

GEOM 4008 – Advanced Topics in Geographic Information Systems

Course outline - Fall 2023

Department of Geography and Environmental Studies

Carleton University

Instructors:	Scott Mitchell	Peter Pulsifer
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	Office Hours TBD	Office Hours TBD

Course calendar¹: Seminars: Weekly in-person lectures and discussion

Labs: Weekly in-person labs
**Consult your personal timetable or
Brightspace for times and locations.**

A take-home exam will be administered at the end of the course.

Course web site: We will use [Brightspace](#)

Course objectives:

1. Explore advanced aspects of some current issues in geomatics, including:
 - a. error and uncertainty analysis and visualization/communication in spatial data and analysis;
 - b. spatial decision support systems;
 - c. spatial interpolation and field models; elevation modelling and data sources;
 - d. spatial pattern measurement or characterization;
 - e. spatial databases; and
 - f. open data, data standards and open source software development: impact and role in spatial data and analysis (standards, data exchange, open tools).

Understanding these concepts will be primarily developed using a combination of exploring the literature, class discussion, and in many cases, practical exercises. There will be presentations throughout the course to introduce and discuss topics, but there is a large component of independent learning in this class, and you will each contribute to the delivery of one of the seminars.

2. Develop skills and understanding of how your training in GIS relates to new software packages. Use this learning to provide new user documentation or tutorials to help others learn to do specific tasks in free or open source software packages, and/or accessing, transforming and making use of open data.

Prerequisites: GEOM 3005 (OR equivalent alternative GIS experience), and honours standing.
Prospective students from other schools or backgrounds should contact us about other acceptable prerequisites.

Marking:	Activity	Marks	Approximate timing¹
	Tutorial improvement:	10%	First month of class
	Seminar:	20%	Sign up for timing within term
	Project proposal:	5%	Just before or after Reading Week
	Quizzes:	10%	Spread through term
	Project presentation:	5%	Last week of classes
	Project (includes exam):	40%	End of term
	Participation:	10%	Throughout course

Course Format:

This course has returned to in-person format. Informed by COVID's forced switch to online courses, we have designed this course using a blend of content and activities that worked well in the various versions of the course. Each week will include an in-person lecture and discussion sessions, and practical workshops in the campus labs. Where valuable, some recorded material may supplement the in-person delivery.

Requirements:

The computers in DGES GIS lab Loeb A237 will be used in this course. If you also want to work on your own computers, we can provide advice given our experience with the past online versions of this course, and use of ones own computer will remain a backup solution should we be forced to stay away from campus for any significant portion of this course.

The exact computing requirements and recommendations will necessarily be a work in progress, since we anticipate learning new restrictions and fixes as we test the software and then bring the students in as the term begins. Updates will be posted on Brightspace.

In this class, you are expected to become familiar with GIS software you have never used before. Students are expected to already be proficient in at least one GIS package (probably ESRI ArcGIS, and for many of you, Geomatica), and able to learn new software using a good deal of independent work. Software training is not a part of this course in the fashion you are used to in other GEOM courses, however many of the tools we use will probably be new to you, and you will get help where needed.

Learning to process and analyse spatial data in a new software environment will be the focus of your final project for this course. The deliverables will include a tutorial with any required training materials, which will be published on the Internet under a Creative Commons license. The take-home final exam reports on this project.

Major topics covered in class will be accompanied by quizzes, in Brightspace, designed to make sure you grasped the main concepts in that topic. Each quiz will be done on your own time, and will be available for a period of at least 5 days. Within that window there will be a time limit, simply to make sure nobody is obsessing over a small quiz instead of working on more important things. Exact scheduling details will be worked out in the first weeks of class, according to the distribution of students signing up for different topics.

Late assignments will receive a penalty of ten percent of the total grade, for up to 2 days late, and after that they will not be accepted without appropriate reasons. All assignments must be produced on a computer and submitted digitally through Brightspace or the tutorial wiki site.

¹ Exact timing varies each year; **detailed schedule will be developed interactively over the first few weeks**, adjusted according to numbers and interests of enrolled students. The full schedule will be worked out before course drop deadline.

Readings:

Journal article and other academic readings will be assigned. Students will prepare and present summaries of readings and their associated concepts in class. Readings supporting these presentations will be chosen in cooperation with the instructor.

Evaluation:	Activity	Marks	Approximate timing²
	Tutorial improvement:	10%	First month of class
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	Project proposal:	5%	Just before or after Reading Week
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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.

Instructional & Conduct Offences:

Instructional offences include, among other activities, cheating, contravening examination regulations, plagiarism, submitting similar work in 2 or more courses without prior permission, and disrupting classes. Conduct offences apply in areas of discrimination and sexual harassment. Further information about University regulations which define and regulate these offences is presented in the Undergraduate Calendar: <http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity/> and the university's [Academic Integrity Policy](#).

Plagiarism:

The University Academic Integrity Policy defines plagiarism as “*presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.*” This includes reproducing or paraphrasing portions of someone else’s published or unpublished material, regardless of the source, and presenting these as one’s own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to: books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations. Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT);
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;

² Exact timing varies each year; **detailed schedule will be developed interactively over the first few weeks**, adjusted according to numbers and interests of enrolled students. The full schedule will be worked out before course drop deadline.

- using another's data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one's own; and
- failing to acknowledge sources through the use of proper citations when using another's work and/or failing to use quotations marks.

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.

Readings:

Journal article and other academic readings will be assigned. Students will prepare and present summaries of readings and their associated concepts in class. Readings supporting these presentations will be chosen in cooperation with the instructor.

Statement on Student Mental Health

As a University student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you.

[You may include the following list or reference this link (<https://carleton.ca/wellness/>)] :

Emergency Resources (on and off campus): <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>

Carleton Resources:

- **Mental Health and Wellbeing:** <https://carleton.ca/wellness/>
- **Health & Counselling Services:** <https://carleton.ca/health/>
- **Paul Menton Centre:** <https://carleton.ca/pmc/>
- **Academic Advising Centre (AAC):** <https://carleton.ca/academicadvising/>
- **Centre for Student Academic Support (CSAS):** <https://carleton.ca/csas/>
- **Equity & Inclusivity Communities:** <https://carleton.ca/equity/>

Off Campus Resources:

- **Distress Centre of Ottawa and Region:** (613) 238-3311 or TEXT: 343-306-5550, <https://www.dcottawa.on.ca/>
- **Mental Health Crisis Service:** (613) 722-6914, 1-866-996-0991, <http://www.crisisline.ca/>
- **Empower Me:** 1-844-741-6389, <https://students.carleton.ca/services/empower-me-counselling-services/>
- **Good2Talk:** 1-866-925-5454, <https://good2talk.ca/>
- **The Walk-In Counselling Clinic:** <https://walkincounselling.com>

Academic Accommodations:

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

Informal accommodation due to short-term incapacitation: [provide information on your requirements for short-term informal accommodations. If you require supporting documentation, you

may only request the Self-Declaration for Academic Considerations form (<https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>) which replaces medical notes.]

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 accommodation regarding a formally-scheduled final exam, you must complete the Pregnancy Accommodation Form ([click here](#)).

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 [click here](#).

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, please request your accommodations for this course through the [Ventus Student Portal](#) 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*). Requests made within two weeks will be reviewed on a case-by-case basis. For final exams, the deadlines to request accommodations are published in the [University Academic Calendars](#). 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).

Survivors of Sexual Violence: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/equity/sexual-assault-support-services>

Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation will be provided to students who compete or perform at the national or international level. 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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>