URBP 608: Advanced GIS Applications in Urban Planning
Fall 2011| W1:35-3:35

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Course website: http://tram.mcgill.ca/Teaching/advancedGIS/gis.html

Office hours:
Ahmed: Thursday from 10:00 am – 12:00 pm room 401 or by appointment or drop by at anytime when I am in my office
Kevin: Thursday 1:00-3:00 or by appointment

Prerequisite:
URBP 505 or equivalent, or permission from the instructors.

Course Description:
This is a studio-based GIS course. The objective of this course is to apply GIS knowledge towards solving and understanding real-world issues. Students will gain practical experience in implementing GIS technologies with specific emphasis on an urban planning context. Main tasks include problem definition, data collection/manipulation, analysis, and presentation of results. Both the theoretical and practical components of the course are stressed. A focus on critical thinking about geographic information presented in maps and published articles is also a key component of the course.

Texts:
There are no required textbooks for this course. There will be required readings, however. You will need to purchase books depending upon your specific areas of interest. PDF versions of the ESRI tutorials will be included on the class website. Some recommended books are listed here:

1- GIS for the Urban Environment (2006) Juliana Maantay and John Ziegler, Esri Press.
2- Statistical Methods for Geography (2006) by Peter Rogerson, Sage Publications
3- How to Lie with Maps (1996) by Mark Monmonier, University of Chicago Press
4- Designing Better Maps: A guide to GIS user (2005) Cynthia A. Brewer, Esri Press.
5- Designing Geodatabases: Case Studies in GIS Data Modeling (2004) by David Arctur and Michael Zeiler, Esri Press.
6- Modeling Our World The ESRI Guide to Geodatabase Design (2000) by Michael Zeiler, Esri Press.
7- Getting to Know ArcObjects (2003) by Robert Burke, Andrew Arana, Esri Press.

Grading:
1- Assignments 4@10% each totaling 40%
2- Demonstration 15%
3- Critical appraisal of an academic paper with a large GIS component (chosen by student and approved by the instructors) 15%
4- Final Project 25%
5- Attendance and Participation 5%

In accordance with McGill University's Charter of Students' Right, students in this course have the right to submit in English or in French any written work that is to be graded.

Academic Integrity
McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/integrity for more information).

Disabilities:
If you have a disability and need any special accommodations, please contact me so we can arrange the appropriate support. It would be helpful if you contact the Office for Students with Disabilities at 398-6009 (online at http://www.mcgill.ca/osd) before you do this.

Safety
McGill University shall strive to be recognized as an environmentally safe and responsible institution, and as a model of environmentally responsible living.
See: www.mcgill.ca/tls/policy/environmental_policy.

For all emergencies please contact McGill Security Services at 514-398-3000.

Demonstrations 15%:
Each student will work to put together a demonstration project regarding particular aspects of GIS functionality. The tutorials must include both documentation and a dataset. The output will be presented to the class and then posted on the course website. The following is a list of examples of demonstrations; please do not limit your selection to this list:

1- The use of online scripts in GIS customization
2- Advanced applications of geoprocessing
3- Raster applications in urban planning
4- Introduction to transportation modeling (e.g. working with TransCAD)
5- Geocoding tricks
6- GPS manipulations and analysis
7- Utilization of model builder
8- Generating land use and historical movies
9- Overlaying GIS planning information over google maps and internet mapping
10- Generating diffusion maps
11- Spatial analysis applications
12- Spatial regression (geographically-weighted regression)
13- 3-D analysis
14- "Advanced" Network analysis applications and customizations
15- Movies, "fly-throughs", and other visualisations

Passwords for ESRI virtual campus tutorials are available for many online courses for free due the license agreement with ESRI. If you need a code for a specific course please contact us as soon as possible so we can obtain the course code for you. Demonstrations will begin on September 21st. Each

student is required to submit the data to the instructors on the Monday before their demonstration. The demonstration is expected to last between 30 and 60 minutes. Be prepared to answer questions from your instructors and classmates. Please speak with the instructors as soon as possible if you require help in finding a topic.

Paper Critique 15%:

This exercise will require each student to choose an article with a large and important GIS and geo-spatial analysis component and to critique its content. This should be much more in-depth than simply describing and critiquing the map content. The following aspects of the paper should be examined:

- Is the research question an important and interesting one?
- Do the authors adequately describe past efforts to examine the same—or similar—issues?
- Is the methodology properly explained and justified?
- (If relevant) How do the authors deal with MAUP, boundary issues, spatial autocorrelation etc?
- Describe any statistical methods used. Are these methods clearly described? Justified? Appropriate? Are the findings robust? Generalizable?
- Do the authors omit any variables? Think particularly about geographical and spatial issues.
- Do policy implications or other conclusions logically follow the analysis presented?
- Would you do anything different?
- Are the authors' choices regarding scale bars, north arrows, colours, contrasts, legend items, other symbols etc. appropriate and easy-to-interpret?

