Applications in Geographic Information Systems
GEOM 4009

Academic year: The final official version will be posted in cuLearn on the first day of class for this course.

Course title: Applications in Geographic Information Systems (GEOM4009)
Department: Department of Geography and Environmental Studies
Faculty of Arts and Social Sciences, Faculty of Science

Instructor: Dan Patterson
Building: B450B Loeb Building
Website: http://www.carleton.ca/geography/people/patterson-dan/
Email: Dan.Patterson@carleton.ca
Phone: My cell number will be provided in class, for text messaging.
Office: To be determined in the first week of each term and posted in cuLearn.

Course Description

Calendar description
Project design and customization, application development within a GIS, digital atlas compilation and geomatics education. Prerequisite: GEOM 3005 Workshop three hours a week.

Other information
The course is delivered as a 3 hour workshop which will entail both lecture and practical work. ArcGIS and a variety of extensions will be used in this course. The intent of this course is to provide you with the tools needed to develop applications to solve geographic problems. You will be introduced to object-oriented programming principles using ModelBuilder (which is part of ArcGIS) and the Python programming language (open source language). Other programming options available within ArcGIS will also be explored. Existing scripts and extensions will be analyzed in order to understand how they can be used to perform a task and you will develop new tools directed to specific problems. The areas of application of these tools will be in the areas of :

1. spatial analysis
2. batch and geoprocessing operations
3. geomatics education
4. programming within GIS

Texts
Any Python textbook will do but none are required (books by O'Reilly publishing are good). A manual is provided (Working with ArcGIS: Beyond the Basics). Other documentation will be
Evaluation

Faculty grading policy:
“Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.”

Course evaluation

The evaluation in this course will be based upon your performance in the following:

- Attendance 5%
- Esri campus course 5%
- Progress reports:
  - Individual 10%
  - Group 20%
- Individual Learning Module 30%
- Group Applications Project 30%

Attendance
You are either here for the workshop, or you are not. Think of this as 0.5% per week with a discretionary absence of 2 weeks. I will not entertain any deviations from this, so plan accordingly in the case of inclement weather or other misadventures.

Virtual Campus Courses
This provides the student the chance to select a topic that may be of interest to them that aren’t expressly covered in the course, or to examine a topic in more detail. The courses are online and can be completed within the first 3 weeks of class. See the following links Virtual campus courses and Course listings. Specific details will be discussed in class.

Progress reports
A series of progress reports for the individual and group projects is required to ensure a continuing flow of progress during this course. There will be individual progress reports

Learning Module
Due date: Last day of classes by 10:00 AM (University regulation governs this date) The learning module is done on an individual basis. You will develop learning materials, and scripts, tools and/or models, which explore aspects of spatial analysis or data transformation or manipulation. Topics may include, but are not limited to:

1. cartographic tools in GIS
2. projections/datums and their transformations
3. working with image data in GIS
4. spatial statistics
5. network analysis
6 analysis of grid data
7 comparison of analysis of vector and grid data
8 transitioning between GIS packages
9 batch processing of data or analyses

Beginning about week 3 or 4, you will be required to submit a proposal for your module. You will make weekly progress reports and discuss your progress with me in class. You be assessed on your progress as well as the final project.

Applications Project Due date and presentation date: Last week of class
The applications project is a group project (3 to 4 people). Students will decide whether they wish to be marked as a group or individually and this request must be submitted in writing before commencing the project. You will be required to research the topic and develop tools (scripts and/or extensions) to meet the needs of the project. Each group will make progress reports on a weekly basis (usually over a 4-5 week period) and a final presentation at the end of term.

The applications project for this year will be discussed in class. They deal with real world requests to develop/extend GIS functionality within a work environment.

Note: There are no late submissions for any assignment except for documented medical reasons which cover the duration of the assignment period. If you have a short term illness, make arrangements to have your assignment submitted by the due date. It is highly recommended that you have your Learning Module well underway before the due date since you don't want to have to deal with 70% of your assessment in the last 2 weeks of class.

Term paper guidelines
Information regarding term papers can be found at the department’s web site.

General University Rules and Regulations

Academic Accommodation:
You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation:
Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide

Religious obligation:
Write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide
Academic Accommodations for Students with Disabilities:
The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable).
## ASSISTANCE FOR STUDENTS

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| ...understanding academic rules and regulations | Student Academic Success Centre (SASC) | 302 Tory Building 613-520-7850
| and regulations | *Helping students build a foundation for academic success by facilitating services that foster personal direction and academic competence* | [http://www2.carleton.ca/sasc/](http://www2.carleton.ca/sasc/) No appointment necessary as all students are seen on a walk-in basis. |
| ...choosing or changing their major | Undergraduate Program Advisors | Consult the individual departmental website |
| ...finding a tutor | | |
| ...academic planning guided by an Academic Advisor | | |
| ...polishing study skills | | |
| ...developing a coherent pattern of courses in the major and consultation about opportunities for graduate and professional study | Paul Menton Centre | 500 University Centre 613-520-6608
| | *Integration, Individualization, Independence* | [http://www2.carleton.ca/pmc/](http://www2.carleton.ca/pmc/) Students can call or drop in to make an appointment |
| ...a learning disability | Writing Tutorial Service | 4th Floor, Library 613-520-6632
| | | [http://www2.carleton.ca/sasc/writing-tutorial-service/](http://www2.carleton.ca/sasc/writing-tutorial-service/) |
| ...developing writing skills | Peer Assisted Study Sessions | Learning Support Services
| | *PASS workshops integrate how-to-learn (study skills) with what-to-learn (course content) in a fun, relaxed environment.* | [http://www2.carleton.ca/sasc/peerassisted-study-sessions/](http://www2.carleton.ca/sasc/peerassisted-study-sessions/) |
| ...peer assisted tutoring for preidentified, notoriously difficult courses | International Student Services Office | 128 University Centre 613-520-6600
| | | [http://www1.carleton.ca/isson](http://www1.carleton.ca/isson) |
| ...polishing English conversation skills, or proof reading (International students only) | Staff at MacOdrum Library (reference services desk) | 613-520-2735
| | | [http://www.library.carleton.ca/](http://www.library.carleton.ca/) |
| ...Library and Research help; Learning Support and IT support | | |
| ...coping with stress or crisis | Office of Student Affairs or Health and Counseling Services | Either ext. 2573 or [http://www.carleton.ca/studentaffairs/](http://www.carleton.ca/studentaffairs/) or [http://www.carleton.ca/health](http://www.carleton.ca/health) |