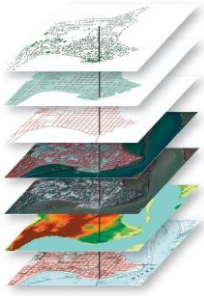
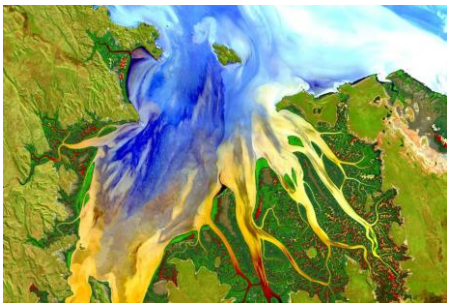
# Maps, Satellites, and the Geospatial Revolution

# GEOM 1004 / ERTH2004 - Winter 2026

Department of Geography and Environmental Studies, Carleton University



**Instructor**: Nicholas Pontone

Contact options:

- "Ask the instructor" forum on Brightspace
- Meet after the lecture
- Office hours (TBA)
- Email: NicholasPontone@cmail.carleton.ca

**Lectures**: Mondays and Wednesdays in person 8:35 am to 9:55 pm

**Laboratory periods**: Tuesday, Wednesday, or Friday during the time indicated below for your section:

| | | |
|---|---|---|
| Section B1: | Thursdays | 9:35 am to 11:25 am |
| Section B2: | Friday | 8:35 am to 10:25 am |
| Section B3: | Thursdays | 2:35 am to 4:25 am |

**Teaching Assistants:**

Yasaman Amini (YASAMANAMINI@cmail.carleton.ca)
Uvini Senanayake (uvinisenanayake@cmail.carleton.ca)

TA office hours are to be announced in the first week of class.

**I. 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, GNSS, remote sensing).

**II. Preclusions:** Precludes additional credit for GEOM 2004 (no longer offered).

**III. Learning Outcomes:**

- To become familiar with the core sub-disciplines in the broad field of geomatics, including cartography, global navigation satellite system applications, geographic information systems, and remote sensing.
- To develop an appreciation for how geospatial tools are used, and how they are shaping the way we make decisions.
- To develop practical, hands-on skills in cartography, GPS data collection and mapping, introductory GIS analysis, introductory remote sensing and to learn how they can be used to help solve social and environmental problems.

**IV. Textbook:**

We will use the online open access textbook "Geomatics for Environmental Management: An Open Textbook for Students and Practitioners**"** by Paul Pickell.

**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.

**VI. Course Evaluation:**

Students will be evaluated based on five components:

| | |
|---|---|
| Geospatial Laboratory Assignments: | 50% |
| Weekly Quizzes: | 10% |
| Midterm Exam: | 10% |
| Final Lab exam: | 15% |
| Final Exam: | 15% |
| **Total:** | **100%** |

*Geospatial Laboratory Assignments:* There will be up to six lab assignments in total. ***These are normally due by midnight on the evening prior to your lab section, two weeks after the assignment introduction.*** Assignments submitted after the due date will be considered late and will be penalized by -1% of the maximum assignment grade for a period of up to 7 days. After 7 days, no late submissions will be accepted. This is a firm policy. If you plan to submit late (up to 7 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. 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. Otherwise, a -1% per day penalty is quite minor and you should simply accept it.

*Weekly Quizzes:* Quizzes will be based on assigned course readings from the textbook and other resources including web-based resources such as websites and videos, and short videos by the instructor. Quizzes will be

completed in person during regularly scheduled lecture periods. You will have a set amount of time to complete each one. It is best to complete your review of the readings and other assigned resources prior to starting the quiz to ensure you have enough time to finish all questions. Your overall quiz grade will be graded from the best 7 out of 9 quizzes. Quizzes will occur at the beginning of the lecture period. If you arrive more than 5 minutes late or miss the lecture, you will be unable to make up the quiz. If you miss a quiz by accident or for another reason (other than a serious, verifiable and extenuating circumstance as described above), you can take advantage of this otherwise flexible assessment policy. Please do not attempt to negotiate with the instructor over missed quizzes unless your circumstance falls within one of these serious categories.

*Midterm Exam: The* midterm exam will evaluate your understanding of key concepts and skills from lectures, lab activities, assigned textbook readings, and other course resources (including selected websites and videos). The exam will be written in person during the scheduled lecture period (see course schedule) and will include a combination of multiple-choice and short-answer questions.

*Laboratory Exam:* This will happen in the final week of classes during your scheduled lab period. It will involve a 110-minute computer-based test in which you will answer multiple-choice and short-answer questions and you will be required to use GIS software to come up with some of your answers.

*Final Exam:* The final exam will be written during the official exam period and will consist of multiple-choice and short-answer questions. It will be cumulative, covering material from lectures, lab exercises, assigned textbook readings, and additional course resources (including relevant websites and videos). The date, time, and location will be posted in the central exam schedule.

*Lecture and lab attendance/participation:* Attendance at all lectures and lab meetings is expected. The purpose of attendance is to prepare you for the final lab exam, the laboratory assignment content and weekly quizzes. While attendance is not mandatory, experience has shown that students that attend lectures and labs will have the necessary tools to successfully complete this course.