Also, be prepared to defend your critique to your peers who will have also read the paper with a critical eye and might have a different opinion! Please prepare a short (one page) summary critique as well as a short (5 or 6 slides maximum) powerpoint presentation. Paper critiques will begin on September 28; each class will have one or two presentations. Please email a copy of the paper to the instructors one week prior (the preceding Wednesday by 5:00 pm) so it can be distributed to your classmates on time. Please contact the instructors if you need help in selecting an appropriate paper.

Final project 25%:

Students are charged with the task of solving a real-world problem requiring advanced GIS skills. Students must develop a project that has a high likelihood of being completed within the time frame of the course. The project should include some kind of customizations and/or spatial modeling using GIS to solve a real world problem. Students are encouraged to develop a project that uses GIS techniques to address an issue that has wider social or urban planning implications.

Each student is required to hand in a powerpoint presentation outlining the findings and the maps. If you plan in printing in black and white please make sure to generate your maps using gray scales. The final presentation should include the following sections:

1- Background and importance of the question you are trying to address
2- Research question
3- Methodology, including major GIS issues faced in answering the question
4- Final outputs of maps or charts or tables showing your results
5- Implications for planning (if relevant)
6- Limitations faced during the process and directions for future research

The final presentation is due on **November 30th** while a one page summarizing your question and approach is due on **October 19th**.

Assignments 10% each total 40%:

The students will be required to complete 4 different assignments. Each assignment is marked out of 10 points and assignments are due at the beginning of the class. One point per day will be deducted for any late assignment. If you have a valid reason for not submitting an assignment on time please communicate this with the course instructors.

In these assignments students will learn different techniques in GIS and will work on solving a GIS problem and answer a series of questions related to the assignment. It is important to note that these are not easy assignments and will require students to put time and effort and use different sources to figure out the best way to answer the required questions. ESRI offers well-designed tutorials and help menus that can be found at (http://support.esri.com/en) and (http://training.esri.com/gateway/index.cfm). Please take advantage of these very useful sources. The level of complexity in the assignments will increase over the course of the term. The assignments will have both technical elements as well as more open-ended questions that address issues of scale, relevance, visualization and other elements covered in the class. For example, you may be asked not simply what you found, but why—or if—it is important for planning practitioners or policy makers.

Data Sources

There are various ways to obtain GIS data. Most of the data needed for assignments is available through the TRAM data archive. You may, of course, require other data for your final project.

http://tramarchive.mcgill.ca/tram/

You will need a user name and password to access the above website.

Detailed Class Schedule:

Please note that all assignments are due at the beginning of the class. Assignment due dates are indicated in bold in the course outline.

Date	Subject	Readings
Sep-07	Introduction to Course Using GIS to solve Urban Planning Questions: Topics, Issues, Solutions *Assignment 1 Distributed: Review of basic spatial analysis techniques and introduction to Geo-statistics*	
Sep-14	Issues of scale, MAUP and visualisation, classification techniques	How to Lie with Maps Chapter 10
Sep-21*	The use of geodatabases (relationships) in land use planning. Customizing geodatabases towards solving planning, review of projections **Assignment 1 Due and Submission of Selected Paper for Critique**	
Sep-28**	Review of OLS, Introduction of Spatial Analysis (Geographically Weighted Regression) *Assignment 2 Distributed: Advanced Spatial Analysis*	Rogerson Chapter 10 and 11
Oct-05	Spatial Analysis, Geo-statistics, importance and applications **Assignment 2 Due**	
No Class ACSP Conference		
Oct-19	GPS, remote sensing, and transportation applications. **Project Proposals Due** *and Assignment 3 Distributed: GPS data analysis*	
Oct-26	Geocoding, address locating applications and Interpolation (inverse weighted, kriging) **Assignment 3 Due**	Maantay and Ziegler Lab 11
Nov-02	Network Analyst Applications. *Assignment 4 Distributed: Accessibility, Network Analyst*	
Nov-09	Internet Mapping Applications **Assignment 4 Due**	
Nov-16	Customizations of GIS applications towards solving planning problems (ArcObjects)	
Nov-23	Special Topics	
Nov-30	**Final Project Presentations**	

* starting date for demonstrations
** starting date for paper critique presentations