



**GEOGRAPHY FINAL COURSE OUTLINE: FALL 2017**

**GEOGRAPHY 333  
H(3-3)**

**Remote Sensing I**

<b>Section</b>	<b>Days</b>	<b>Time</b>	<b>Location</b>
LEC 01	Tu/Th	08:00 – 09:15	ES 920
LAB 01	We	08:00 – 10:50	ES 407
LAB 02	We	14:00 – 16:50	ES 407

<b>Instructor:</b> Dr. Geoffrey J. Hay	<b>Office:</b> ES 304
<b>Telephone:</b> 403-220-4768	<b>Email:</b> <i>Please email through D2L*</i>
<b>Office Hours:</b> <i>By Appointment Only</i>	
<b>TA:</b> Sarah St. Germain	<b>Email:</b> <i>Please email through D2L*</i>
<b>TA:</b> Cammy Radloff	<b>Email:</b> <i>Please email through D2L*</i>

- *\*Please use email for administrative concerns only. Substantive issues should be addressed in person, either in class, during office house, or by appointment.*

**Please note: the appropriate emergency evacuation assembly point for all classes taught in Earth Sciences is ICT Food Court.**

**Official Course Description:**

Basic instruction in the use and interpretation of remote sensing imagery. Identification, interpretation and mapping of both physical and cultural landscape features will be covered.

**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 they facilitate and the expected level of achievement.

<b>Course Learning Outcomes</b>	<b>PLO(s)</b>	<b>Level(s)</b>
<b>Identify characteristics of EMR production, transmission &amp; reflection; use wavelength &amp; frequency fluently.</b>	<b>2</b>	<b>1,2</b>
<b>Describe RS History of space and airborne technology &amp; its current influence.</b>	<b>2</b>	<b>1,2</b>
<b>Perform reflectance &amp; radiance calibrations, &amp; correct for atmosphere influence.</b>	<b>3,4,6</b>	<b>2,3</b>
<b>Manipulate data layers, creating color composites, enhance and visually evaluate satellite and airborne digital images.</b>	<b>3,4,6</b>	<b>1,2</b>
<b>Perform neighborhood operations on digital images to exploit spatial structure.</b>	<b>4,5,6</b>	<b>1,2</b>
<b>Explain and critique the foundations of RS – including EMR spectrum, energy-matter interactions &amp; the elements of image interpretation.</b>	<b>2,5,7</b>	<b>1,2</b>
<b>Explain and perform RGB color theory and contrast-enhancements to display multi-band images.</b>	<b>4,5,6</b>	<b>1,2</b>
<b>Explain and perform methods of geometric and radiometric corrections and know when to apply them &amp; to what kinds of data.</b>	<b>4,5,6</b>	<b>1,2</b>
<b>Explain &amp; perform basic image transforms: PCA, Veg Indices, Image Algebra, etc</b>	<b>4,5,6</b>	<b>1,2</b>
<b>Explain and perform all aspects of classification: supervised/unsupervised, including training and test class selection and accuracy assessments.</b>	<b>2,3,4,5,6</b>	<b>2,3</b>
<b>Explain/critique strengths/limitations of pixel/object-based processing &amp; MAUP.</b>	<b>4,5,6,7</b>	<b>2,3</b>
<b>Write technical reports using standard formats and citation standards.</b>	<b>7,8</b>	<b>2,3</b>

**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, (3) Advanced.

**Prerequisites:** Geography 231

**Supplementary Fees:** (field trips etc). N/A

**Text(s)/Readings:** (No Required Text for Class)

**Recommended Text:**

- **\*\*\*Jensen, J. R., 2015: Introductory Digital Image Processing: A Remote Sensing Perspective. Prentice Hall. 4<sup>th</sup> Edition. pp 623.**
- *Lillesand, T. M, Keifer, R. W., Chipman, J. W., 2015. Remote Sensing and Image Interpretation. 7<sup>th</sup> 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.

**Grading (Weighting):**

Item	Weighting
Lab 1	10%
Lab 2	10%
Lab 3	10%
Lab 4	10%
Lab 5	10%
Midterm Exam	30%
Final Exam	10%
Class Participation	10%
<b>Total</b>	<b>100%</b>

**Note:** The final exam will **NOT** be scheduled by the registrar. It is not necessary to pass each course component in order to pass the course.

