

GEOG*3480/6480 GIS and Spatial Analysis

Tentative course outline, Fall 2026, 0.5 Credits

University of Guelph Department of Geography, Environment and Geomatics

Instructor

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Office hours: To be determined

Graduate Teaching Assistants (GTAs)

To be determined

Prerequisites & Location

- GEOG*3480: 7.50 credits, including GEOG*2480
- Guelph, in-person

Overview

This course is one of four 3rd-year courses in the [Geomatics stream of courses offered by Geography](#) (the others being GEOG*3420 Remote Sensing of the Environment, GEOG*3430 Geomatics for Environmental Analysis, and GEOG*3440 GIS for Decision Making). GEOG*2480 Mapping and GIS, an introduction to the fields of cartography and geographical information science, is necessary to provide the theoretical foundation on which this course is positioned.

The focus of GEOG*3480 is on the analysis of geographical data using GIS and related Geomatics technologies. Additionally, students will learn about the unique properties of geospatial data and ethical considerations in the handling of these data. The third-year geomatics courses provide the analytical background necessary for the thematic capstone course, GEOG*4480 Applied Geomatics.

Course Calendar Description

GEOG*3480 - This course focuses on the use of raster and vector-based geographic information systems to analyze spatial data. Topics include map digitizing, data query and overlay, spatial interpolation, multi-criteria evaluation, least cost pathway determination and digital elevation models. This course requires some familiarity with numerical methods and computer operations.

GEOG*6480 - This course focuses on the use of raster and vector-based geographic information systems to analyze spatial data. Topics include overlay, spatial interpolation, multi-criteria evaluation, least cost pathway determination, digital elevation models and surface analysis, and network analysis. This course requires familiarity with numerical methods and computer operations. Offered in conjunction with [GEOG*3480](#). Extra work is required for graduate students.

Learning Outcomes

By the end of the course, students should be able to:

- Understand the foundational theories of GIS and the unique character of spatial data
- Analyze geospatial data using GIS software
- Identify key issues related to spatial data error
- Understand spatial analysis techniques and practices
- Practice communicating concepts through formal written and visual forms

Course Organization

This course is an in-person offering in Guelph. There will be two lectures per week in the [MacKinnon Building \(MCKN\)](#) Rm. 115, Mondays & Fridays 4pm – 5:20 pm.

There will be one, two-hour, lab session per week held in the [H.L. Hutt Building \(HUTT\)](#) Rm. 231:

- Section 01: Tuesdays, 11:30am – 1:20 pm
- Section 02: Tuesdays, 8:30am – 10:20 am

Text and Other Resources

There is no required text for this class. The main recommended texts are:

- Burrough, PA, McDonnell, RA, Lloyd, CD (2015). **Principles of Geographical Information Systems, 3rd Edition**. Oxford University Press, ISBN-9780198742845.
 - Available via the UoG bookstore (\$92.75, new; \$44.99, 180-day eBook), as well as 4-hour reserve in the McLaughlin Library.
 - [180 Day eBook Purchase Link](#)
- de Smith, M, Goodchild, MF, and Longley, PA (2024) Geospatial Analysis 7th Edition, online: **Geospatial Analysis 7th Edition, 2025 - de Smith, Goodchild, Longley et al.**
- [GEOG*3480 CourseLink](#) site. Repository for course materials, where you will submit assignments, and receive grading feedback. I will enrol GEOG*6480 students in the GEOG*3480 site.

Evaluation

Grade Distribution

- Data gathering exercise, 3% (pass/fail)
- Laboratory Assignments, 40% (4 * 10% each)
- Midterm, 27%: Online, **Friday October 30 during class time**. Exact timing TBD.
- Final Exam, 30%: Online. **Date/time/timing TBD**.

Exams

Lecture material will be evaluated through a midterm and a final exam. Both the midterm and final exams will be scheduled online exams, taken through the Quizzes tool on CourseLink. Concepts covered in labs may be included on both the mid-term and final exams.

You must achieve an average exam grade of 50% or higher to pass the course.

Attendance

Attendance at all lectures and lab sessions is mandatory, though no participation marks are awarded. Students who miss a session must contact classmates for missed material.

