GEOG 481 / PLAN 481

Geographic Information Systems Project

Spring 2018

Instructor: Derek T. Robinson
Room: EV1-105a
Email: dtrobins@uwaterloo.ca
Office hours: TBD
Class time: Tuesday 8:30 a.m. – 11:20 a.m.
Lab time: Lab 101 10:30 – 12:20 Thursdays
                   Lab 102 8:30 – 10:20 Fridays
Lecture room: EV3 3412
Computer lab: EV1 240
Prerequisites: GEOG/PLAN 381 and GEOG/PLAN 387

Teaching assistant: Omar Dzinic
Office hours: During Lab time and by email appointment.

Course Calendar Description
"The development, implementation, and presentation of a response to a set of GIS related project requirements is the focus of this course. Students work in small teams to enhance and develop their abilities to work with GIS and related spatial technologies and analytical methods in an advanced project setting. The nature of the project requirements and themes varies with faculty and student strengths and interests. Projects may emphasize development of software applications, use of programming, or advanced GIS analysis methods, and draw from theme areas such as environment studies and management, human and physical geography, or planning."

Course Description
Building on the knowledge and skills acquired in GEOG/PLAN 281, 381, and 387, students develop and answer a research question that involves the use of geographic information systems (GIS). While the course is structured around a set of specific deliverables, listed in the section titled Schedule, it can broadly be divided into the following three parts: a proposal, project implementation, and a final paper.

    The first part of the course focuses on developing a research question and demonstrating how it will be achievable to answer, within the timeframe of the course, in the format of a project proposal. As part of the proposal students will conduct a literature review to identify knowledge gaps, conceptual and implementation challenges, and situate their question within the field of GIScience research.

    The second part of the course involves implementing the proposed project and overcoming unanticipated challenges. This portion of the course typically involves investment and learning in new tools and techniques outside the standard GEOG/PLAN curriculum. During this time, project and time management skills will be tested. The instructor facilitates project management through meetings with individual groups that collaboratively define tasks for completion and assess the completion of previously defined tasks in a submitted weekly progress report.

    The third part of the course focuses on understanding the structure of scientific publications and learning how to write a scientific paper. The project will be documented in the format of a scientific paper that uses the materials developed in the proposal, describes the data and methods used to answer the defined research question, presents results from the project, discusses the broader impacts of the type of research conducted, and identifies potential future directions. There will be a chance for preliminary feedback and subsequent revision of the final paper by individual

groups, but this is dependent on a draft of the final paper completed early by students.

Students will learn how to define a research problem, implement a solution, and communicate the process and results in a paper format. This course is a prerequisite for GEOG / PLAN 487 and is part of the requirements for the Diploma of Excellence in GIS.

NOTE: The course carries a weight of 1.0 and is equivalent to two standard undergraduate courses. Effectively this means that you should expect to complete the same amount of work as was done in GEOG/PLAN 381 and 387 combined. Therefore, significant additional time will be required for independent and group work outside scheduled lecture hours. "Consequently, you can expect to devote **at least** 10 to 12 hours each week to learning new skills and applying them to your assignments. If you cannot make this level of time commitment, you should seriously consider other courses." (Dr. Feick, previous 481 syllabus Fall 2009)

Laboratory Component
The course has a formal computer laboratory component. The labs are dedicated to the members of the course at these times and these labs will be the primary time with which you can interact with the teaching assistant. Furthermore, based on the selection of topics by students the teaching assistant and/or the instructor may hold additional workshops during these times. While attendance will not be taken, the short duration of the course and the intensity of the material required for completion suggests that you attend each lab session to acquire the optimal level of help from your peers, the teaching assistant, and the instructor.

Schedule
The course comprises a 3-hour lecture. The lecture will be used to introduce GIScience projects and issues and skills around managing a project, writing a proposal and research paper for GIScience research, and how to report and present results. Half of the lectures will be devoted to scheduled group meetings that will have weekly defined milestones required for completion. This time will address roadblocks and concerns and facilitate the identification of approaches to overcome those challenges. The schedule of course content and deliverables is subject to change. Additional tutorials or workshops may be added to the course to facilitate project advancement. It may also be the case that guest speakers will be brought in to discuss their work in the field of GIScience. If a change or addition occurs then an updated version of this course outline will be posted on the course LEARN website.

