



Course Number	PLAN 608	Classroom	PF 2170 (Computer Lab.)
Course Name	Geographic Information Systems for Environmental Design		
Pre/Co-Requisites	N/A		
Instructor	Youjung Kim	Office Hours/ Location	by appointment/ PF 3173
	Email: youjung.kim@ucalgary.ca	Phone: 403.210.9223	
Class Dates	Lecture/Lab F 9:00AM – 1:00PM		
Instructor Email Policy	Please add Course Number on email title: [PLAN 608] . Please note that all course communications must occur through your @ucalgary email, and I will respond to emails sent via student's @ucalgary emails within 48 hours.		
Name and Email of Teaching Assistant(s)	Neal Greywall Email: navneal.brar@ucalgary.ca		

Course Description

This course offers students an opportunity to develop skill in geographic information systems (GIS) and their applications to environmental design questions. The laboratory-centred course takes a hands-on approach to learning with several student projects that address authentic problems in urban planning, regional planning and landscape design. The main emphasis of the course is on **the use of GIS tools and the interpretation of findings**. Relevant theory is discussed in order to support effective application of these tools. The course assumes no background in GIS and begins by examining a range of basic operations on spatial data to support cartography, proceeding to more advanced manipulations of these data to perform spatial analyses of sites, neighbourhoods, communities, regions and landscapes. The intent is to offer students broad exposure to applications of spatial information relevant to environmental design, and includes operations on data representing urban, demographic and environmental phenomena, in the forms of vector and raster datasets, digital elevation models (DEMs), and road networks.

Course Hours: 3 units (4hr – lecture & lab)

Course Learning Outcomes

Upon completion of this course, students will be able to:

1. develop an **empirical evidence-based orientation** when undertaking planning and design decisions and assess the quality of evidence that may be used in professional work.
2. understand selected concepts in **geography, cartography, spatial analysis, and network analysis** that are relevant to planning and designing at a variety of scales.
3. **assess the characteristics of sites, the suitability of sites, and the need for design interventions** at neighbourhood, community, regional and landscape scales.

4. use **spatial analytical techniques** to prepare quantitative and cartographic empirical evidence upon which to base planning and design decisions.
5. develop confidence to **obtain, handle, and manipulate spatial data** using mainstream GIS technologies for the purposes of cartographic representation and spatial analysis.

Teaching Approach

This **laboratory-based course** combines instructor-centred and student-centred classroom time with hands-on computer coaching by instructor and teaching assistants. Assessment focuses on the effective application of GIS-related knowledge rather than on recording evidence of its acquisition. Four course assignments collectively provide opportunities to **develop effective graphic and written communication skills within a planning and design context, produce and interpret quantitative spatial analyses relevant to environmental design.**

Learning Resources

There are no required textbooks for this course, but the following supplemental resources are recommended:

- Geographic Information Science and Systems (4th Edition) by Paul A. Longley, Michael F. Goodchild, David J. Maguire & David W. Rhind.
 - o <https://www.chapters.indigo.ca/en-ca/books/geographic-information-science-and-systems/9781118676950-item.html?ikwid=Geographic+Information+Science+and+Systems+by+Paul+A.+Longley+%2c+Michael+F.+Goodchild%2c+David+J.+Maguire+%26+David+W.+Rhind%2c+Wiley&ikwsec=Home&ikwidx=0#algoliaQueryId=1b05e7c2e9fcab9059009ecbf80cfd1>
- GIS Fundamentals: A First Text on Geographic Information Systems (7th Edition) by Paul Bolstad & Steven Manson.
 - o <https://www.gisfundamentals.org/>
- Getting to Know ArcGIS Pro 2.8 by Michael Law & Amy Collins.
 - o https://www.chapters.indigo.ca/en-ca/books/product/9781589487017-item.html?s_campaign=goo-SmartShop_Books_EN&gclid=Cj0KCQiAyracBhDoARIsACGFcS68743CNaT57q-XiuG48J3iTW1WGcZV0mslwUoE6h7LEvZVRV7WRAIaAnO5EALw_wcB&gclsrc=aw.ds
- Making Maps: A Visual Guide to Map Design for GIS (3rd Edition) by John Krygier & Denis Wood.
 - o <https://www.amazon.ca/Making-Maps-Third-Visual-Design/dp/1462509983>
(Online version is available in the University library.)

Assessment Components		
Assessment (Weight %)	Description	Aligned Course Learning Outcome
Map portfolio (25%)	<p>Create a portfolio that assembles evidence of in-class experimentation with cartographic and basic spatial analysis tools using ArcGIS Pro. The product will be a collection of map artifacts that meet certain criteria that will be provided. These maps will be associated with text that describe the process used to create the map and interpret what it shows. Full instructions will be provided on an assignment sheet distributed in class.</p> <p>(Due: Friday, February 10th before 9:00 am, electronically on D2L as a single PDF)</p>	1,2,3,4, and 5
Physiographic site analysis (20%)	<p>Working with digital elevation data perform a site analysis, and prepare a short report describing the findings. Full instructions will be provided on an assignment sheet distributed in class.</p> <p>(Due: Friday, March 3rd before 9:00 am, electronically on D2L as a single PDF)</p>	1,2,3,4, and 5
School walkshed infographic (15%)	<p>Perform analyses of school walksheds using a variety of tools and present quantitative comparisons of the properties of these areas in the form of a small poster infographic. Full instructions will be provided on an assignment sheet distributed in class.</p> <p>(Due: Friday, March 24th before 9:00 am, electronically on D2L as a single PDF)</p>	1,2,3,4, and 5
Site selection report (40%)	<p>Given a scenario for the selection of a site, students will prioritize the factors that are necessary to meet the client's expectations and assemble spatial data inputs in order to perform multi-criteria decision analyses. The product of this decision-support exercise will be a report to the client recommending a site, complete with cartographic and other empirical evidence. Full instructions will be provided on an assignment sheet distributed in class.</p> <p>(Due: Friday, April 14th before 4:00 pm, in print, at SAPL Main Office)</p>	1,2,3,4, and 5

