

Vector GIS: Points, Lines and Polygons

GEOM 2007 - Fall 2021

Department of Geography and Environmental Studies, Carleton University

Professor: Murray Richardson, PhD

Contact options:

- Talk with the instructor at the end of the weekly online lecture meeting
- "Ask the instructor" on Brightspace
- Email: murray.richardson@carleton.ca

Lectures: Thursdays online (*synchronous*) via Zoom 11:35 am to 1:25 pm. Typically, the online lecture period will not make use of the entire period and will end early.

Laboratory periods: Monday, Tuesday or Friday online (*synchronous*) according to your section:

Section A1:	Fridays	11:35 am to 1:25 pm
Section A2:	Thursdays	2:35 pm to 4:25 pm
Section A3:	Monday	2:35 pm to 4:25 pm

Note: Online meetings (lecture and lab) will take place over "Zoom". Students are required to setup a free Zoom account using their Carleton email address. Please refer to section VII for more information about setting up your Zoom account. Please note that your attendance is expected at all meetings and will be tracked for instructor information purposes, and used in the event of an assessment dispute resulting from a student missing any important announcements during class time. During zoom sessions, please make sure to enter your full (first and last name) as your identifier.

Teaching Assistants (Contact options/office hours: TBA):

Emily Lindsay, PhD EmilyLindsay@cmail.carleton.ca

Jason Beaver, PhD candidate JasonBeaver@cmail.carleton.ca

I. Calendar Description:

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

Prerequisite(s): [GEOM 1004](#) or permission of the Department.

II. Learning Outcomes:

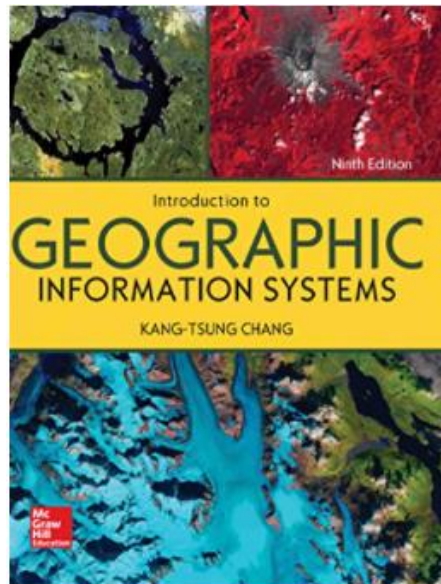
By the end of this course students will:

- 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.

IV. Readings:

This course has a mandatory textbook, available through the Carleton University Bookstore:

Kang-tsung Chang – ISE Introduction to Geographic Information Systems, 9e



A detailed explanation of the required textbook readings and other resources will be posted on Brightspace on a week-by-week basis.

V. Course Calendar: Please refer to the course schedule posted on Brightspace for a detailed timeline of course topics and assessments. The schedule may require minor revisions to accommodate unexpected scheduling issues and you will be notified of any updates throughout the term.

VI. Course Evaluation:

Students grade evaluation will be based on five components:

Geospatial Laboratory Assignments (5):	60%
Online Quizzes	15%
Group term project:	25%
Total:	100%

VII. Other General Course Information

Weekly Course Structure

The typical weekly structure of the course, including types of activities and expectations, are as follows:

- Complete posted readings and other weekly assigned resources on your own schedule but prior to the posted deadline;
- Complete any practice questions related to weekly resources in preparation for mid-term tests
- Attend the online weekly class lecture via Zoom at your designated time as shown at the top of this outline to receive weekly guidance and mini-tutorials, and to interact with the instructor;
- Attend your online weekly lab session via Zoom at your designated time as shown at the top of this outline to receive assignment instructions and technical help;
- Make use of "Ask your instructor" for course content and schedule-related questions (if possible, please limit your use of email to the instructor; use it primarily for more personal issues that require discussion or to arrange an in-person Zoom meeting). Meeting online after our scheduled lecture periods is also a good option and there will always be time made available for this.