**Grading System:**

A+	90-100	B+	77-79.9	C+	67-69.9	D+	57-59.9	F	0-49.9
A	85-89.9	B	73-76.9	C	63-66.9	D	53-56.9		
A-	80-84.9	B-	70-72.9	C-	60-62.9	D-	50-52.9		

For additional detailed course information posted by the Instructor Desire2Learn at <https://d2l.ucalgary.ca/d2l/home>

**Human Subjects - Students will not participate as subjects or researchers on human subjects**

**USRI**

At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses ([www.ucalgary.ca/usri](http://www.ucalgary.ca/usri)). Your responses make a difference - please participate in USRI Surveys.

**Writing across the Curriculum**

Writing skills are not exclusive to English courses and, in fact, should cross all disciplines. The University supports the belief that throughout their University careers, students should be taught how to write well so that when they graduate their writing abilities will be far above the minimal standards required at entrance. Consistent with this belief, students are expected to do a substantial amount of writing in their University courses and, where appropriate, members of faculty can and should use writing and the grading thereof as a factor in the evaluation of student work. The services provided by the Writing Support Services can be utilized by all undergraduate and graduate students who feel they require further assistance.

### **Principles of Conduct**

The University of Calgary 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 the University's property. This statement applies in all situations where the members of the University community are acting in their University capacities. All Members of the University Community have a responsibility to familiarize themselves with this statement which is available at: <http://www.ucalgary.ca/pubs/calendar/current/k.html>

### **Internet and electronic communication device information:**

No restriction 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 time unless you are a health care or law enforcement professional with appropriate ID.

### **Plagiarism**

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. Quite 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 proper referencing and 3) using work completed for another course. This activity will not be tolerated in this course and students conducting themselves in this manner will be dealt with according to the procedures outlined in the calendar: <http://www.ucalgary.ca/pubs/calendar/current/k-5.html>

### **Academic Accommodations:**

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. The procedure can be found at:

[ucalgary.ca/policies/files/policies/student-accommodation-policy](http://ucalgary.ca/policies/files/policies/student-accommodation-policy)

Students needing an accommodation based in relation to their coursework or to fulfil requirements for a graduate degree, on a Protected Ground other than Disability, should communicate this need, preferably in writing to their instructor or the appropriate Associate Dean or Department Head.

[ucalgary.ca/policies/files/policies/student-accommodation-policy](http://ucalgary.ca/policies/files/policies/student-accommodation-policy)

Students needing an Accommodation unrelated to their coursework or the requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience).

### **Freedom of Information and Protection of Privacy**

*FOIP:* The Freedom of Information and Protection of Privacy (FOIP) legislation disallows the practice of having students retrieve assignments from a public place, e.g., outside 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 provide the instructor with a stamped, self-addressed envelope to be used for the return of the assignment.

**Re: Posting of Grades and Picking-up of Assignments**

- All assignments will be handled through D2L or personally.
- Their own grades will be available to each student on D2L by password access. Grades will **not** be available at Geography's main office.

**Contact Information for Student and Faculty Representation**

- SU VP Academic Phone: 220-3911 and e-mail: [suypaca@ucalgary.ca](mailto:suypaca@ucalgary.ca)
- SU Faculty Rep. Phone: 220-3913 and e-mail: [arts1@ucalgary.ca](mailto:arts1@ucalgary.ca)

The students ombudsman office information can be found at:

<http://www.su.ucalgary.ca/page/affordability-accessibility/su-structure/contact-info>

**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, 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.

**Faculty of Arts Program Advising and Student Information Resources**

- Have a question, but not sure where to start? The new Faculty of Arts Students Centre is your information resource for everything in Arts! Drop in at SS 102, call us at 403-220-3580 or email us at [ascarts@ucalgary.ca](mailto:ascarts@ucalgary.ca) you can also visit the Faculty of Arts website at <http://arts.ucalgary.ca/undergraduate> which has detailed information on common academic concerns.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at (403) 210 7625 or visit them at the MacKimmie Library Block.

Contact for Students Union Representatives for the Faculty of Arts:

[arts1@su.ucalgary.ca](mailto:arts1@su.ucalgary.ca), [arts2@su.ucalgary.ca](mailto:arts2@su.ucalgary.ca), [arts3@su.ucalgary.ca](mailto:arts3@su.ucalgary.ca), [arts4@su.ucalgary.ca](mailto:arts4@su.ucalgary.ca)