Course Schedule

Week of...	Lecture Topics (tentative)	Readings	Lab Notes
0. Sept. 7	'Unit 0' – Course Introduction Friday Sept. 11		
1. Sept. 14	Unit 1 – Intro to GIS and Spatial Analysis	Burrough et al., Chs 1 & 5	Lab sessions begin, Lab 01 assigned
2. Sept. 21	Unit 2 – Spatial Data Quality	Burrough et al., Chs 2 – 4; pp 149-150 & 261-262	
3. Sept. 28	Unit 3 – Basic GIS Analysis	Burrough et al., Ch 7 (not pp 132 – 135); pp 201-218	Lab 01 due Friday, Oct. 2, 11:59pm
4. Oct. 5	Unit 4 – Multi-criteria Evaluation No lecture Friday Oct. 9 (liu data gathering)		Lab 02 assigned
5. Oct. 12	No lecture Monday Oct. 12 (Thanksgiving) Unit 5 – Least-cost Pathway Analysis		No lab session Tuesday Oct. 13 (Fall Study Break)
6. Oct. 19	Unit 6 – GIS modelling and programming		Lab 02 due Friday Oct. 23, 11:59pm
7. Oct. 26	Unit 7 – Spatial Statistics Mid-term – Friday Oct. 30 (online during class)	Burrough et al., Ch 6	Lab 03 assigned
8. Nov. 2	No lecture Monday Nov. 2 (liu data gathering) Unit 7 – Spatial Statistics		
9. Nov. 9	Unit 7 – Spatial Statistics Unit 8 – Spatial Interpolation	Burrough et al., Chs 8 & 9	Lab 03 due Friday Nov. 13, 11:59pm
10. Nov. 16	Unit 8 – Spatial Interpolation Unit 9 – Terrain Analysis	Burrough et al. Chs 10 & 11	Lab 04 assigned
11. Nov. 23	Unit 9 – Terrain Analysis Unit 10 – Network Analysis		
12. Nov. 30	Unit 10 – Network Analysis Unit 11 – WebGIS / ArcGIS Online (AGOL)		Lab sessions on Thursday Dec 3 (Tuesday Fall Study Break make-up) Lab 04 due Friday Dec. 4, 11:59pm

Laboratory Assignments

All lab assignments are due to the **CourseLink Dropbox by 11:59pm** on the date listed in the **Important Dates** section of this syllabus.

- Lab 01: Introduction to Geodatabases and Topology
- Lab 02: Multi-criteria Evaluation (MCE) and Least-cost Pathway (LCP) Analysis
- Lab 03: Introduction to Python for ArcGIS
- Lab 04: Introduction to Spatial Statistics

Lab assignments provide hands-on experience with spatial datasets and GIS techniques, building core GIS and problem-solving skills through creating, editing, analyzing, and mapping spatial data.

- Submit labs to the correct CourseLink Dropbox by the deadline.
- Late assignments need prior approval to avoid a 10% daily penalty, including weekends.
- Students must back up files (e.g., University OneDrive or USB); **lost files do NOT justify late submission.**
- With TA permission students may attend another lab session; registered students have priority.
- Lab assignments use ArcGIS Pro, which is installed on Hutt GIS lab computers. Students using personal computers must install and maintain their own GIS software.
- Lab attendance is mandatory. Students who miss a session must contact get notes from classmates; GTAs will not re-teach material outside class time (e.g. by email or other means).
- Labs are for assignment work and GTA help; they also serve as GTA office hours. Outside of class time, post lab and ArcGIS questions on the CourseLink Discussion Board.
- GTA email time is limited; **use email only for personal course matters.**

How to do well in this course

- Take care of yourself; communicate with your instructor/GTA about any challenges.
- Attend lectures, take notes, and engage with exercises.
- Do the readings.
- Attend labs and complete assignments.

- Work through technical issues with classmates, your TA, CourseLink, forums, and me.
- Help classmates on via the CourseLink Discussion Board; it will strengthen your learning too! 😊
- Ask questions if you are feeling stuck!!

University of Guelph Policy Statements

Academic Integrity

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.

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 business days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer).

More information: 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 Accommodation of 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

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.

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](#). If you are concerned about your mental health and not sure where to start, connect with a [Student Wellness Navigator](#) who can help develop a plan to manage and support your mental health or check out our [mental wellbeing resources](#). 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 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.

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](#).