Required Computer Software

During this course you will make use of the following software and phone apps:

1. ArcGIS Pro v2.8 or higher for PC only (student license available)
2. QGIS (latest version) for PC and macOS
3. Other software TBA

For more information about computing requirements to run ArcGIS Pro please visit:

<https://www.carleton.ca/geography/computing-requirements-for-dges-courses/>

For students using macOS, please refer to the note in the above link that pertains to you. Briefly, ArcGIS Pro only runs on the Windows platform, and you will need to install a Windows partition on your computer, or use Windows VM access with the installed software (instructions will be posted on Brightspace).

Understanding the purpose of online meetings, weekly assigned resources with quizzes and laboratory assignments:

The online meetings, weekly assigned resources with quizzes, and laboratory sessions/assignments are designed to complement and reinforce each other in meeting the course's learning objectives. Online meetings for "lectures" will be approximately 1 hour. These meetings will be synchronous ("live") online sessions conducted using "Zoom". The purpose of these meetings is not to impart all of the course theory as in a more typical lecture format, but to introduce critical concepts for the week, to provide opportunities for student-instructor engagement, and to explain other aspects of the course as required. The weekly assigned resources cover the substantive theoretical concepts for vector GIS. The laboratory assignments will also take place online over "Zoom" through synchronous Laboratory meetings. Assignments will allow the opportunity to apply key methods and concepts related to vector GIS and data structures.

Student Zoom Accounts

To facilitate the use of breakout rooms during our online meetings, please sign up for a free zoom account (<https://zoom.us/signup>) **using your Carleton email address (this is critical to make sure the breakout sections work correctly)**. Next, download and install the "Zoom Meeting Client" (<https://zoom.us/download>) on your PC (if you've used Zoom already then most likely you have it installed on your computer as the web browser client will download automatically when you start or join your first Zoom meeting). Each time you are joining a lecture or a lab session please use your first and last names as used in Carleton's records (like the ones on your Carleton student card).

Attendance during online meetings

Students are expected to attend all synchronous online meetings. Please understand that it will be challenging to participate asynchronously in this course. At the same time, we recognize there will be challenges and will work with you to provide flexibility. Some of this will likely involve the recording of synchronous sessions. If you have a genuine scheduling issue that prevents you from attending one or more meetings (either the lecture or the lab), please contact the professor ahead of time by email to arrange access to a recording of the meeting.

Our first "lecture" meeting will be on Thursday, September 9th at 12:35 pm

Privacy issues related to recordings of online meetings

Synchronous online learning with recording creates potential privacy problems that we never had to worry about in the past. When we do synchronous video calls, and we have cameras on, we are opening windows into our homes. Please respect that fact with all your fellow students and instructors. Do not record people without their permission, and do not distribute recordings that may be made available by the instructor, to anyone outside of the course. Remember, it is not just the course materials anymore, now it is also recordings of what was said and seen and shown by all of your classmates. If you have any concerns about privacy, don't hesitate to bring them up with the instructor.

Finally, by reading this course outline (required) and by continuing in this course you are implicitly providing your permission to allow these recordings to happen, under the conditions outlined above, i.e. that the recordings only be used for the purposes of reviewing or getting caught up while taking this class.

Quizzes

Online quizzes will be based primarily on the textbook readings and will have firm due dates. If you miss a quiz due to an extenuating circumstance, please contact the instructor as soon as possible for accommodation.

Assignment Scheduling and Due Dates

There will be at least five laboratory assignments required for this course. All assignments must represent individual work that is completed independently. Any form of plagiarism will be treated as a serious instructional offence in accordance with university policy (see below).

Students should attend the online "lecture" and laboratory sessions having done the required readings and ready to participate in discussions or lab activities.

The introduction, explanation and submission of laboratory assignments will adhere to the schedule posted on Brightspace. *Please note that there will be no laboratory session the first week of class - your first official laboratory session will be during the week of September 13th.* Please review the class schedule carefully. The topic associated with a laboratory assignment will be introduced through the weekly assigned resources. Next, the assignment will be explained in the online laboratory session. Finally, students will be expected to submit their completed assignments online in accordance with the assigned due dates as indicated on brightspace or in the course schedule.