**VII. Other General Course Information**

*Weekly Course Structure*

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

- Complete textbook readings and other weekly assigned resources on your own schedule, prior to the lecture to which they are assigned;
- Attend lectures to receive weekly guidance and mini-tutorials and to interact with the instructor;
- Attend your lab session at your designated time as shown at the top of this outline to receive assignment instructions, GIS tutorials, 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);
- Make use of "Student Coffee Shop" on Brightspace to interact and converse with other students and to help and support each other!

*Required Computer Software*

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

1. Google Earth Pro Desktop Version (free)
2. ArcGIS Pro (student license available)
3. Avenza Maps GPS App for iOS and Android (free version)

Software is available on the computers in the computer labs (Loeb A200 and A237) and students are free to use the rooms whenever they are not used by other classes (room schedules are usually printed and posted next to the rooms a few weeks into the term).

If you desire to work on your assignments from home, you can install all software that is needed for free or using a Carleton student license. ArcGIS Pro only runs on the Windows platform, and you will need to install a Windows partition on your computer if you want to run it from an MacOS machine.

*Understanding the purpose of lectures, weekly assigned resources with quizzes and laboratory assignments:*

The lectures, weekly quizzes, and laboratory sessions/assignments are designed to complement and reinforce each other in meeting the course's learning objectives. Meetings for lectures will be a maximum of two hours. These meetings will be in person. The purpose of these meetings is not to impart all of the course theory as in a more typical lecture format, but to introduce key 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 introductory geomatics, and the quizzes are based on these resources and used to help students engage with and learn the material. Laboratory meetings and assignments will provide the opportunity to apply key methods and concepts introduced via the weekly assigned resources.

The geospatial laboratory assignments provide an opportunity to apply course concepts and get hands-on experience using geomatics tools. Assignments will be introduced during the laboratory sessions by your teaching assistant and/or the course instructor, which usually includes a brief review of relevant course material, software demonstrations, and tips on how to successfully complete the assignment. While the assignments have been designed by the instructors, the TAs are primarily responsible for organizing and running the laboratory sessions, for providing assistance during their office hours, and for grading assignments. Please seek assistance as needed, but keep in mind that their role is to facilitate learning and not to provide answers.

*Assignment Scheduling and Due Dates*

There are up to six 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 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 that is posted on Brightspace. *Please note that there will be no laboratory session in the first week of class* and your first official laboratory session will be during the following week. 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.

*Submission and Grading of Assignments*

Assignments instructions will be distributed on Brightspace in .PDF format, with detailed instructions. Answers will be submitted entirely online for each assignment. For that, students are required to generate a digital report in .docx or .pdf format (.pages documents will not be accepted) with answers to each of the questions numbered in accordance with the assignment sheet. The reports are to be uploaded using the posted submission link on Brightspace. Submissions are due as indicated in the course schedule, but usually at midnight before your lab session, two weeks after the introduction of the assignment.

A more detailed guide on formatting your assignment reports is posted on Brightspace.

Please spell check your written answers. Poor writing and grammatical/spelling errors will be penalized. TAs will mark your responses to the questions and grades will be posted on the course's Brightspace site. 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 10 days*** after the day that the assignments are returned in the laboratory. Students who fail to meet the above-outlined course requirements may be assigned an FND grade. Final grades are subject to the Dean's approval.

*Covid-19*

In order to ensure a safe in-person teaching environment, every student is encouraged to follow measures that help prevent the spread of Covid-19. Please consider not coming to class if you have any of the typical covid/cold/flu symptoms. Wearing a mask during indoor classroom settings is recommended, as well as staying up to date with booster vaccinations.

*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). Additionally, students may use AI tools for ideas and clarifying challenging concepts. Some acceptable uses include:

- Providing definitions or explanations of complex concepts (e.g. using AI to explain a difficult theory or to find relevant information).
- Summarizing and organizing lecture notes or other reference materials to create study guides.

**Limitations:** Students may not use AI for the following tasks:

- AI may not be used to complete graded work in place of your own thinking. This includes generating partial or complete answers for laboratory assignments. Even when acknowledged or rewritten, the use of AI generated text in this course is not permitted.
- Students are responsible for the accuracy and originality of all submitted work. AI-generated content may be incorrect, incomplete, or biased and should be critically evaluated.

As our understanding of the uses of AI and its relationship to student work and academic integrity continues 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

**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, submitting similar work in two or more courses without prior permission, 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/registrar/academic-integrity/.

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

- Reproducing or paraphrasing portions of someone else's published or unpublished material, and presenting these as one's own without proper citation or reference to the original source;
- Submitting an 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;
- Failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- Handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs."

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. Plagiarism is a serious offence which cannot be resolved directly with the course instructor. The Associate Deans of the Faculty conduct 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 include sanctions ranges from a grade of zero for the assignment to suspension from your program of study.

**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/.

COVID-19: Please follow university guidelines regarding covid-19 prevention measures. 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://www2.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/