GEOG*4480: Applied Geomatics

Course Outline (Provisional) Winter 2025, 1.0 Credits
Department of Geography, Environment and Geomatics
University of Guelph

Instructor	Ben DeVries
Office	HUTT-131
Contact	bdv@uoguelph.ca
Office Hours	By appointment
Lecture Times	Fridays, 8:30am to 11:30am
Lecture Venue	TBD
Lab Times	Section 0101: Mondays, 8:30am - 10:20am
	Section 0102: Wednesdays, 8:30am - 10:20am
Lab Venue	TBA
Teaching Assistants	TBA

---

1 Description

GEOG*4480 (Applied Geomatics) is a full-credit (1.0CR) course focusing on the use of geographic information systems (GIS) and remote sensing to address practical problems in resource management, planning (rural, urban or regional) or any other area where a spatial approach is appropriate. In addition to GIS project design and application, students will learn about and use various GIS functions and models and will develop skills relating to data creation and manipulation, data quality assessment, and the presentation of the findings of analytical work.

Most of the learning in the course will take place in a hands-on manner. Students will design and carry out projects involving GIS and remote sensing datasets and spatial analysis. Live, lecture (remote or in-person) sessions will be used selectively to lay the foundation for project design and problem solving and to introduce students to emerging themes in Geomatics. The core of the course is a group project. The students in a team will identify a problem, design a solution, gather the necessary data, implement their solution, and present results. Labs are used to demonstrate techniques and approaches that will reinforce concepts learned in GEOG*2480 and GEOG*3480, introduce new tools and approaches in GIS, and support your ongoing project work.

2 Learning Objectives

At the end of the course, students will have acquired the following:

- Knowledge on a wide range of geomatics applications
- Ability to locate data sources for geomatics applications and assess data quality
- Skills on processing real-world data for a geomatics project
- Experience with project design and proposal writing
- Skills on geomatics-based problem solving
- Experience preparing professional research reports and web publishing
- Presentation skills
- Enhanced teamwork skills

3 Prerequisite

The prerequisite for this course is GEOG*3480 GIS and Spatial Analysis. The two remote sensing courses offered by the Department - GEOG*2420 and GEOG*3420 - are not required courses but are strongly recommended for any students interested in working with remote sensing data in their projects. In addition, strong computer skills and familiarity with GIS software packages (ArcGIS and/or QGIS) are essential.

4 Course Content and Evaluation

4.1 Mark Breakdown

Table 1 provides a breakdown of the marks in this course. Each item is described in detail in the following sections.

Table 1: Breakdown of GEOG*4480 marks.

Item	Percent of Final Grade
Labs (individual)	15%
Project Pre-Proposal Deliverables (Group/Individual)	15%
Project Proposal: Full Final Version (Group)	25%
Final Report: Results and Discussion (Group)	10%
Final Report: Full Final Version (Group)	30%
Participation in group project (Individual)	*factored into final report grade*
Project presentation (Group)	5%

4.2 Labs

The purpose of the labs is to familiarize you with GIS techniques that may be important for your group projects and future applications of geomatics. Scripting with python will be a major component of the labs, although no or minimal prior experience with python is assumed. All of the necessary software will be installed on lab computers in HUTT-231. Any students wishing to use their own computers to carry out lab work are responsible for installing and maintaining their own software environments. A tentative schedule of lab topics and due dates is given in Table 4 on page 5.

4.3 Pre-proposal Deliverables

Before submitting the project proposal, project groups will submit a number of smaller deliverables, including a group contract, a 1-2 page document outlining the research problem and objectives, and a 1-2 page document outlining data sources to be used in the project. Some of these deliverables will eventually be incorporated into the project proposal. In addition, each group will be expected to set up a meeting with me and their respective GTA to discuss their research objectives after submitting them and before submitting the proposal. Individual pre-proposal deliverables will be graded according to Table 2 on the next page. Detailed instructions for each deliverable will be given during lectures and on the class Teams page.

4.4 Project Proposal

The aim of the project proposal is to establish a firm foundation for the course project. The team should review literature and extensively examine data to develop a strong grasp both of the research problem being addressed and of the role GIS and remote sensing data and methods will play in addressing the problem.