Submission and Grading of Assignments

Assignments instructions will be distributed on Brightspace in .PDF format, with detailed instructions. Assignment reports will be submitted online for each assignment. In this course, assignment submission will follow a technical lab report guideline, normally including the following sections: "Introduction and Purpose"; "Methods"; "Results and Discussion"; "Conclusion"; and "Bibliography". A title page is not required provided you have included your name, student number and section (e.g. A1) at the top of the first page or in a multi-page header. Please submit your reports in MS Word or .PDF format. Tables and figures must have appropriate captions (Table 1; Figure 1). Table captions appear above the table. Figure captions appear below. References to tables in figures must precede the appearance of the actual table or figure in the document, and should be numbered according to the order in which they appear. It is incredibly important to learn how to write technical reports and to clearly and professionally communicate work flows/results/interpretations; This is the fundamental purpose for having you submit your assignments as well-formatted lab reports. Your report writing will be assessed as part of your grade for each assignment.

TAs will mark your reports and grades will be posted on the course's Brightspace site after review by the

instructor. Students are responsible for checking their assignment grades on Brightspace. Any questions regarding assigned grades must take place in written form (i.e., email) **within ten days** after the day that the assignments are returned. Final grades are subject to the Dean's approval.

Late assignments will be deducted by -2% per day for up to seven days. Unless you have an extenuating family, medical or other circumstance beyond your control, please do not attempt to negotiate an extension to the late penalty or seven day submission period. If you plan to submit late (up to seven days), you do not need to notify the instructor and if you do, you will not likely receive a response. Only extenuating circumstances such as an acute health problem, accident or family emergency will be considered as a valid reason to extend the deadline without penalty or beyond seven days. Please do not attempt to negotiate with the instructor or TAs over assignment submission deadlines unless your circumstance falls within one of these serious categories.

Final Project

Working in groups of 2 to 3 (max) students, you will undertake a final project involving vector GIS data processing, analysis and cartographic representation. The project will include a proposal component earlier in the term, at least one meeting with the instructor, and a final report structured similarly to your assignment reports but with more elaboration and more cartographic products. There will be prescribed elements to the project, but the actual topic will be up to your group. More details will be provided prior to the October reading week. The due date for your final project will be midnight on the last day of term, which is also the last day for handing in term work:

<https://calendar.carleton.ca/academicyear/>

VIII. Instructional and Conduct Offences

Carleton University has clear and firm policies regarding instructional and conduct offences. Instructional offences include among other activities cheating, contravening examination regulations, plagiarism, and disrupting classes. Conduct offences apply in areas of discrimination and sexual harassment. Further information about the University's Academic Integrity Policy can be found at:

<https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy-2021.pdf>

Plagiarism is one kind of instructional offence. Examples of plagiarism include:

- 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;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works

and/or failing to use quotation marks;

Plagiarism is a serious offence which cannot be resolved directly with 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.

For more information on how to cite sources, refer to the library web page "*Citing Your Sources*", available at <http://www.library.carleton.ca/help/citing-your-sources>.

Academic Accommodation:

You may need special arrangements to meet your academic obligations during the term. You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://www.carleton.ca/equity/>. 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.

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.

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). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (<https://carleton.ca/pmc/>) for the deadline to request accommodations for the formally scheduled exam (if applicable). Please note – if you do not meet with your instructor to discuss your letter of accommodation, we cannot guarantee your required accommodation. *It is your responsibility to approach us about this.* You can visit the Equity Services website to view the policies and to obtain more detailed information on academic accommodation at <http://www2.carleton.ca/equity/>.

Carleton University has suspended the need for a doctor's note or medical certificate until further notice when requesting academic accommodation related to COVID-19. Students should complete the self-declaration form available on the Registrar's Office website to request academic accommodation for missed course work, including exams and assignments. Here is the link to the form: <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>.

For more information about deferrals for final exams/take-home exams, please see these websites: <https://carleton.ca/registrar/deferral/> and <https://stuapps.carleton.ca/sarms/registrar/deferral>. Please note that students may also submit a COVID-19 self-declaration form instead of a medical note for these deferrals.

Students are encouraged to connect directly with their instructors to discuss required accommodations arising from the COVID-19 situation. Equity and Inclusive Communities and Academic Advisors can also be reached if students are unable to reach out to instructors directly.

Campus Resources for Students

Student Experience Office <http://www.carleton.ca/seo/>
Health and Counselling Services <http://www.carleton.ca/health>
International Student Services Office <http://www.carleton.ca/isso>
Academic Advising <https://carleton.ca/academicadvising/>
Career Services <https://carleton.ca/career/>