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.

Course Organization
- Monday/Wednesday lectures
  - In-person
  - Recorded and posted to Courselink
- Friday quiz review, demos and other activities, and guest lectures
  - In-person
  - Recorded and posted to Courselink
- One two-hour lab per week
  - In-person
  - TA available for live help via Teams

Instructor
Dr. Eric Nost | enost@uoguelph.ca
Hutt 344
Office hours TBD

Teaching Assistants
TBD

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 the 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 environmental and societal topics (e.g. land use change, Census statistics, and COVID-19 rates).

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 location-based surveillance.

Textbook

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 reflections

The final lab assignment (#4) 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.

- **Exam 1** (in-class, Friday October 14th) 10%
  - Exam 1 will consist of approximately 30 minutes worth of multiple choice, matching, and short answer questions, though you will have 50 minutes to complete it.

- **Exam 2** (TBD) 16%
  - Exam 2 will consist of approximately 90 minutes worth of multiple choice, matching, and short answer questions, though you will have 2 hours 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!!
## Schedule

<table>
<thead>
<tr>
<th>Week of...</th>
<th>#</th>
<th>Topic</th>
<th>Reading</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep 9</td>
<td>0</td>
<td>Welcome! (No class)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sep 12</td>
<td>1</td>
<td>Introduction to mapping and GIS</td>
<td>Chapters: 1, 2.1</td>
<td>Getting set up with ArcGIS Pro</td>
</tr>
<tr>
<td>Sep 19</td>
<td>2</td>
<td>Spatial data models: vectors and rasters</td>
<td>Chapters: 2.3, 4, 6.2</td>
<td>Complete Lab 1 tutorials</td>
</tr>
<tr>
<td>Sep 26</td>
<td>3</td>
<td>Measuring Earth: map scale, geodesy, and coordinate systems</td>
<td>Chapters: 2.2</td>
<td>Work on Lab 1</td>
</tr>
<tr>
<td>Oct 3</td>
<td>4</td>
<td>Map projections</td>
<td></td>
<td><strong>LAB 1 DUE</strong></td>
</tr>
<tr>
<td>Oct 10</td>
<td>5</td>
<td>Exam 1 review (No class Monday, No labs Monday or Tuesday)</td>
<td></td>
<td><strong>EXAM 1</strong></td>
</tr>
<tr>
<td>Oct 17</td>
<td>6</td>
<td>Data classification</td>
<td>Chapters: 5, 6.1, 6.3</td>
<td>Complete Lab 2 tutorials and data classification section</td>
</tr>
<tr>
<td>Oct 24</td>
<td>7</td>
<td>Symbolization</td>
<td>Chapters: 9.2</td>
<td>Complete Lab 2 symbolization section</td>
</tr>
<tr>
<td>Oct 31</td>
<td>8</td>
<td>Spatial analysis I</td>
<td>Chapters: 6.2, 7, and 8</td>
<td><strong>LAB 2 DUE</strong></td>
</tr>
<tr>
<td>Nov 7</td>
<td>9</td>
<td>Spatial analysis II</td>
<td></td>
<td>Begin Lab 3 tutorials</td>
</tr>
<tr>
<td>Nov 14</td>
<td>10</td>
<td>Automating spatial analysis: modeling and programming</td>
<td></td>
<td>Complete Lab 3 modeling sections</td>
</tr>
<tr>
<td>Nov 21</td>
<td>11</td>
<td>Map design and use</td>
<td>Chapters: 9.1, 9.3, and Ch. 1 from Designing Better Maps – available through Courselink</td>
<td><strong>LAB 3 DUE</strong></td>
</tr>
<tr>
<td>Nov 28</td>
<td>12</td>
<td>Course review</td>
<td></td>
<td><strong>LAB 4 DUE</strong></td>
</tr>
<tr>
<td>TBD</td>
<td></td>
<td><strong>EXAM 2</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Lab sections
Labs will be held at the following times:
- TBD
All lab sections will be held in-person in Hutt 231 and/or 236. We will also set up a Teams channel for you to engage with your TA remotely during lab times. In lab sections, TAs will give a preview of each lab assignment, suggest tips and tricks, 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 7 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 4 by 11:59pm

Lab #3: Spatial Analysis and Automating Your Workflow
Due Nov 25 by 11:59pm

Lab #4: GIS from Start to Finish
Due Dec 2 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).
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: As soon as possible, get in touch – please use the extension request form on Courselink. Lectures will be recorded and made available through 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 (quizzes). For regrades, we reserve the right to either increase OR decrease your grade depending on what we find in regrading.

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 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.
University of Guelph Policy Statements

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.

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.

Drop Date
Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.

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.

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 7 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information: www.uoguelph.ca/sas

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.

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

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).

For information on current safety protocols, follow these links: https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/ https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.

Disclaimer
Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email. This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (https://news.uoguelph.ca/2019-novel-coronavirus-information/) and circulated by email.