

GEOG*2480 Mapping and GIS

Winter 2025 Course Outline

Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

Calendar Description

An introduction to the theory and techniques of manipulating and displaying spatial data in a GIS (Geographic Information System). Mapping concepts such as scale, co-ordinate systems, map projections, symbolization and vector data encoding are introduced. Major honours students in Geography must complete this course by the end of semester 4.

Prerequisite(s): 5.00 credits

Department(s): Department of Geography, Environment and Geomatics

Course Fit Within Program/Curriculum

This course is one of two 2nd-year courses in the Geomatics stream of courses offered by Geography (<https://calendar.uoguelph.ca/undergraduate-calendar/course-descriptions/geog/>). GEOG*2480 Mapping and GIS is an introduction to geographical data and the fields of digital cartography and geographic information systems (GIS). This course is necessary to provide the foundation on which some of the advanced 3rd-year courses, specifically GEOG*3430 Geomatics for Environmental Analysis, GEOG*3440 GIS for Decision-Making, and GEOG*3480 GIS and Spatial Analysis, are positioned. While this course focuses more on GIS, the complementary geomatics discipline of remote sensing (earth observation) is the focus of GEOG*2420 The Earth From Space and GEOG*3420 Remote Sensing of the Environment. The geomatics stream of courses culminates in the capstone course, GEOG*4480 Applied Geomatics. If you enjoy this course, you may consider others in the geomatics stream, or the BSc Minor in Applied Geomatics (<https://geg.uoguelph.ca/minor-applied-geomatics>).

Course Description

This course introduces the use of GIS to manipulate spatial information and create effective maps. By completing instructional tutorials and a set of lab assignments, students will acquire competencies in using GIS to organize, query, analyze, and cartographically display georeferenced data on a variety of topics (e.g. land use change, rare species distributions, and environmental justice).

How do we properly portray our 3-D world on 2-D screens? The first part of this course focuses on the digital representation of real-world geographic features, in both the vector and raster data models. We will examine concepts of topology, scale, generalization, coordinate systems, geodetic datums, and map projections.

How do we analyze spatial data? The second part of the course emphasizes data processing and symbolization methods for thematic maps. We will cover classification techniques and how to match different data types and levels of measurement with appropriate symbols. We also introduce basic tools for (automated) geoprocessing and highlight guidelines for effective map design.

Throughout, we will consider the ethical dimensions of mapping practice, including topics such as the privacy concerns associated with location-based surveillance.

Course Level Learning Outcomes

By the end of this course, you will be equipped with the conceptual and technical tools needed to work with a variety of geospatial data. You will be able to:

- Identify and describe foundational concepts in geomatics, including data models, projection, scale, generalization, classification, symbolization, geoprocessing, and design.
- Work independently with industry standard Geographic Information Systems (GIS) software to appropriately apply concepts to project, symbolize, analyze, and present data.
- Critically evaluate data sources, analysis methods, and some advantages and disadvantages of GIS software.



Instructor Information

Adam Bonnycastle

Email: abonnyc@uoguelph.ca

Office hours: Mondays 1:00 pm – 3:00 pm, Hutt 231A

Teaching Assistants

TA email is for personal matters only, such as extension requests. Please use the **CourseLink discussion forums for questions related to coursework** (how to do something with ArcGIS, inquiries about lab questions, etc.)

- Alexander Johnston, ajohns39@uoguelph.ca
- Yannan Wang, wang25@uoguelph.ca

Lecture Schedule

Tuesdays/Thursdays 4:00 pm – 5:20 pm

ROZH 102

Lab Sections

All lab sessions are taught in the HUTT 231 computer lab. You are welcome to attend lab sessions other than your own, space permitting.

- Section 0101 – Mondays, 3:30 pm – 5:20 pm
- Section 0102 – Wednesdays, 11:30 am – 1:20 pm
- Section 0103 – Wednesdays, 3:30 pm – 5:20 pm
- Section 0104 – Wednesdays, 1:30 pm – 3:20 pm

The HUTT 236 computer lab is also available to you during Open lab times. Schedules for both computer labs will be posted.

Resources

Required Resources

Essentials of Geographic Information Systems. 2011. Jonathan Campbell and Michael Shin. <https://open.umn.edu/opentextbooks/textbooks/essentials-of-geographic-information-systems>.

To facilitate learning in this course, we will be using an open access textbook. A PDF copy is available to you free of charge at the above link, and you may also view and read chapters online.

Assessment Breakdown

Description	Weighting (%)	Due Date
Lab 1 - Introduction to GIS through ArcGIS Pro	12%	End of Week 5, February 3rd, 11:59 pm
Lab 2 - Classifying and Symbolizing Data	12%	End of Week 8, March 3rd, 11:59 pm
Lab 3 - Spatial Analysis and Automating Your Workflow	12%	End of Week 12, March 31st, 11:59 pm
Lab 4 - Take-Home Final: GIS from Start to Finish	12%	Thursday, April 17th, 11:59 pm
Test 1	20%	Thursday, February 13th, online
Test 2	20%	Thursday, March 27th, online
Quizzes	12%	10 quizzes, approximately weekly.

Assessment Details

Lab Assignments (48%)

Lab assignments are where you apply the knowledge we are producing through readings and lectures. They are essential for building the technical skills you'll need to take your geomatics training to the next level. The first three lab assignments each consist of:

- A set of technical tutorials
- A series of applications
- Written reflections

Lab Assignment 4 is a take-home final assignment - it is a capstone focused on application and reflection (no tutorials).

Tests (40%)

Tests will consist of approximately 40 minutes worth of multiple choice, matching, and true/false questions, though you will have 80 minutes to complete them.

