

Maps, Satellites and the Geospatial Revolution, GEOM1004-A/ERTH2004-A

Carleton University
Department of Geography & Environmental Studies
Fall 2026

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Office Hours: Tuesdays (12:00pm-1:00pm) or by appointment

COURSE DESCRIPTION

Introduction to the creation and use of maps using a variety of geospatial tools to better understand and resolve physical, social, and environmental problems. Overview of geomatics (cartography and map design, geographic information systems, GPS, and remote sensing).

PRECLUSIONS

Precludes additional credit for GEOM 2004 (no longer offered).

LEARNING OUTCOMES

The main learning objectives are to: (1) to become familiar with the core sub-disciplines in the broad field of geomatics, (2) to develop an appreciation for how geospatial tools are used, and how they are shaping the way we make decisions, and (3) to develop practical, hands-on skills in cartography, GPS mapping, GIS analysis, and remote sensing and to learn how they can be used to help solve social and environmental problems.

COURSE FORMAT

Lectures will follow the attached course outline. The schedule may require minor revisions to accommodate unexpected scheduling issues. The lectures will introduce and illustrate the major concepts in geomatics. Support material will be available on the Brightspace course site.

SCHEDULE

Lectures: Monday and Wednesday 1:05pm- 2:25pm

Lab sessions: - section A1: Thursday 11:35am-1:25pm
- section A2: Thursday 2:35pm-4:25pm
- section A3: Friday 12:35pm-2:25pm

Note: Labs will run in the following order: A1→A2→A3

COURSE TEACHING ASSISTANT

Uvini Senanayake (UviniSenanayake@cmail.carleton.ca)
Office Hours: TBA in [Loeb A200](#)

Mohamed Abbas (MohamedAbbas3@cmail.carleton.ca)
Office Hours: TBA in [Loeb A200](#)

RECOMMENDED TEXTBOOK

Jonathan Campbell and Michael Shin, 2011. Essentials of Geographic Information Systems. Saylor Foundation Brady, N.C. Open access textbook available on:
<https://www.saylor.org/site/textbooks/Essentials%20of%20Geographic%20Information%20Systems.pdf>
Other reading materials will be posted on Brightspace.

STUDENT RESOURCES AND COMMUNICATION

Office Hours, Email and Appointments

If you have questions pertaining to lecture material, I encourage you to come to my office hours or to meet me at the end of class to make an appointment.

All questions about missed assignments, missed exams, and other practical concerns about the course should be directed to me by email. Emails will be responded to during business hours only. Please place the course number GEOM1004/ERTH2004 in the subject line. Private correspondence with the Instructor and Teaching Assistants should be through a Carleton email account (this is accessible in Brightspace).

Brightspace Course Site

The Brightspace course site of GEOM1004/ERTH2004 contains information on all aspects of the course. It includes partial outlines of lectures (not complete notes) and graphs or diagrams presented in class. You need to supplement these notes by attending the class lectures or by referring to the textbook. You will be able to access Brightspace course site and to download files on the first week of classes. If you are not able to login, please contact the course instructor. Follow this link to access the course Brightspace home page: [Homepage - Crosslist EARTH2004A:GEOM1004A \[31826:32214\] Maps Satellites and Geo Rev \(LEC\) Fall 2026](#)

EVALUATION

Final marks in the course are based on your performance in five categories as follows:

Lecture Participation Questions	10%
Lab Assignments	30%
Midterm Exam	30%
Lab Exam	15%
Story Map Project	15%

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.

Lecture Participation Questions

To encourage and enable active student participation in lectures, this course requires the use of the iClicker app to answer the lecture participation questions.

Setting up iClicker Account:

1-Create your iClicker student account Go to <https://student.iclicker.com/#/login> or download the iClicker Student application on your smart device then select sign up option.

2- Sign up for a student iClicker free account. You should use your university email address and your Carleton University ID in the Student ID field. You might have to pay for a subscription (\$21.99 for a six-month subscription). Please don't pay for a subscription prior to our first class meeting.

3- You can join the class by using this link <https://join.iclicker.com/LZUM> OR Search with the following information to find this course and **add** it to your iClicker account:

Institution: Carleton University

Course: GEOM1004: Maps, Satellites and the Geospatial Revo

Lab exercises

There will be six lab assignments. The lab exercises are meant to complement the course materials and to facilitate application and integration of knowledge gained from lectures and readings. The lab exercises will be posted on Brightspace at least one day ahead of their corresponding lab session. These are normally due at the beginning of your lab section, two weeks after the assignment introduction. 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. The assignment reports must be received by the start of the lab period of the day on which they are due.

