GEOGRAPHY FINAL COURSE OUTLINE: WINTER 2017
GEOGRAPHY 457
H(3-3)

Geographic Information Systems II

Section	Days	Time	Location
LEC01	MoWeFr	08:00 – 08:50	ES 342
LAB 01	We	09:00 – 11:50	ES 407

Instructor: Ryan Burns	Office: ES 442	Office hours: TR 10:00-11:00, by appt.
Telephone: 220 7846	Email: ryan.burns1@ucalgary.ca	

Please note: The appropriate emergency evacuation assembly point for classes taught in Earth Sciences if ICT Food Court.

Official Course Description:
The role of GIS in environmental (physical-human interactions) research and management is explored both theoretically and practically. Topics will primarily relate to major issues within the environment/earth sciences field, but will also draw on examples from the social sciences. Advanced analytical approaches will be critically examined within lecture and laboratories, and students will have the opportunity to explore a GIS-related analysis and special topic of their choice and interest. A major GIS package will be used for laboratories and student projects.

Prerequisites: Geography 357

General Information
Purpose of the Course

This course builds on your previous introductory-level coursework in GIS, through a more in-depth examination of GIS applications in urban and environmental studies, and the data structures, source, and analysis techniques used in them. We will explore urban spatial analysis, decision-making in a GIS environment, and representational challenges, including project planning, spatial data acquisition, data preparation and coding, analysis and visualization of project findings, and communication and implementation of project results. You will gain experience in locating and obtaining geospatial data from local, provincial, and national government sources; developing primary data for urban spatial analysis; and analyzing and representing these data using desktop GIS software. You will also be exposed to low-level programming techniques in Python. We examine a range of urban and environmental uses of GIS, including crime analysis, disaster management, transportation and routing application, and environmental justice advocacy. Underlying this course is the question of "what is the urban? and what is the environment?", which has been formulated to challenge the often-present assumption of an urban/nature binary. Geography 357 or an equivalent is a prerequisite background for this course.

Learning Objectives

By the end of this course, students will be expected to:

- Apply diverse spatial analytic approaches toward urban and environmental planning, decision-making, and administration,
- Evaluate appropriate data sources for diverse spatial problems,
- Compose maps using cartographically sound principles,
- Deconstruct the ways representations and data come to shape the ways we think of places and the people in them, and
- Devise policy recommendations based on spatial analyses.

Format

During our 50-minute lecture sections, we will discuss the concepts and spatial thinking processes that guide urban and environmental GIS work, and their connections with policy-making. The lab sections will serve two purposes: (1) they will be your chance to practice implementing those concepts and processes by tackling spatial-analytic challenges, and (2) they will allow you to work on group projects with your groupmates. Completing the lab activities for Urban & Environmental GIS will require additional work outside of the 3 regularly scheduled hours. Most students need 3.5-5 hours total to complete each lab, and this will be on top of the group project work. The course reading load is designed to balance this lab commitment (i.e. you have far less reading that I would assign in a non-lab course).

Attendance

Students tend to work at their own pace on assignments – some need a lot of attention from the instructor and some prefer to work by themselves. I am here to support you and help you learn GIS whatever type of learner you are. Note, however, that the labs are sometimes written without detailed instructions purposefully so that students are required to solve analytical GIS problems using their own knowledge. It is nearly impossible to complete the lab assignments without guidance from the instructor. Thus, prolonged absence from class will likely affect your grade, inhibit your understanding of the lecture material, and prevent you from receiving help on the lab assignments.

Required Texts

There is no required textbook for this course. Course readings will be drawn from GIS texts and academic journals reporting on current research supporting urban applications of GIS. The required readings will be available on the course D2L site. Lab materials will be distributed on D2L as well.

Assignments, Activities, and Grading

Geography 457 Assignments and Weighting

- 5 Lab Exercises (30 each)   (150 points)
- Mid-term exam   (100 points)
- Final Community Project   (150 points)
  - o   Proposal: 20 pts
  - o   Progress report: 20 pts
  - o   Check-ins: No points, but highly recommended!
  - o   Final written policy proposal & maps: 60 pts
  - o   Presentation: 50

A	92-100%	**3.9-4.0**
A-	90-91.9%	**3.5-3.8**
B+	88-89.9%	**3.2-3.4**
B	82-87.9%	**2.9-3.1**
B-	80-81.9%	**2.5-2.8**
C+	78-79.9%	**2.2-2.4**
C	72-77.9%	**1.9-2.1**
C-	70-71.9%	**1.5-1.8**
D+	68-69.9%	**1.2-1.4**
D	62-67.9%	**0.9-1.1**
D-	60-61.9%	**0.7-0.8**
F	<60%	**0.0**

Important Notices

Well-being:
College can be stressful, and your mental well-being is important. If you are a student of University of Calgary, the SU Wellness Centre offers you support for your emotional, educational or vocational concerns. Assistance is free of charge. They provide an atmosphere that is informal and professional, where you can feel safe and comfortable seeking help. Find them at **MacEwan Student Centre 370** or call them at **403-210-9355**.

