

GEOM 2007A
Points, Lines and Polygons
Department of Geography and Environmental Studies
Faculty of Arts and Social Sciences

Academic year: Fall 2023

Instructor: Niloofar Alavi, PhD

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Lectures: Monday 14:35-16:25

Labs: A1: Wednesday 14:35-16:25

A2: Thursday 14:35-16:25

Office hours: Monday 16:25-17:25 or by appointment

Teacher Assistants : To be determined

TA office hours: To be determined

Course Description:

This course introduces vector geospatial data and geographic information systems (GIS) tools for managing, analyzing, and presentation of vector spatial information. You will learn both conceptual and practical aspects of working with vector GIS data and tools, and how to compile and work with spatial databases. 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.

Prerequisite(s): GEOM1004 or permission of the Department

Learning Objectives:

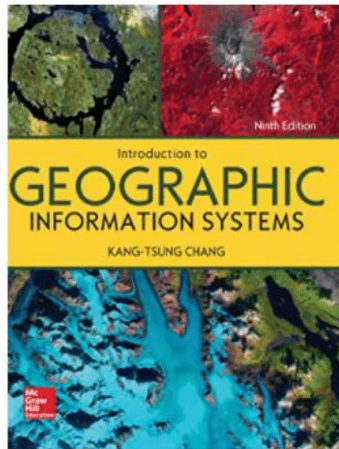
- 1) Understanding the theory and application of vector GIS data structures including concepts and techniques related to vector geospatial database systems (feature creation/editing, storing, querying).
- 2) Gaining the foundational knowledge and skills required for intermediate vector geoprocessing including site suitability analysis using vector geoprocessing tools and network analysis.
- 3) Understanding 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.

Textbook:

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

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

**Computing requirements:**

The computing requirement of this course is ESRI ArcGIS Pro 3.1. You can download a one-year student license through the [GIS library website](#). Follow the instruction to install the software on your computer. If you have any questions or technical problems regarding downloading and installing ArcGIS Pro on your machines email GIS@carleton.ca. Please note that ArcGIS Pro is not supported on Mac operating system.

The DGES GIS lab is available for students 24/7 (unless another class is going on). In addition, remote access to the lab computers is enabled using VMware Horizon Client. Instructions on how to login to the virtual machines through VMware Horizon Client is given [here](#). Please note that VMware Horizon Client is the Virtual Desktop Infrastructure (VDI). VDI allows you to access campus computers and labs to use software already installed on the virtual machine without needing to download the software onto your own machine. You should not be downloading software onto the virtual machine – you do not have the privileges to do so.

This course depends largely on a progression of practical exercises, with skills building upon each other across assignments using the software. If you have any questions or concerns in that regard please talk to your instructor or TAs early in the semester. In addition, you must practice careful file management (saving files in the proper directories, deleting all unwanted files, naming files thoughtfully, and keeping track of where everything is) at all times, especially when remotng in to the GIS lab computers. Instruction on file management will be given in the introductory lab session.

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:

Grade evaluation will be based on these components:

Lab assignments (4): 40% (10% each)

Written term test: 30%

Final project: 30%

Lab assignments: There will be four assignments in total, each worth 10%. The lab assignments are meant to complement the course materials and to facilitate application and integration of knowledge gained from lectures and readings. The lab assignments will be posted on Brightspace at least one day ahead of their corresponding lab session. Please feel free to collaborate with others during the lab sessions to obtain common data, but please submit your own individually-written lab reports that contain your own analyses and answers to questions. Lab assignments must be typed and submitted via the submission portal provided on Brightspace. **Late assignments will be penalized by -2% of the maximum assignment grade per day up to 7 days.**

Assignment submission should 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.

Term Test: On the last day of the course during the lecture (Dec 4) there will be a multiple-choice written test on theoretical course contents.

Final Project: During the second half of term, you will be working on individual final projects, producing interactive electronic map-based presentations. Examples of past projects will be discussed in class. You will use ArcGIS Pro software to produce the electronic maps. The thematic data that can be used in your projects are available in the GIS library. You need to submit a project proposal mid semester, which makes up 10% of the total grade for your final project. You will submit all the files needed for a working map project, as well as a written report. The final project makes up 30% of your final grade. This grade is based on your project proposal, the final project report as well as electronic files.

Plagiarism is a serious offence and will not be tolerated. If you submit someone else's work (ideas or material) as your own, that is plagiarism. All ideas presented which are not your own must be properly referenced. This includes more than just verbatim presentation of the writings or ideas of others as one's own – it can also include near-verbatim copying, or even the use of someone else's ideas, from other students, books, the Internet, or anywhere else. All plagiarism offences will be reported to the Faculty Dean's office.

You will often be working collaboratively to prepare for an assignment and possibly even to collect data, but **you must ALWAYS submit individual course work.** This means that every assignment **must be written and submitted individually**, demonstrating your **personal understanding and interpretation of the assignment content.** Carleton's Academic Integrity Policy covers all these expectations and more, and is available at <http://www2.carleton.ca/studentaffairs/academicintegrity>

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 Menon 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.

GEOM2007A – Fall 2023 – Tentative term schedule

<i>Week</i>	<i>Date</i>	<i>Lecture</i>	<i>lab</i>
1	Week of Sep 11	Introduction	Introduction
2	Week of Sep 18	Earth models, projection and coordinate system	Assignment 1 starts
3	Week of Sep 25	Data model and attribute data	Assignment 1 continues
4	Week of Oct 2	Vector data operations	Assignment 1 due Assignment 2 starts
5	Week of Oct 9	Reading week	
6	Week of Oct 16	Effective cartography part I	Assignment 2 continues
7	Week of Oct 23	Effective cartography part II	Assignment 2 due Assignment 3 starts
8	Week of Oct 30	Vector data input and editing	Assignment 3 continues Project proposal due
9	Week of Nov 6	Spatial Analysis	Assignment 3 due Assignment 4 starts
10	Week of Nov 13	Network Analysis	Assignment 4 continues
11	Week of Nov 20	3D Analysis-Guest lecturer	Assignment 4 due Working on final projects
12	Week of Nov 27	GIS customization-Model Builder– Coding in GIS–Guest lecturer	Working on final projects
13	Week of Dec 4	Term test	No labs
14	Week of Dec 22	Final project due	