GEOM 2007: Vector GIS: Points, Lines and Polygons

Fall 2025 Course Outline

Department of Geography and Environmental Studies - Carleton University

---

Instructor:	Scott Mitchell	Scott.Mitchell@carleton.ca
		Office: Loeb A301B (subject to change)
		Office Hour: Tuesdays and Wednesdays 10:30-11:30
TAs:	Elisha Richardson	ElishaRichardson@cmail.carleton.ca
	Anna Magistrale	AnnaMagistrale@cmail.carleton.ca
		Office hours online (email) or by appointment

Please see Carleton Central for details of class timing and locations, and Brightspace for all course materials, including the finalized version of this outline when ready.

Our first meeting will be in the lecture hall on Monday, September 8th. Labs are held Tuesdays.

This is an **in-person** course. If you are required to miss class due to illness, please contact the instructor as soon as possible to get guidance on how to participate from home as best possible if you are well enough to continue with some course activities, and/or how to get caught up in any case.

Course Description

Calendar entry:

Storage, visualization, manipulation and analysis of vector geospatial data. Vector geoprocessing including buffering, overlays and topological analysis; feature classification and cartographic representation; managing coordinate reference systems for vector layers; selected applications of vector GIS such as urban planning, environmental and resource management and socio-economic mapping.
Includes: Experiential Learning Activity

Prerequisites: GEOM 1004 or permission of the department.

Learning Objectives – by the end of this course, students will:

1. Understand the theory and application of vector GIS data structures including concepts and techniques related to vector geospatial database systems (feature creation/editing, storing, querying);
2. Possess the foundational knowledge and skills required for intermediate vector geoprocessing including site suitability analysis using vector geoprocessing tools and network analysis;
3. Understand the types of problems that can be solved using vector-GIS analysis and be proficient with designing and implementing vector-based GIS problem solving workflows for spatial decision support;
4. Be proficient with several different GIS software tools for manipulating, analyzing and mapping vector features and their attributes for intermediate geospatial analysis;
5. Have developed skills and experience in effective technical writing and cartographic presentation.

Readings and support materials:

This course uses a mandatory textbook, available through the Carleton University Bookstore, and elsewhere.
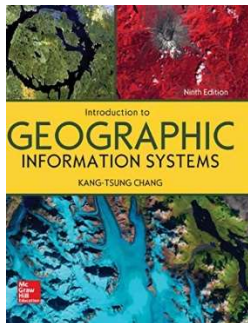
Digital and print versions are available. Note that the same textbook is **also** used for GEOM 2008. The link above takes you to the Campus Bookstore page for this text. They sell both the physical text book ($99), or 180 day access to the e-Book for just $10! You can also order from the publisher but that as of this writing, that is more expensive.

The above text is the only item/resource you will need to purchase for this course.

Additional readings will be provided at times, digitally. Required and occasionally supplemental readings and resources will be posted on Brightspace on a weekly basis.

Evaluation:

Quizzes: 20% (lowest quiz mark in each half of term dropped)
Labs: 50% (evenly spread across 4 assignments)
AI Literacy module: 5% ("free" 5% for completion of the module)
Final group project: 25% (5% proposal, 20% presentation and report)

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.

Late Policy:

All assignments must be submitted through Brightspace by the due date and time. No late assignments will be accepted, with exception of cases where a student is sick or has already arranged for academic accommodation as described in subsequent sections of this outline. In the case of illness, you must make arrangements with the course instructor prior to the due date/time. In place of a doctor's note or medical certificate for short-term illnesses, students are advised to complete the self-declaration form available on the Registrar's Office website to request academic accommodation for missed coursework including exams and assignments.

Attendance at lectures and labs, and further time requirements:

Lectures will cover theoretical components of remote sensing and may also include software demonstrations. When possible, recordings of demonstrations will be made available for later review. Labs will include software demonstrations and one-on-one help will be available for software and practical related questions. You will be expected to attend these sessions to succeed in this course, and there will often be in-person assessment activities. If illness or other mutually-agreed-upon emergency situations develop, we will help you find a plan to keep up.

You will be responsible for completing lab assignments on your own time in addition to formally scheduled time in the lab. You will have access to our lab spaces to do this, any time a class is not using that space.

For group work, you will likely need to allocate time for the group to communicate to plan and coordinate project activities. Groups will schedule this on their own.

