

## GEOGRAPHY FINAL COURSE OUTLINE: FALL 2018

### GEOGRAPHY 333 H(3-3)

#### Remote Sensing and Raster GIS

Section	Days	Time	Location
LEC 01	TuTh	15:30 – 16:45	ES 443
LAB 01	Mo	08:00 – 10:50	ES 415
LAB 02	We	08:00 – 10:50	ES 407
LAB 03	Th	09:30 – 12:20	ES 415

Instructor: John Yackel	Office: ES 444
Telephone: 403 220 4892	Email: Please email through D2L *
Office Hours: By Appointment Only	
TA: Sarah St. Germain	Email: Please email through D2L *
TA: Hoi Ming Lam	Email: Please email through D2L *

- Please use email for administrative concerns only. Substantive issues should be addressed in person, either in class, during office hours, 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. Basic principles of raster display, computation and analysis. 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>
Identify characteristics of EMR production, transmission & reflection: use wavelength & frequency fluently.	<b>2</b>	<b>1,2</b>
Describe RS history of space and airborne technology @ its current influence.	<b>2</b>	<b>1,2</b>
Perform reflectance & radiance calibrations & correct for atmosphere influence.	<b>3,4,6</b>	<b>2,3</b>
Manipulate data layers, creating colour composites, enhance and visually evaluate satellite and airborne digital images.	<b>3,4,6</b>	<b>1,2</b>
Perform neighbourhood operations on digital images to exploit spatial structure.	<b>4,5,6</b>	<b>1,2</b>
Explain and critique the foundations of RS – including EMR spectrum, energy-matter interactions & the elements of image interpretation.	<b>2,5,7</b>	<b>1,2</b>
Explain and perform RGB colour theory and contrast-enhancements to display multi-band images.	<b>4,5,6</b>	<b>1,2</b>
Explain and perform methods of geometric and radiometric corrections and know when to apply them & to what kinds of data.	<b>4,5,6</b>	<b>1,2</b>
Explain & perform basic image transforms: PCA, Veg Indices, Image Algebra, etc.	<b>4,5,6</b>	<b>1,2</b>
Explain and perform all aspects of classification: supervised/unsupervised, including training and test class selection and accuracy assessments.	<b>2,3,4,5,6</b>	<b>2,3</b>
Explain/critique strengths/limitations of pixel/object-based processing & MAUP.	<b>4,5,6,7</b>	<b>2,3</b>
Write technical reports using standard formats and citation standards.	<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:** 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. 4th 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):**

<b>Item</b>	<b>Weighting</b>
Lab 1	10%
Lab 2	10%
Lab 3	10%
Lab 4	10%
Lab 5	10%
1 <sup>st</sup> Midterm Exam	20%
2 <sup>nd</sup> Midterm Exam	20%
Final Exam	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, visit the course Desire2Learn page online at <https://d2l.ucalgary.ca/d2l/home>.

### **SUPPLEMENTAL INFORMATION**

#### **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, faculty members can and should consider quality of writing as a factor in the evaluation of student work.

The services provided by Writing Support Services can be utilized by all undergraduate and graduate students who feel they require further assistance: [www.ucalgary.ca/ssc/writing\\_support/overview](http://www.ucalgary.ca/ssc/writing_support/overview).

#### **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: [www.ucalgary.ca/access/accommodations/policy](http://www.ucalgary.ca/access/accommodations/policy). 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: [www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf](http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf).

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

### **Principles of Conduct**

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](http://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](http://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: [www.ucalgary.ca/pubs/calendar/current/k-5.html](http://www.ucalgary.ca/pubs/calendar/current/k-5.html).

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

There is 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, unless you have previously identified yourself to the instructor as a health care or law enforcement professional. The use of any calculators and/or devices during examinations will be allowed only when specifically mentioned by the instructor.

### **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.

### **Posting of Grades and Picking-up of Assignments**

Graded assignments will be returned by the instructor or teaching assistant personally during schedule 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.

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

Have a question, but not sure where to start? The 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 provides detailed information about common academic concerns.

For guidance on course registration (add, drop, swap), information about paying fees, and assistance with your Student Centre, contact Enrolment Services at 403-210-7625 or visit them at the MacKimmie Block.

### **Contact Information for Student and Faculty Representation**

- SU VP Academic Phone: 220-3911 and e-mail: [suvpaca@ucalgary.ca](mailto:suvpaca@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: [www.ucalgary.ca/ombuds/](http://www.ucalgary.ca/ombuds/)

### **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/>).

### **Human subjects**

Students will not be expected to participate as subjects or researchers when research on human subjects may take place

### **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.

### **USRI Surveys**

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, so please participate in USRI surveys.