Week#	Date	Topic	Deliverable
1	1 May	Introduction to the course, deliverables, expectations; potential project topics; formulating a research question	Upload bio, domain of expertise, and skills to LEARN Due May 5th
2	8 May	Writing a research proposal and conducting a literature review	Submission of groups and group members
3	15 May	How to report results and spatial patterns	
4	22 May	No class	
5	29 May	Group meetings with instructor	Weekly progress report
6	5 June	Proposal presentations	Proposal submission
7	12 June	Group meetings with instructor	Weekly progress report
8	19 June	Group meetings with instructor	Weekly progress report
9	26 June	Group meetings with instructor	Weekly progress report
10	3 July	Group meetings with instructor	Weekly progress report
11	10 July	Group meetings with instructor	Weekly progress report
12	17 July	Final Paper Presentations	Final Presentation
13	24 July	Group meetings with instructor	Paper submission - July 25th

Method of Evaluation
The course comprises five deliverables as outlined below.

Deliverables (Total 100%)
- 5%   Deliverable 1: Bio, skillset, and research area of interest submission
- 35%   Deliverable 2: Proposal
    - Research Question
    - Literature Review
    - Timeline of project milestones
    - Team member accountability
    - Other proposal aspects
- 5%   Deliverable 3: Proposal Presentation
- 10%   Deliverable 4: Paper Presentation
- 35%   Deliverable 5: Paper Submission
    - Introduction
    - Methods
    - Analysis
    - Results
    - Discussion
    - Conclusion
- 10%   Deliverable 6: Individual and group evaluations

Deliverable 1 and 6 will be submitted individually. All other deliverables are prepared and submitted in groups of 3 or 4. Groups of 5 are unacceptable. Deliverables must be newly developed for GEOG/PLAN 481 and differentiated from past and current coursework. Any duplication of text verbatim and in some cases duplication of methods will result in those items being handed off to Faculty with administrative duties to deal with academic offenses. Deliverables must be submitted to the appropriate drop box on the course website by 11:55 pm on the due date. Late deliverables will not be accepted and will receive a mark of zero. Exceptions may be made for extreme documented medical reasons.

Group meetings will involve setting a list of requirements for completion over the coming week and then addressing the outcomes of those requirements the following week in a progress report. Where individuals have not made weekly progress or submitted a progress report there is a penalty of 2% applied to your final grade for each scheduled group meeting that does not show significant progress.

Note: "The instructor reserves the right to adjust final marks up or down, based on the performance, contribution, and participation of each student to their group." (Su-Yin Tan, GEOG/PLAN 481 Spring 2012)

References
There is no required textbook for this course. Course notes and slides will be provided as electronic documents on Waterloo LEARN. Students are expected to make use of the online help files for the ArcGIS software, discussion groups in the online learning platform, and other web-based GIS resources. The following books cover spatial analyses that may be used in the course, are suitable for further reading, and are available in the course reserves either electronically or at the Porter library:

De Smith, M.J., M.F. Goodchild & P.A. Longley (2007). *Geospatial analysis: a comprehensive guide to principles, techniques and software tools*. Matador.
        Available electronically at http://www.spatialanalysisonline.com

Lloyd, C.D., (2010). Spatial data analysis: an introduction for GIS users. Oxford University Press.
Lutz, M. (2009). *Learning Python*. 4th edition, O'Reilly.
    Available electronically through the library / course e-reserves.
O'Sullivan, D. & D.J. Unwin (2010). *Geographic information analysis*. Wiley.
    Available electronically through the library / course e-reserves
Wilson, J.P. & J.C. Gallant (2000). *Terrain analysis: principles and applications*. Wiley.

Computer Labs
You can use the Galileo (EV1-240), Geddes (EV2-1002A) or Magellan (EV2-1014) labs for practical work in this course when they are not booked for other courses. Access codes are available at the Mapping Analysis and Design helpdesk in EV2. Software found in these labs is also available off-campus by logging on to the terminal server (festerm1.uwaterloo.ca). Directions for accessing the terminal server can be found here: http://uwaterloo.ca/environment-computing/services-support/geospatial-support/windows-terminal-server
    NOTE: No food or drink is allowed in the labs. Failure to abide by this rule may result in your computer accounts being suspended.

