), 258 pp.** <https://www.nrcan.gc.ca/maps-tools-and-publications/satellite-imagery-and-air-photos/tutorial-fundamentals-remote-sensing/9309>
- Lillesand, T. M, Keifer, R. W., Chipman, J. W., 2015. *Remote Sensing and Image Interpretation*. 7th Edition. Wiley, pp 720.
- Northey, M. and D.B. Knight, 2012: *Making Sense, A Student's Guide to Research and Writing in Geography and Environmental Sciences*, Fifth Edition. Oxford University Press.

Assessment Methods

Item	Weighting	Dates
Lab 1	10%	TBA
Lab 2	10%	TBA
Lab 3	10%	TBA
Lab 4	15%	TBA
Midterm 1	20%	▪ 10:00 AM on Oct 6, 2021 until 10:00 AM, Oct 07, 2021
Midterm 2	20%	▪ 10:00 AM on Nov 10, 2021 until 10:00 AM, Nov 11, 2021
Final Exam	15%	▪ 10:00 AM on Dec 08, 2021 until 10:00 AM, Dec 09, 2021
Total	100%	

All exams will be online using D2L, and the final exam (during the last week of classes) will not be scheduled by the Registrar's Office.

**Please note that due to the digital and random allocation of questions independently for each student during exams, it will not be possible to directly go over each student's individual exam results. Consequently, individual exam reviews will not be made available to students post exam.

Use of internet and electronic devices in class.

Aids (i.e., textbooks, calculators, laptops, etc.) are permitted during online exams, but communication with others is strictly prohibited.

What students should do if they miss a required component of the course or have technology issues during exams.

- In the event that a student misses a midterm or any course work due to illness, domestic affliction, or religious conviction, 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.
- In the event that one or more students experience technology issues during their online exams, or with the posting of their labs please note that we are here to assist you and additional time/resources will be provided once you have reached out to your Instructor or TA and explained the situation. *Please do not inappropriately take advantage of this opportunity.*
- **If you miss an assignment or examination, or you cannot take an exam during the scheduled time**, and you provide the instructor with the appropriate documentation you will have one opportunity to make arrangements for the missed work. If possible, please contact the instructor prior to missing an assignment or examination. We recognize that "life happens" and will do our best to accommodate you. However, without appropriate documentation and or instructor contact, you will receive a zero for that portion of your grade.

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

Posting of Grades and Picking-up of Assignments

All student completed assignments will be posted to the appropriate Dropbox on D2L (TBA) for the TA to grade.. Graded assignments will be 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.

Flexible Grade Option (CG Grade)

<https://www.ucalgary.ca/pubs/calendar/current/f-1-3.html>

Exams & Deferrals <https://www.ucalgary.ca/registrar/exams>

Supplementary Fees

No supplementary fees will be assessed.

Human subjects

No research will be carried out on human subjects.

Referencing Standard

In written work presented in this class, the accepted method for referencing the work of others will be the Chicago Manual of Style: <https://www.chicagomanualofstyle.org/home.html>

Important Dates

- The last day to drop this course and receive a tuition fee refund is **Thursday, September 16th, 2021**. The last day to withdraw from this course is **Thursday, December 9th, 2021**.
- There are no classes **Sept 30th, 2021**.
- The last day of classes is **December 9, 2021**.

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 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.

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).

Online courses - Learning Technologies and Requirements

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology.

- A computer with a supported operating system, as well as the latest security and malware updates
- A current and updates web browser
- Webcam (built in or external)
- Microphone and speaker (built in or external) or headset with microphone
- Broadband internet connection
- Any additional software required in class will be free to use and instructions will be provided prior to use.

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a “live” video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published with the instructor’s permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith and respect (as per the [Code of Conduct](#)). When entering Zoom or other video conferencing sessions (such as MS Teams), you play a role in helping create an effective, safe and respectful learning environment. Please be mindful of how your behavior in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities. Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies (e.g. Student Non Academic Misconduct Policy). If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your Zoom sessions visit: <https://elearn.ucalgary.ca/guidelines-for-zoom/>.

If you are unable to attend a Zoom session, please contact your instructor to arrange an alternative activity for the missed session (e.g., to review a recorded session). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (for group work, presentations, etc.).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only and will not be shared or used for any other purpose.

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.

Accessibility

Students will have access to a full PDF of the presentation. The accompanying lecture will follow the PDF content. Captions will not be available on the Zoom presentation.

Copyright Legislation

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright <https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy> and requirements of the copyright act (<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.

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/policies/files/policies/sexual-violence-policy.pdf>

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>

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.