Your academic advisors can be great advocates for you. While I expect that you will all make an effort to keep me informed if you will be absent, or ask for help if you are struggling, your advisor also can help you find the people at the university that you need to talk to if you have an unexpected life event.

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). 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/j-2.html

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/honesty/plagiarism

Academic Accommodations:
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: www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf
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: www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities_0.pdf
Students needing an accommodation based on a Protected Ground other than Disability, should communicate this need, in writing, to the Instructor.

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: suvpaca@ucalgary.ca
- SU Faculty Rep. Phone: 220-3913 and e-mail: 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 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, arts2@su.ucalgary.ca, arts3@su.ucalgary.ca, arts4@su.ucalgary.ca

Lab Information

1. **Introduction**
   For each lab assignment you will be expected to write a technical report. The point of these exercises is to 'get our hands dirty' with some innovative ways of collecting, massaging, and representing data for urban and environmental analysis and planning. You may work on these assignments within lab time or outside of lab time. However, you can only expect assistance during this time or during office hours.

2. **Lab Reports**
   Each lab contains an assignment which you are expected to complete. This assignment will be focused on an analysis task. You should approach these lab reports as deliverables to stakeholders who are not in any way associated with this course. In other words, jargon should be minimized and explained, you should reference "this analysis" or "this project" rather than "this lab", and the writing should be as active and engaging as possible.

   For each lab assignment you must hand in a brief report as a Word file via D2L – click on the assignment in D2L and upload your file. Do not email me your report. I will grade and make comments on your report where applicable, and you can access the commented report via D2L.

   This report must be approximately 1-2 pages in length (of text), single spaced, 12 point TIMES NEW ROMAN* FONT, with one inch margins, and indented paragraphs. It should have your name, date, and lab assignment number (e.g. Lab 1) at the top of the page. It must also include the maps required in the assignment. It should

be written according to standard writing practices – as much as I love dropping emojis into my Twitter and Facebook communication, those shouldn't go here! Points will be deducted for not formatting your lab report correctly.

*=other acceptable fonts: Garamond 12-point, Cambria 11-point.

The report must contain the following five sections, and the name of the section must appear in bold at the top of each section:
1. Introduction
2. Methods
3. Results
4. Conclusion
5. Tables and Figures

The name of the section must appear in bold at the top of each section.

The **introduction** section should state the objective - what you are trying to accomplish in your assignment. It should also provide some context as to why it's an important topic. Here, your objective is the goal of your analysis/project, not the learning objective. *The introduction should NOT (**NOT**) state that your objective is 'to learn network analysis' or something similar!*

The **methods** section should state how you did the analysis, what analytical steps you took to complete the assignment. This section does not need to state every drop down menu item you selected or every button you pushed, but should summarize what analytical operations you used. For this you should use the precise terms (e.g., network routing,) we have used in class, but again, explaining jargon where necessary.

The **results** section should report the results of your analysis, and some interpretation. This section is often very brief, as it should be devoid of substantial commentary or reflection. What does your map show? Are there any insights to be garnered from your visualization?

The **conclusion** section should offer some reflection and commentary on your results as well as report on any assumptions and limitations of your analysis and what other steps could be taken to improve the analysis. The conclusion should *not* detail only your map's limitations.

In addition, the lab may require the creation of maps, tables, and/or charts, as specified in the lab assignment. These graphics should be appended onto the end of the report and referred to in the text.

3. **Due Dates**
   Due dates are indicated at the top of the lab assignment, and will be the Friday of the week listed in the calendar below. Deadlines are firm.

4. **Working with Other Students**
   I encourage students to work together on lab assignments and assist each other in understanding the course material. However:

   ALL CONTENTS OF EACH STUDENT'S LAB REPORTS (TEXT AND GRAPHICS) MUST BE AUTHORED SOLELY BY THAT STUDENT.

5. **Grading**

   Each lab will be graded out of 30 points.

   Labs will be graded based not only on whether you 'get the right answer', but also on your ability to express yourself in a coherent fashion through both writing and graphics (i.e. maps). In order to help you earn maximum credit for these assignments, check your cartographic choices with your instructor or TA.

   If a lab report is turned in late, 6 points will be deducted from that lab grade. No labs will be accepted more than two weeks after their due date.

Schedule

(Note: This is a general plan. The day-to-day topics and lab dates may change as we proceed through the semester).

Jan 9-13 – Topic 1 – Course Intro, Urban/Environmental GIS intro

   Batty, M. 2013. Big Data, Smart Cities & City Planning. *Dialogues in Human Geography* 3(3): 274–279.

Jan 16-20 – Topic 2 – Urban and environmental spatial data types & sources

   Manson,S., H. Sander, D. Ghosh, J. Oakes, M.Orfield, W.Craig, T. Luce, E. Myott, S. Sun. 2009. Parcel data for research and policy. *Geography Compass* 3(2): 698-726.

   Attard, Judie, et al. "A systematic review of open government data initiatives." Government Information Quarterly (2015): 1-20.