Quizzes (12%)

Approximately each week I will deliver a set of 10 questions to you via CourseLink. These relatively low-stakes quizzes will keep you on track with the readings and lectures and provide you with timely feedback. Your top 8 quiz scores count towards your final mark (out of 10 total quizzes).

Schedule of Topics and Assignments

Week Number...	Week of...	Topic	Activities	Lab Assignments or Tests:
1	Jan 6 th	Introduction to mapping and GIS	Chapters: 1, 2.1	
2	Jan 13 th	Spatial data models: vectors and rasters	Chapters: 2.3, 4, 6.2	Lab 1 assigned
3	Jan 20 th	Measuring Earth: map scale, geodesy, and coordinate systems	Chapters: 2.2	
4	Jan 27 th	Map projections		
5	Feb 3 rd	Data classification	Chapters: 5, 6.1, 6.3	Lab 1 due
6	Feb 10 th	Exam 1 review		Lab 2 assigned
	Feb 17 th	Winter Break		
7	Feb 24 th	Symbolization	Chapters: 9.2	Test 1 Thursday, February 13 th
8	Mar 3 rd	Spatial analysis I	Chapters: 6.2, 7, and 8	Lab 2 due
9	Mar 10 th	Spatial analysis II		Lab 3 assigned
10	Mar 17 th	Automating spatial analysis: modeling and programming		
11	Mar 24 th	Exam 2 review		Lab 4 available
				Test 2 Thursday, March 27 th
12	Mar 31 st	Map design	Chapters: 9.1, 9.3 Ch. 1 from Designing Better Maps, available through CourseLink	Lab 3 due

Lab Schedule

Week Number...	Week of...	Activity
1	Jan 6 th	No lab sessions
2	Jan 13 th	Lab 1 assigned, get set up and started with ArcGIS Pro, get started on Lab 1 tutorials
3	Jan 20 th	Complete Lab 1 tutorials
4	Jan 27 th	Complete Lab 1 Parts One and Two
5	Feb 3 rd	Finish Lab 1
6	Feb 10 th	Lab 2 assigned, complete Lab 2 tutorials
	Feb 17 th	Reading Week
7	Feb 24 th	Complete Lab 2 Data Classification
8	Mar 3 rd	Finish Lab 2
9	Mar 10 th	Lab 3 assigned, complete Lab 3 tutorials
10	Mar 17 th	Complete Lab 3 Spatial Analysis
11	Mar 24 th	Complete Lab 3 modeling
12	Mar 31 st	Finish Lab 3

In lab sessions, TAs will give a preview of each lab assignment, demo GIS tools, provide feedback on previous assignments, and help answer specific questions you may have. Lab sessions are TAs' office hours; they are limited in their ability to respond to emails.

Last Day to Drop Course

The final day to drop Winter 2025 courses without academic penalty is the last day of classes: Friday, April 4th, 2025.

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

Please submit lab assignments according to the instructions on each assignment.

Late Assignments

Late assignments will only be accepted without penalty with prior approval. Otherwise, there may be a penalty of 10% of the assignment's value per day (*including weekend days*).

Regrades

Please wait at least 24 hours / over the weekend before asking for an assignment to be re-assessed. Sit on it and think about what exactly the problem is. Then, email your TA (labs) or Adam (exams and quizzes) with a description of the issue and an argument for why your grade should be changed. For anything beyond a simple math error, *be sure to reference the course material when stating why a particular question should be re-assessed*. For re-grades, **the entire assignment/quiz/test may be re-assessed, and we reserve the right to either increase OR decrease your grade** depending on what we find.

Expectations

What you can expect from me

- To help you not only understand but get excited about the material, learning as much as possible about mapping! We're all coming from different perspectives and starting points, meaning that it is everyone's responsibility, but especially mine, to work to provide a respectful and engaging learning environment. I'm here to work with you from where you are and build up your understanding of the course content.
- To provide prompt feedback on assignments.
- To give you a sense of the flow of the semester – when the assignment load will be heavier, so that you can prepare appropriately.
- To assist in developing your critical analysis and communication skills, through our assignments. These are skills that will be useful to you in both your chosen profession and as a citizen.
- To advise you on future coursework, jobs, grad school, and/or volunteering opportunities.

What I expect of you

- To treat each other with respect. Our classroom is a safe space for all students, regardless of sex, gender, race, ethnicity, religion, age, sexual orientation, nationality, ability or disability. Every person is welcome here.
- To communicate with me about what you expect from the course, what you need, and your challenges.
- To put your best possible effort into this class.

CSAHS Academic Misconduct Policy

The *Academic Misconduct Policy* is detailed in the Undergraduate Calendar. The University of Guelph is committed to upholding the highest standards of academic integrity and **it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct** and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Instructors **shall not** determine if academic misconduct has occurred. This is up to the Associate Dean Academic's office. Instructors shall not assign a grade of zero even if they believe that the student has committed some form of academic misconduct (e.g., copied material from a website like Course Hero) on an assignment or exam.

Instructors **can** determine if a student has poorly paraphrased and/or improperly cited material and can provide a grade accordingly as long as this is clearly identified as part of the assessment criteria via a rubric or other assessment tools.

For more information about Academic Integrity resources and how to prevent Academic Misconduct.

Standard Statements for Undergraduate Courses

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The Academic Misconduct Policy (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>) is outlined in the Undergraduate Calendar.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to make a booking at least 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website.

(<https://www.uoguelph.ca/sas/>)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/>).

Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all undergraduate students except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in the Undergraduate Calendar - Dropping Courses (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>).

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigators/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (<https://wellness.uoguelph.ca/shine-this-year/>). The Student Wellness team are here to help and welcome the opportunity to connect with you.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

Recording of Materials

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars (<https://calendar.uoguelph.ca/undergraduate-calendar/>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>)