Quizzes (20%): Quizzes will be conducted in labs, supervised, through Brightspace. They will be primarily based on the lectures and textbook readings, and must be written in the scheduled lab period, on departmental computers. You may refer to your notes, the textbook, and our course materials in Brightspace while writing the quiz, but no other

materials. If you miss a quiz for extenuating circumstances, contact the instructor to discuss possible accommodations. There are three quizzes before Reading Week, then a fourth quiz immediately after reading week that covers all material from the first three quizzes. The best 3 of those 4 quizzes will count towards half of your quiz grade (i.e. 10% of the course). There are two more quizzes after Reading Week and then again one more that covers the materials from the previous two quizzes, and the best 2 of those 3 quizzes will count as the other 10% of the grades allotted to quizzes.

Labs (50%): There are four lab exercises spread through the term, starting next week, with two weeks to work on each of them. Each lab includes a scenario that requires specific analyses to produce a solution, and will require you to document your findings in a lab report. Details on these requirements will be delivered as the assignments are released, and the Teaching Assistants will go through each of them on the day they are first assigned, and then be available for further help in the following lab period.

AI Literacy Module (5%): We are going to participate in the Future Skills Innovation Network, by completing their module designed to develop and foster skills in artificial intelligence. You will not be graded on this component – you will receive 5% of your final grade for successfully completing all of the module's requirements, or 0% if you do not complete it.

Final Project (25%): Final projects will be completed by pairs of students working together; designing the project will start in the weeks leading up to reading week, and a proposal will be due immediately after Reading Week. Work will progress through the second half of term, with presentations in the final week and a report due on the last day of term. Further details will be discussed and made available on Brightspace in Week 5.

Detailed expectations and grading schemes for the labs and final project will be provided on Brightspace as the term progresses. If you ever suspect that full instructions might be missing, please do not hesitate to ask the instructor for clarification / to see if something was inadvertently missed.

Course calendar: The order and duration of the topics and activities listed above are available in the schedule posted here in Brightspace (this link will only work for registered students). It will still be considered a draft timeline in Week 1, but starting in Week 2 it will only be changed if unforeseen circumstances force an adjustment.

Required software: This course will use ESRI ArcGIS Pro 3.3 and QGIS 3.42. Please see this page about software used in our program for links about minimum requirements for these programs, and how to access them to install on your own computers. You are welcome to use your own computers if you wish, however we do not make any assumptions that you will do that, and the computers in the lab are fully capable of everything we will do in this course. Please note that there are severe limitations on the

possibility of running ArcGIS on a macOS computer (so severe that it is usually impossible), but QGIS is no problem.

If any other software is added to our mix, it will be available at no charge, and will likely be multi-platform.

Use of social media (Discord, other chat services, etc.):

Often someone in the class will set up a Discord server or other opportunity for class members to chat and discuss class content online. If this is done, please make sure that everyone in the class is aware of the arrangements. If you are not familiar with the platform, please ask your classmates about it. The instructor or TA will not be part of any conversations using such channels, cannot provide support for such platforms, and nothing said there should be considered official communications about the class. All official communications will take place in person and on Brightspace.

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;
- 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.

As our understanding of the uses of AI and its relationship to student work and academic integrity continue to evolve, students are required to discuss their use of AI in any circumstance not described here with the course instructor to ensure it supports the learning goals for the course.

Statement on Student Mental Health:

As a 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. For more information, please consult https://carleton.ca/wellness/.

Emergency Resources (on and off campus):

Telephone Resources:
- Crisis/Urgent Counselling Support: 613-520-6674 (Mon-Fri, 8:30-4:30
- Suicide Crisis Helpline: call or text 9-8-8, 24 hours a day, 7 days a week.
- For immediate danger or urgent medical support: call 9-1-1

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/
- Good2Talk: 1-866-925-5454, https://good2talk.ca/
- The Walk-In Counselling Clinic: https://walkincounselling.com

Requests for Academic Accommodations:

Carleton is committed to providing academic accessibility for all individuals. You may need special arrangements to meet your academic obligations during the term. The

accommodation request processes, including information about the Academic Consideration Policy for Students in Medical and Other Extenuating Circumstances, are outlined on the Academic Accommodations website (students.carleton.ca/course-outline).