Jan 23-27 – Topic 3 – Formal data sources: The Canadian Census, data structures, attributes, and analysis

   Lab 1 due Fri Jan 27th, 5pm
   Reading TBA

Jan 30-Feb 3 – Topic 4 – Network analysis & its urban applications

   Wilson, R. and Cales, B. 2008. Geographic information systems, evacuation planning, and execution. *Communications of the IIMA* 8(4): 13-30.

   Comber, A., Brunsdon, C., Hardy, J., and Radburn, R. 2009. Using a GIS-based network analysis and optimization routines to evaluate service provision: A case study of the UK Post Office. *Applied Spatial Analysis* (2): 47-64.

Feb 6-10 – Topic 5 – Environmental Justice Applications

   Lab 2 due Fri Feb 10th, 5pm
   Bae C-H C, *et al*. 2007. The exposure of disadvantaged populations in freeway air-pollution sheds: a case study of the Seattle and Portland regions. *Environment and Planning B: Planning and Design* **34**(1) 154 – 170.

   Nas, B., and Berktay, A. 2010. Groundwater quality mapping in urban groundwater using GIS. *Environmental Monitoring and Assessment* 160: 215-227.

   Su, J., Larson, T., Gould, T., Cohen, M., & Buzzelli, M. 2010. Transboundary air pollution and environmental justice: Vancouver and Seattle compared. *GeoJournal* 75: 595-608.

Feb 13-17 – Topic 6 – Visualizing cities: data surfaces

   Midterm exam Fri Feb 17th, regular class time
   Burns, Ryan, A. Skupin. 2013. Towards Qualitative Geovisual Analytics: A Case Study Involving Places, People, and Mediated Experience." Cartographica 48(3): 157-176.

   Xie, Z. and Yan, J. 2008. Kernel Density Estimation of traffic accidents in a network space. *Computers, Environment and Urban Systems* 32(3): 396–406.

Feb 20-24 – Mid-term break

Feb 27-Mar 3 – Topic 7 – Crime analysis

Lab 3 due Mar 3, 5pm

Tompson, J., Townsley, M. 2010. (Looking) back to the future: Using space-time patterns to better predict the location of street crime. *Int'l Journal of Police Science & Management* 12(1): 23-40.

Pain, R., MacFarlane, R., Turner, K., Gill, S. 2006. 'When, where, if, and but': qualifying GIS and the effect of streetlighting on crime and fear. *Environment and Planning A* 38(11): 2055–2074.

Mar 6-10 – Topic 8 – Public health applications

Parmenter, B., *et al*. 2008. Developing Geospatial Data Management, Recruitment, and Analysis Techniques for Physical Activity Research. *The URISA Journal* 20(2): 13-19.

Parenteau, M., Sawada, M., Kristjansson, E., Calhoun, M., Leclair, S., Labonté, R., Runnels, V., Musiol, A., and Herold, S. Development of Neighborhoods to Measure Spatial Indicators of Health. *The URISA Journal* 20(2): 43-55.

Mar 13-17 – Topic 9 – Emergency management

Lab 4 due Fri Mar 17, 5pm

Graham, C., C. Thompson, M. Wolcott, J. Pollack, M. Tranh. 2015. A guide to social media emergency management analytics: Understanding its place through Typhoon Haiyan tweets. *Statistical Journal of the IAOS* 31: 227-236.

Fazeli, H., M. Said, S. Amerudin, M. Rahman. 2015. A Study of Volunteered Geographic Information (VGI) Assessment Methods for Flood Hazard Mapping: A Review. Jurnal Teknologi 75(10): 127-134.

Mar 20-24 – Topic 10 – The 'open data' movement

Recupero, D.R. *et al*. 2016. An Innovative, Open, Interoperable Citizen Engagement Cloud Platform for Smart Government and Users' Interaction. *J. of the Knowledge Economy*: 1-25.

Kontokosta, C. 2015. Data and the City: The Promise and Perils of Urban Informatics. http://www.sallan.org/Snapshot/2015/07/data_and_the_city_the_promise_and_perils_of_urban_informatics.php

Mar 27-31 – Topic 11 – Volunteered geographic information & the geoweb

Lab 5 due Fri Mar 31, 5pm

Sui, D. 2008. The wikification of GIS and its consequences: Or Angelina Jolie's new tattoo and the future of GIS. *Computers, Environment and Urban Systems* 32(1): 1-5.

Haklay, M., Singleton, A., and Parker, C. 2008. Web-mapping 2.0: The neogeography of the geoweb. *Geography Compass* 2(6): 2011-2039.

Apr 3-7 – Topic 12 – Community-engaged urban GIS (no class 4/5 and 4/7)

Elwood, S. 2006. Beyond cooptation or resistance: Urban spatial politics, community org's, and GIS-based spatial narratives. *Annals of the Ass'n of American Geographers* 96(2): 323-341.

Optional: Esnard, A. 2007. Institutional barriers to the effective use of GIS by community-based organizations. *The URISA Journal* 19(2): 13-21.

Final project presentations – Apr 10, 12