Spatial analysis of the built and natural environments: evidence for planning
EVDS 683.57 H(3-0)

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Course coordinator:
Paul Galpern
pgalpern@ucalgary.ca
office: 403.220.7436
PF 3192

Introduction

Spatial data describing the built and natural environments of North America are abundant and freely-available. Analysis of these data can provide important evidence to inform planning and landscape architecture at any scale: from the site to the city and the region. In this small group seminar course we focus on quantitative and spatial techniques that can be used to provide decision support for projects and initiatives. Depending on student interest, topics may include: spatial analysis of neighbourhoods and natural landscapes using geographic information systems (GIS); analyzing road networks, slopes, viewsheds, and walksheds; optimizing distances from points of interest; selecting optimal sites using multiple criteria; making smooth maps from data measured at point locations; identifying places in cities and regions where there are clusters of occurrences; analyzing the connectivity of ecological infrastructure; and using statistical analysis to draw conclusions and make predictions about how data are structured on a map. Students will define their own research question related to a real-world planning or design issue. With instructor coaching, they will explore the question using available data and one or more of the methods developed in the course. This course may also interest architecture students concerned with optimal siting for design projects. Some familiarity with GIS is recommended.

Objectives

1. To acquire knowledge of the key techniques in spatial analysis that can be applied to planning questions in the built and natural environments.

2. To perform evaluative or decision-support spatial analyses related to urban, regional, landscape or conservation planning.

3. To develop confidence to dialogue in the ideas and the skills of spatial analysis, and independence to learn additional skills in this domain.

Teaching Approach

The course combines instructor- and peer-delivered GIS tutorials, seminars, and hands-on computer lab time. The small class size (10 or fewer) will allow us to adopt a coaching format, where both the instructor and student peers can support skill development in the spatial analysis techniques we will explore. The course concludes with an authentic final project that should relate directly to students' individual research interests (i.e. thesis work) or professional career development goals.

Content areas

1. Types and availability of spatial data online and at the University of Calgary.
2. Review of ArcGIS facilities for displaying and manipulating spatial data and for cartography.
3. Techniques for analyzing raster and vector spatial data (e.g. overlay, proximity, network and connectivity analyses)
4. Familiarity with current spatial analytical approaches for decision-support in urban, regional, landscape and conservation planning.

Evaluation

The course evaluation will be based on two assignments and a major project. There will be no final examination. Complete instructions for these assignments as well as assessment criteria will be provided in class when the assignment is first introduced.

Technique tutorials (15%)
Students will select a spatial analysis technique and lead a short tutorial for the class demonstrating how to apply the technique to spatial data from the built or natural environments.
(Due at date of tutorial; One class during the term as assigned).

Spatial analysis seminar (15%)
Students will select an academic paper, book chapter, or report that presents a spatial analysis of the built or natural environments and lead a seminar discussion with the class on this paper. The discussion will begin with a short presentation by the student of the paper, its purpose, main results and key methods used.
(Due at date of seminar; One class during the term as assigned)

Research project proposal (10%)
A proposal for a research project related to a real-world urban, regional, landscape or conservation planning issue that will occupy the majority of class time. The proposal should clearly describe the research question, justify its importance, identify potential spatial analysis methods to be applied and describe strategies to obtain the required spatial data. It should also contain a short bibliography relevant to the topic, and initial thoughts about how the products of this research will be presented.
(Due: February 5th)

Research project (60%)
A product of the research, containing an indication of its methods and evidence of its findings is required. Students should determine the format of this product and select one that reflects their own research interests or career development goals (e.g. a research manuscript for academic publication; a report for a government, planning, or corporate client audience; a plan or design that is responsive to the evidence generated; other formats are possible).
(Due: April 15th)

Electronic resources

An accessible introduction to ArcGIS for those wishing background information.
Kennedy, M.D. 2014. *Introducing geographic information systems with ArcGIS: a workbook approach to learning GIS (3rd ed.).* John Wiley & Sons.
Available electronically at University of Calgary Library (Use ebrary for complete book)

An excellent reference for the concepts behind GIS. Highly recommended.
Lloyd, C.D. 2010. *Spatial data analysis: an introduction for GIS users.* Oxford University Press.
Available electronically at University of Calgary Library.

Readings

Additional readings will be assigned during the course to be used in seminars.

Notes:
Final grades will be reported as letter grades, with the final grade calculated according to the 4-point range. All assignments will be evaluated by percentage grades, with their letter grade equivalents as shown

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	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89	Very good performance
B+	3.30	3.15-3.49	80-84	Good performance
B	3.00	2.85-3.14	75-79	Satisfactory performance
B-	2.70	2.50-2.84	70-75	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69	All final grades below B- are indicative of failure atthe graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64	
C-	1.70	1.50-1.84	55-59	
D+	1.30	1.15-1.49	50-54	
D	1.00	0.50-1.14	45-49	
F	0.00	0-0.49	0-44	

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. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor. Submissions must come from an official University of Calgary (ucalgary) email account.

2. Academic Accommodations. Students who require 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 or the designated contact person in EVDS, Jennifer Taillefer (jtaillef@ucalgary.ca). Students who require 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). For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/

Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when:(a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(b) parts of the work are taken from another source without reference to the original author,(c) the whole work (e.g., an essay) is copied from another source, and/or,(d) a student submits or presents work in one course which has also been submitted in another course(although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.

Information regarding the Freedom of Information and Protection of Privacy Act (http://www.ucalgary.ca/secretariat/privacy) and how this impacts the receipt and delivery of course material. Emergency Evacuation/Assembly Points (http://www.ucalgary.ca/emergencyplan/assemblypoints) Safewalk information (http://www.ucalgary.ca/security/safewalk)

Contact Info for: Student Union (http://www.su.ucalgary.ca/page/affordability-accessibility/contact); Graduate Student representative(http://www.ucalgary.ca/gsa/) and Student Ombudsman's Office (http://www.su.ucalgary.ca/page/quality-education/academic-services/student-rights).