Course Website
A course website has been created on the new learning platform "Learn" (Desire2Learn). Information on access to the website will be provided in class. Students registered in the course and have paid their fees can access the course website after the course commences by going to the LEARN website (http://learn.uwaterloo.ca) and logging in using your WatIAM/Quest username and password. Once logged in, you will see the course listed under "My Courses and Communities". Click on GEOG 481/PLAN 481 to see the course content.
    The course website provides access to lecture presentations, course notes, and other relevant information. Online material in LEARN can be opened or downloaded by clicking on the appropriate link. In addition, the course website supports announcements, discussion groups and e-mail. Deliverables will be handed in via the LEARN course website and students should become familiar with the website and submission process early so as not to receive a late submission.

Getting Help
Students are expected to get into the habit of using the on-line help files as the **first** source of help. The TA and instructor will be available during scheduled help sessions and office hours to answer questions related to the assignments. Additional help is available from the MAD help desk.

Email
Please include the course shortcode and your family name in the subject of your email (e.g. Robinson GEOG/PLAN 481). The instructor will try to respond to emails within 24hrs excluding weekends (i.e. Friday 5pm to Monday 8am). The instructor will respond to emails regarding course content or logistics, while questions or concerns regarding evaluation will be reserved for discussion during office hours.
    Email and online discussions are governed by the same rules of academic conduct as your behaviour in class. Please use common courtesy, be polite, and, of course, avoid sending or forwarding aggressive, sexist, racially discriminatory, obscene, offensive, libellous, or defamatory comments of any kind. If the instructor does not respond to your email within 24 hours please send another email or see the instructor in person as it may have been deleted by a spam filter or a server may have been down when the email was sent. Email can be a benefit to both the student and instructor objectives; however, email is not a substitute for one-on-one discussion and therefore I prefer to meet with you during office hours.

Administrative Matters

Academic Integrity: To create and promote a culture of academic integrity, the behaviour of all members of the University of Waterloo is based on honesty, trust, fairness, respect and responsibility.
Students are strongly encouraged to review the material provided by the University's Office of Academic Integrity: http://www.uwaterloo.ca/academicintegrity/. Students who are unsure what constitutes an academic offence are requested to visit the on-line tutorial at: http://www.lib.uwaterloo.ca/ait/

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4, http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm. When in doubt, please contact your Undergraduate Advisor for details.

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm . For typical penalties, check Guidelines for Assessment of Penalties, http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm

Appeals: A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals, http://secretariat.uwaterloo.ca/Policies/policy72.htm

Research Ethics: Please also note that the 'University of Waterloo requires all research conducted by its students, staff, and faculty which involves humans as participants to undergo prior ethics review and clearance through the Director, Office of Human Research and Animal Care (Office). The ethics review and clearance processes are intended to ensure that projects comply with the Office's Guidelines for Research with Human Participants (Guidelines) as well as those of provincial and federal agencies, and that the safety, rights and welfare of participants are adequately protected. The Guidelines inform researchers about ethical issues and procedures which are of concern when conducting research with humans (e.g. confidentiality, risks and benefits, informed consent process, etc.). If the development of your research proposal consists of research that involves humans as participants, the please contact the course instructor for guidance and see: http://iris.uwaterloo.ca/ethics/human/index.htm

Note for students with disabilities: The AccessAbility Services, located in Needles Hall, Room 1132, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AccessAbility Services at the beginning of each academic term. It is imperative that you address all aspects of your situation with the instructor as close to the start date of the course as possible to ensure a fair outcome for yourself, your classmates, and for the instructor.

Religious Observances: Please inform the instructor at the beginning of term if special accommodation needs to be made for religious observances that are not otherwise accounted for in the scheduling of classes and assignments.

Turnitin **Software**: Plagiarism detection software (Turnitin) may be used to screen assignments in this course. This is may be done to verify that use of all materials and sources in assignments is documented. Students will be given an option if they do not want to have their assignment screened by Turnitin. In the first week of the term, details will be provided about arrangements and alternatives for the use of Turnitin in this course.

Annotated bibliography: For advice on how to prepare an annotated bibliography, see: http://www.lib.sfu.ca/help/writing/annotated-bibliography

Group Assignment Checklist: All group members are required to fill in, sign, and as a group submit on LEARN a group assignment checklist. The group assignment checklist template is posted on our course LEARN website. Several scanners are available to students following signing of the form, which are located in the General Windows Lab EV2-1011 and four are located in the General Mac Lab EV1-136.