Assessment and Evaluation Information
<p>The course evaluation will be based on four assessments, which are described in the Assessment Components. Complete details for these assignments as well as assessment criteria will be provided in class when the assignment is first introduced. All assignments will be done individually.</p> <p>Attendance and Participation Expectations: Class time will be provided to develop the skill necessary to complete these assignments. There will also be time reserved to complete them with coaching assistance of the instructor and TA. It is strongly encouraged to attend all classes.</p>

Guidelines for Submitting Assignments:

The first three assignments (ArcGIS Pro portfolio, physiographic site analysis, and school walkshed infographic) need to be submitted electronically on D2L as a single PDF as specified in the previous page. The final project (site selection report) needs to be submitted as a hard copy to SAPL Main Office for Both sections.

Final Examinations:

There will be no final examination.

Late Assignments:

In order to be fair to all students, assignments submitted after the deadline will be assessed using the rubric, the mark converted to a percent, and then **10% deducted (per week)** from the assignment total. Thank you for your help in avoiding this uncomfortable situation. If you find yourself in an emergency that you could not have planned for, and that you believe warrants an exception, please contact the instructor.

Grading Scale

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

The School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School. (<https://www.ucalgary.ca/pubs/calendar/current/salp-3-3.html>)

Topic Areas & Detailed Class Schedule

Week	Date	Topic		Assignments/ Due Dates
		Lecture	Lab	
1	Jan 13	Introduction to GIS, course outline, data types and projections	Introducing ArcGIS Pro - Working with geodatabases and spatial data - Exploring our course geodatabase - Mapping of feature data · changing the symbology / varying by attributes / using the selection tool / creating new layers from selections - Choosing and changing the projection - Layouts with multiple data frames	
2	Jan 20	Cartography I	- Adding north arrows, scale and legends - Clipping feature data - Summarizing data by polygons - Converting polygons to points - Joins and spatial joins - Importing and selecting palettes	
3	Jan 27	Analysis of spatial relationships	- Select by spatial relationships · connected (intersection) / contain and within / proximity - New layers based on spatial relationships · intersecting lines and polygons / point distances - Summary statistics on attribute tables - Making charts from attribute tables	
4	Feb 3	Cartography II & III	- Cartography examples - Labelling features - Using Editor to create and simplify features - Using downstream software to improve the map	
5	Feb 10	Physiographic site analysis I	- Selective mapping of rasters · using classified and stretched schemes / using raster calculator - Mapping of topography · digital elevation models / deriving slope and aspect / deriving solar radiation	Assignment 1 / Due 9AM, Feb. 10
6	Feb 17	Physiographic site analysis II	- Mapping of viewsheds - Inferring hydrology from topography · predicted drainage paths	
7	Feb 24	No class		Feb 19 -25 Term Break
8	Mar 3	Service area analysis I	- Finding distance-based service areas - Finding road network-based service areas · creating road network models / finding the network distance from a point of origin	Assignment 2 / Due by 9AM, Mar. 3
9	Mar 10	Service area analysis II	- Mapping the properties of service areas · summarizing features with polygons / summarizing rasters with polygons / creating map infographics	
10	Mar 17	No class		Winter Block Week
11	Mar 24	Multi-criteria decision analysis I	- Making criterion rasters · buffers / point and line density	Assignment 3 / Due 9AM, Mar. 24
12	Mar 31	Multi-criteria decision analysis II	- Making criterion rasters · polygons to raster / reclassification - Multi-criteria decision analysis (MCDA)	

			· weighted sum of criterion rasters / presenting the results of MCDA	
13	Apr 7	No class		Good Friday Assignment 4 / Due 4:00PM, Apr. 14

* This is a tentative schedule. Topics and schedule are subject to change according to progress of the students, lectures, labs, and/or the academic schedule.

Guidelines for Zoom Sessions

Note, classes will be delivered in person, at the University of Calgary Campus, however, if anything changes and Zoom classes become a requirement, the following will be relevant.

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 the 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 without 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 behaviour 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 in advance to arrange an alternative activity for the missed session (e.g., to review the 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.

University of Calgary Policies and Supports

COVID-19 PROCEDURE FOR SICK STUDENTS: <https://www.ucalgary.ca/risk/covid-19-procedure-for-sick-students>

UNIVERSITY OF CALGARY COVID-19 UPDATES: <https://www.ucalgary.ca/risk/emergency-management/covid-19-response>

ACADEMIC ACCOMMODATION

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-accommodation-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: <https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure>

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to their instructor (contact information on first page above).

SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

ACADEMIC MISCONDUCT

Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For information on the Student Academic Misconduct Policy and Procedure please visit:

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

Additional information is available on the Academic Integrity Website

at <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

COPYRIGHT LEGISLATION:

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) 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 Policy (<https://www.ucalgary.ca/pubs/calendar/current/k.html>).

INSTRUCTOR INTELLECTUAL PROPERTY

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

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. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>

UNIVERSITY STUDENT APPEALS OFFICE: If a student has a concern about a grade that they have received, they should refer to Section I of the Undergraduate Calendar (<https://www.ucalgary.ca/pubs/calendar/current/i-3.html>) which describes how to have a grade reappraised. In addition, the student should refer to the SAPL's Procedure for reappraisal of grades

OTHER IMPORTANT INFORMATION

Please visit the Registrar's website at:

<https://www.ucalgary.ca/registrar/registration/course-outlines> for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk