

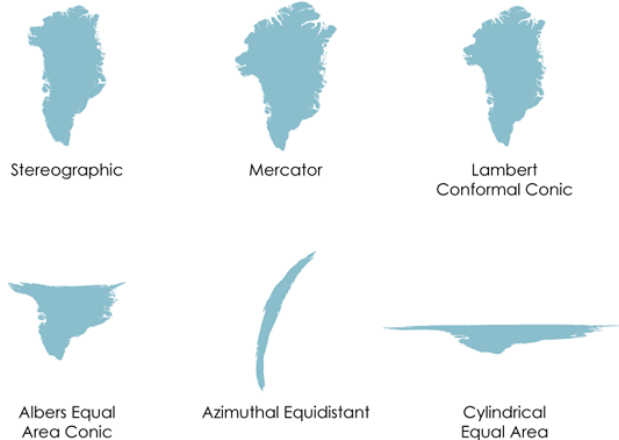
GEOG*2480

Mapping and GIS

Fall 2023

University of Guelph

Department of Geography,
Environment and Geomatics



Week 4: Projections of our 3-D world onto 2-D maps distort the relative size or shape of Earth's features – in this case, Greenland.
Source: Axis Maps.

Instructor

Dr. Eric Nost | enost@uoguelph.ca
Hutt 344
Office hours: Fridays, 11am-1pm

Teaching Assistants

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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:

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

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).



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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. Basic tools for (automated) geoprocessing are also introduced. Guidelines for effective map design are highlighted.

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

Textbook

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

In order 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.

Evaluation

- **Lab Assignments** (4, equal weight) **64%**
 - 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 reflectionsLab assignment #4 is a take-home final - it is a capstone focused on application and reflection (no tutorials).
- **Quizzes** (Best 8 out of 10, 1.25% each) **10%**
 - Each week I will deliver a set of 10-15 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. Each week's quiz is due the following Monday morning before class.
- **Exam 1** (in-class, Friday October 13th) **13%**



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- Exam 1 will consist of approximately 30 minutes worth of multiple choice, matching, and true/false questions, though you will have 50 minutes to complete it.
- **Exam 2** (in-class, Friday November 24th) **13%**
 - Exam 2 will consist of approximately 30 minutes worth of multiple choice, matching, and true/false questions, though you will have 50 minutes to complete it. Questions will be inclusive of the entire course.

How to do well in this course

- Take care of yourself, and communicate with your instructor and TA about the challenges you are facing
- Attend lectures, take notes, and engage in the exercises
- Do the readings and complete the weekly quizzes
- Attend your lab section and complete the lab assignments
- Work through technical problems with the help of your classmates, TA, prof, and online forums
- Ask questions when you're feeling stuck!!
- If you are concerned about any aspect of your academic program: make an appointment with a program counsellor in your degree program.
- If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist.
- If you are struggling with personal or health issues:
 - Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
 - Student Health Services is located on campus and is available to provide medical attention.
 - For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations.
- If you have a documented disability or think you may have a disability:
 - Student Accessibility Services SAS can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see the [SAS website](#).



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Schedule

Week of...	#	Topic	Reading	Milestones
Sept 7	0	Welcome!		
Sept 11	1	Introduction to mapping and GIS	Chapters: 1, 2.1	<ul style="list-style-type: none"> Getting set up with ArcGIS Pro
Sept 18	2	Spatial data models: vectors and rasters	Chapters: 2.3, 4, 6.2	<ul style="list-style-type: none"> Complete Lab 1 tutorials
Sept 25	3	Measuring Earth: map scale, geodesy, and coordinate systems	Chapters: 2.2	<ul style="list-style-type: none"> Work on Lab 1
Oct 2	4	Map projections		<ul style="list-style-type: none"> LAB 1 DUE
Oct 9	5	Exam 1 review (No class Monday, no labs Monday or Tuesday)		<ul style="list-style-type: none"> EXAM 1
Oct 16	6	Data classification	Chapters: 5, 6.1, 6.3	<ul style="list-style-type: none"> Complete Lab 2 tutorials and data classification section
Oct 23	7	Symbolization	Chapters: 9.2	<ul style="list-style-type: none"> Complete Lab 2 symbolization section
Oct 30	8	Spatial analysis I	Chapters: 6.2, 7, and 8	<ul style="list-style-type: none"> LAB 2 DUE Begin Lab 3 tutorials
Nov 6	9	Spatial analysis II		<ul style="list-style-type: none"> Complete Lab 3 spatial analysis sections
Nov 13	10	Automating spatial analysis: modeling and programming		<ul style="list-style-type: none"> Complete Lab 3 modeling sections
Nov 20	11	Course review		<ul style="list-style-type: none"> EXAM 2
Nov 27	12	Map design	Chapters: 9.1, 9.3, and Ch. 1 from Designing Better Maps – available through Courselink	<ul style="list-style-type: none"> LAB 3 DUE
	13			
	14	Wednesday, December 13th		<ul style="list-style-type: none"> LAB 4 DUE



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Lab sections

Lab sections are held at the following times:

- 101 – F 9:30-11:20a - Alejandro
- 102 – Th 8:30-10:20a - Zion
- 103 – W 2:30-4:20p - Alejandro
- 104 – Th 11:30a-1:20p - Zion

All lab sections will be held in-person in Hutt 231. In lab sections, 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. Since lab sessions are TAs' office hours, they are limited in their ability to respond to emails outside of lab sessions.

Lab assignments

Lab #1: Introduction to GIS through ArcGIS Pro

Due Oct 6 by the end of classes (according to University rules, Fall Break begins when classes end on this day, but University administrators cannot even tell me when classes end! 5pm? 6? Who knows 🙄(ツ)🙄 Please turn in the assignment sometime this day.)

Lab #2: Classifying and Symbolizing Data

Due Nov 3 by 11:59pm

Lab #3: Spatial Analysis and Automating Your Workflow

Due Dec 1 by 11:59pm

Lab #4 (take-home final): GIS from Start to Finish

Due Dec 13 by 11:59pm

All labs must be submitted to the appropriate CourseLink Dropbox. Late assignments will only be accepted without penalty with prior approval – please use the extension request form on CourseLink. Otherwise, there may be a penalty of 10% of the assignment's value per day (including weekend days).



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A brief Q&A

Q: I have a question, who should I contact and how?

A: We've put together this flow chart to help you navigate who you should reach out to.



We will respond to your requests and questions as soon as we can. Please do not count on an immediate response, especially for important last-minute questions regarding assignments.

Q: I have to miss lecture or an exam/lab for a family/personal/medical emergency. What should I do?

A: We plan to record lectures and make them available through Courselink for up to two weeks after each class – however, this is entirely contingent upon whether Zoom and other classroom technology systems end up working, so don't count on it. Regardless, all lecture slides will be posted ahead of time to Courselink. For exams and labs, please get in touch as soon as possible using the extension request form on Courselink.

Q: I'm not happy about my exam or lab grade. Will you change it?

A: Please wait at least 24 hours / over the weekend. Sit on it and think about what exactly the problem is. Then, email your TA (labs) or Prof Nost (exams and quizzes) with a description of the issue and an argument for why your grade should be changed. For regrades, we reserve the right to either increase OR decrease your grade depending on what we find.

Q: I'm confused about the material—what should I do?

A: First off, don't feel embarrassed—few scholars, whether undergraduates or tenured professors - understand everything completely the first time! Please bring your questions to class



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and/or lab! If you are confused, it's likely that your classmates are, too. If you bring me questions, it helps me evaluate how best to help you learn the material. If you are still confused, please come to my office hours. I am glad to help!

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 virtual 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.



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University of Guelph Policy Statements

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.

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services (SAS) as soon as possible. For more information, contact SAS at 519-824-4120 ext. 56208 or visit the [SAS website](#).

Academic Misconduct

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.

Please note: 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.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar.

E-mail 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.

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 students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students.



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The regulations and procedures for course registration are available in their respective Academic Calendars.

- Undergraduate Calendar - [Dropping Courses](#)
- Graduate Calendar - [Registration Changes](#)
- Associate Diploma Calendar - [Dropping Courses](#)

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.

Recording of Materials

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

Resources

The Undergraduate Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.