Late Midterm Exam

A late midterm exam will take place on **November 23rd** during the regularly scheduled lecture period. The Exam will cover lecture materials.

Students who cannot attend on-campus assessments in person may apply to write their exams remotely, if they meet certain criteria. More information for instructors and students is available at <https://carleton.ca/ses/distance-exams/>.

Lab Exam

This will happen the week of **November 30th** during your laboratory session. It will involve a 90-minute computer-based test in which you will answer multiple-choice and short-answer questions, and you will be required to use mapping software to come up with some of your answers.

Story Map

[ArcGIS Story Maps](#) is an online platform for communicating engaging topics through maps, photos and written content. Over the course of the semester, you will be working on your own individual story map during lab work periods. The specific topic will be up to you (e.g. documenting a recent trip you did, your favourite coffee shops/pubs around Ottawa, an “homage” to the neighbourhood you grew up in, or a story map that documents a social/environmental issue of interest). You will receive additional guidelines early in the term. Your final story maps will be submitted through ArcGIS online.

COURSE POLICIES

Late Assignments

Late assignments will be penalized by subtracting 10% per day (including Saturday and Sunday) of the total value of the assignment. Students whose assignments are late because of a valid medical reason or family emergency will not be penalized, however, the completion of the [Academic Consideration for Coursework form](#) is requested.

If you are not able to hand your assignment directly to the Instructor or TA, you may email a copy of your work to demonstrate you have completed it on time (before the due date) and provide a hard copy (for marking) as soon as possible after that. Every student will be able to hand in any one assignment up to one week late without penalty.

Missed Exams

Students who fail to write the midterm exam will receive an automatic grade of zero. The only exceptions will be for instances of significant illness or a family emergency, however, the completion of the [Academic Consideration for Coursework form](#) is requested. Students who are not able to write the final exam during the exam period must consult with *Exam Services* as soon as they are aware that they will miss the test.

Standards of Written Work

Any assignment submitted should be printed using *word processing software* and checked for spelling and grammar. The overall presentation quality of the assignments will be reflected in your grade.

GENERATIVE ARTIFICIAL INTELLIGENCE (AI)

AI use in this course

Students may use AI tools for basic word processing functions, including grammar and spell checking (e.g. Grammarly, Microsoft Word Editor, Copilot)

Documenting AI use

It is not necessary to document the use of AI for the permitted purposes listed above. If you have questions about a specific use of AI that isn't listed above, please consult your instructor.

Why have I adopted this policy?

This policy ensures that student voices and ideas are prioritized and authentically represented, maintaining the integrity of the work produced by students while allowing basic support to enhance clarity, correctness, layout and flow of ideas. The goal of adopting a limited use of AI is to help students develop foundational skills in writing and critical thinking by practicing substantive content creation without the support of AI.

Limitations: Students may not use AI for producing any part of their lab reports and they are not allowed to use AI during their lab exam.

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.

ACADEMIC INTEGRITY

Academic integrity is a necessary foundation for all meaningful scholarly activity and verified instances of intellectual dishonesty will be dealt with in full accordance with the procedures laid out in Academic Integrity Policy. Additional information regarding what constitutes plagiarism may be found on Carleton University web site: <https://carleton.ca/secretariat/wp-content/uploads/Academic-Integrity-Policy-2021.pdf> The University Senate defines plagiarism as “presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one’s own.” This can 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;
- 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, Gemini, Claude, etc.)
 - 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, 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
- failing to acknowledge sources with proper citations when using another's work and/or failing to use quotations 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.

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://wellness.carleton.ca/>"

Instructors may also wish to list of some or all the following resources:

Emergency Resources ([on and off campus](#))

- 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: call 613-238-3311, text 343-306-5550, or connect online at <https://www.dcottawa.on.ca/>
- Mental Health Crisis Service: call 613-722-6914 or toll-free 1-866-996-0991, or connect online at <http://www.crisisline.ca/>
- Empower Me Counselling Service: call 1-844-741-6389 or connect online at <https://students.carleton.ca/services/empower-me-counselling-services/>
- Good2Talk: call 1-866-925-5454 or connect online at <https://good2talk.ca/>
- The Walk-In Counselling Clinic: for online or on-site service <https://walkincounselling.com>

ACADEMIC ACCOMMODATION

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:

<https://students.carleton.ca/course-outline/>

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 visit the Equity Services website: <http://www.carleton.ca/equity/>

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 visit the Equity Services website: <http://www.carleton.ca/equity/>

Academic Accommodations for Students with Disabilities: If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC 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 your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre website](#).

