



Winter 2024

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 3175
	Email: youjung.kim@ucalgary.ca	Phone: 403.210.9223	
Class Dates	Lecture/Lab Wednesday 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)	Mustafa Kagdi Email: mustafa.kagdi@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.

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=go-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.)

Technology requirements (D2L etc.):

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.

Assessment Components:

Assessment (Weight %)	Description	Aligned Course Learning Outcome
Map portfolio (25%)	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. (Due: <u>Wednesday, February 7th before 9:00 am, electronically on D2L as a single PDF</u>)	1,2,3,4, and 5
Physiographic site analysis (20%)	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. (Due: <u>Wednesday, March 6th before 9:00 am, electronically on D2L as a single PDF</u>)	1,2,3,4, and 5
School walkshed infographic (15%)	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. (Due: <u>Wednesday, March 20th before 9:00 am, electronically on D2L as a single PDF</u>)	1,2,3,4, and 5
Site selection report (40%)	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. (Due: <u>Wednesday, April 10th before 11:59 pm, electronically on D2L as a single PDF</u>)	1,2,3,4, and 5

Assessment and Evaluation Information

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.

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. **Absence more than three times without notes will get penalty: 10% in the final grade.**

Guidelines for Submitting Assignments:

All assignments (Map portfolio, physiographic site analysis, school walkshed infographic, and site selection report) need to be submitted **electronically on D2L as a single PDF** as specified in the previous page. All maps should be from your works. If you use other’s maps, they should be cited properly. Otherwise, it will be regarded as plagiarism. **For all assignments, format, design, colors, line weights, and other map & report details will be evaluated.**

Final Examinations: There will be no final examination.

Expectations for Writing (<https://www.ucalgary.ca/pubs/calendar/current/e-2.html>):

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/f-1-3.html>

Topic Areas & Detailed Class Schedule

Week	Date	Topic		Assignments/ Due Dates
		Lecture	Lab	
1	Jan 10	Introduction to GIS, course outline, and data types	Introducing ArcGIS Pro - Working with geodatabases and spatial data - Mapping of feature data - Choosing and changing the projection - Layouts with multiple data frames	
2	Jan 17	Datum, projections, and coordinate Systems	- Exploring our course geodatabase - 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 24	GIS operation & cartography 1	- Select by spatial relationships - New layers based on spatial relationships - Summary statistics on attribute tables - Making charts from attribute tables	Assignment 1 announcement
4	Jan 31	Data type, source & cartography 2	- Cartography examples - Labelling features - Using downstream software to improve the map ※ Q&A: Support for (working on) Assignment 1	
5	Feb 7	Scale & physiographic site analysis	- Selective mapping of rasters - Mapping of topography	Assignment 1 / Due 9AM, Feb. 7 Assignment 2 announcement
6	Feb 14		Winter SAPL Block week	
7	Feb 21		Winter Term Break	
8	Feb 28	Digitizing, remote sensing & Census data	- Mapping of viewsheds - Inferring hydrology from topography · predicted drainage paths	
9	Mar 6	Service area analysis (transportation network analysis)	- 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. 6 Assignment 3 announcement
10	Mar 13	Geo-processing, Infographics & GIS application in Planning	- Mapping the properties of service areas · summarizing features with polygons / summarizing rasters with polygons / creating map infographics	
11	Mar 20	Multi-criteria decision analysis	- Making criterion rasters · buffers / point and line density - Making criterion rasters · polygons to raster / reclassification	Assignment 3 / Due 9AM, Mar. 20 Assignment 4 announcement
12	Mar 27	GIS in Urban Plan	- Multi-criteria decision analysis (MCDA) · weighted sum of criterion rasters /presenting the results of MCDA	
13	Apr 3	(Last Class) Wrap-up	- Q&A for Final Assignment 4. - Geocoding using address - Census JOIN to create Choropleth Map	Assignment 4 / Due 11:59PM, Apr. 10

* 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.

University of Calgary Policies and Supports

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/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>. 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://www.ucalgary.ca/legal-services/university-policies-procedures/student-academic-misconduct-policy>

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 (<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 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 AND GENDER-BASED 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/legal-services/university-policies-procedures/sexual-and-gender-based-violence-policy>.

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