4.5 Final Report

The project report will take the form of a summary of the problem, the objectives, the research approach, the findings and conclusions. The report should be approximately 3,000 words, not including tables and figures. Although some lenience will be given with respect to report length, reports exceeding this limit by a large margin (e.g., 500 words or more) will result in a reduced overall grade. Before submitting the final report, students will be asked to submit a draft of their Results, Discussion, and Conclusion sections. These should address the Research Objectives submitted in January, so any changes to these objectives should also be noted on this draft. Students will be expected to incorporate feedback on this assignment in their final reports.

4.6 Participation

Your individual contribution to your group projects will be evaluated through participation in lecture sessions, regular meetings with your group, TA and myself, as well as a peer evaluation report to be completed and submitted by all group members. Groups will be asked to set up regular meeting times and keep notes during project meetings. In addition, all students will be asked to fill out a peer-evaluation report, which will include a detailed outline of what each group member contributed to the project, as well as a confidential assessment of each group member's contribution throughout the project. I will take these peer reviews, as well as my own and TA's evaluations of ongoing participation in the group project (e.g., meeting

notes, etc.) into consideration when assigning a final report grade. Failure to participate and contribute in the group project will have a significant impact on your final report grade.

4.7 Project Presentation

Project groups will deliver a presentation to the rest of the class during the final lecture period of the semester. The purpose of the presentation is to share your research findings with your peers. The presentation should be concise (approximately 10 minutes) and build on your project report. The grade for the project presentation will be determined through a randomized peer evaluation.

4.8 Due Dates

Table 2 outlines the specific deliverables in the course (excluding labs, which are described in Section 4.2)

Table 2: List of project-related assignments, due dates and evaluation methods. All deliverables are due at 5:00pm on the date listed, unless otherwise indicated.

Deliverable	Due Date	Evaluation
Pre-proposal Deliverables		
Group members and topic	2025-01-17 *(before start of lecture)*	Not Graded
Individual Learning Goals	2025-01-17	Numeric *(individual)*
Signed group contracts	2025-01-24	Pass/Fail
Draft Research Objectives	2025-01-24	Numeric
Annotated Bibliography	2025-01-24	Numeric *(individual)*
Data Description	2025-01-31	Numeric
Revised Research Objectives	2025-02-07	Numeric
Main Project Deliverables		
Full Project Proposal	2025-02-14	Numeric
Project Results and Discussion	2025-03-28	Numeric
Final Presentation	2025-04-04	Numeric
Final Report	2025-04-08	Numeric
Peer Evaluation and Personal Reflection	2025-04-08	Numeric *(individual)*

5 Course Format and Schedule

Table 3 outlines the *tentative* schedule for the course. All lectures will be conducted in person. Topics are subject to change in the future. Table 4 outlines the schedule of labs and their respective due dates.

Table 3: Tentative schedule of lecture topics.

Week	Date	Topic
1	2025-01-10	Introduction
2	2025-01-17	Group project work, Writing Research Proposals
3	2025-01-24	Geospatial Data
4	2025-01-31	Group Meetings
5	2025-02-07	GIS Models and Workflows
6	2025-02-14	Data Preprocessing
7	2025-02-21	Reading Week (no lectures)
8	2025-02-28	Proposal review, Selected topic
9	2025-03-07	Writing a research paper
10	2025-03-14	Group Work
11	2025-03-21	Group Work
12	2025-03-28	Group Work
13	2025-04-04	Final Presentations

Table 4: Tentative schedule of labs. Labs are due before the beginning of the lab session on the week indicated. Changes to this schedule will be communicated via the course Teams group.

Lab	Topic	Week Assigned	Week Due
1	Introduction to arcpy	2025-01-13	2023-01-20
2	Basic GIS Data Processing	2025-01-20	2025-01-27
3	Geo-Dataframes	2025-01-27	2025-02-03
4	Rasters and Arrays	2025-02-24	2025-03-03
5	Statistical Models	2025-03-03	2025-03-20

6 University Policies and Other Details

6.1 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.

6.2 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.

6.3 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.

6.4 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.

6.5 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 14 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: uoguelph.ca/sas

6.6 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 outlined in the Undergraduate Calendar.

6.7 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.

6.8 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.

6.9 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.

6.10 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). Students are also responsible for the course content for period of absence due to illness and should be prepared to get notes shared by classmates who were able to attend.

6.11 COVID-19 Safety Protocols

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