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 the [Equity and Inclusive Communities website](#).

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 must be provided to students who compete or perform at the national or international level. Please contact your instructor 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 [Senate Policy on Accommodation for Student Activities \(PDF, 25KB\)](#).

Academic Consideration for Medical and Other Extenuating Circumstances: Due to medical and other extenuating circumstances, students may occasionally be unable to fulfil the academic requirements of their course(s) in a timely manner. The university supports the academic development of students and aims to provide a fair environment for students to succeed academically. Medical and/or other extenuating circumstances are circumstances that are beyond a student's control, have a significant impact on the student's capacity to meet their academic obligations, and could not have reasonably been prevented. Students may request Academic Consideration for Coursework or Other Academic Deliverable. For further information please review the [Procedure for Academic Consideration](#) and the [FAQ page](#).

Scheduling and Examination Support: Scheduling and Examination Services provides various supports for both in-term and end-of-term tests and exams. Details can be found on the [Exam Support website](#).

Maps, Satellites and the Geospatial Revolution (GEOM1004/ERTH2004)
Fall term 2026 Course Outline

Week	Lecture Class	Lab	Readings
Sept. 9	Introduction to Course	<i>NO LAB</i>	Course outline
Sept. 14-18	Introduction: Maps, Satellites, and the Geospatial Revolution Thinking spatially – Key Concepts	Intro to Google Earth Pro and ArcGIS Pro Lab Assignment #1 Introduction to Google Earth Pro	Ch.1 Ch.2 (40-48)
Sept. 21-25	Coordinate Systems and Projections	Lab Assignment#2: Mapping Nunavut communities. <i>Assignment #1 is due</i>	Ch.2 (49-60)
Sept. 28 Oct. 2	Coordinate Systems and Projections (cont'd) Global Navigation Satellite Systems	Lab Assignment#2: Mapping Nunavut communities (cont'd)	Ch.2 (49-60)
Oct. 5-9	An Introduction to Cartographic Design Principles	Introduction to Avenza Maps for GPS data acquisition Lab Assignment #3: GNSS data collection and accuracy assessment. <i>Assignment #2 is due</i>	
Oct. 12-16	Oct. 12: NO CLASS- Statutory Holiday Introduction to Geographic Information Systems (GIS)	Lab Assignment #3: GNSS data collection and accuracy assessment (cont'd)	Ch.9
Oct. 19-23	Monday Oct. 19: Intro to GIS (cont'd) Wed. Oct. 21: Jeff Hughes, Lindsay Ellison, and Bryan Ladds ESRI Canada-Guest lecture on ArcGIS online platform	Lab Assignment #4 – Symbolizing raster and vector data (Friday lab section). <i>Assignment #3 is due</i>	
Oct. 26-30	<i>NO CLASS – Term BREAK</i>	<i>NO LAB – Term BREAK</i>	
Nov. 2-6	Introduction to Geographic Information Systems (GIS) (cont'd)	Lab Assignment #5. Examining spatial data and spatial relationships. <i>Assignment #4 is due</i>	Ch.9
Nov. 9-13	Spatial Analysis Using GIS	Lab Assignment #5. Examining spatial data and spatial relationships (cont'd) <i>Work on Story Map Project</i>	Ch.4.3
Nov. 16-20	Spatial Analysis Using GIS Introduction to and Remote Sensing	Lab Assignment #6: Introduction to raster GIS analysis. <i>Assignment #5 is due</i>	Ch.4.3
Nov. 23-27	Nov. 23rd: Late Midterm Exam-During our Regular Class Period. Nov. 27th: Introduction to Remote Sensing (cont'd)	Overview of the Lab Exam. <i>Assignment #6 is due Brightspace upload. Work on Story Map Project.</i>	
Nov. 30- Dec. 4	Introduction to Remote Sensing (cont'd)	Lab Exam during your regularly scheduled lab period.	
Dec. 7-11	NO CLASS	<i>Work on Story Map Project. Story Map project due by Sunday December 20th 11:59pm via Brightspace upload.</i>	