GEOG*3480 GIS and Spatial Analysis (0.5 CR)

Course Outline, Winter 2021 Provisional

Department of Geography, Environment & Geomatics
College of Social and Applied Human Sciences
University of Guelph

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Prerequisite: 10.00 credits, including GEOG*2480

1. Overview

This course is one of two 3rd year courses (the other being GEOG*3420 Remote Sensing of the Environment) in the Geomatics stream of courses offered by Geography. The focus of this course is on the analysis of geographical data using GIS and related Geomatics technologies. GEOG*3480 provides the analytical background necessary for the thematic capstone course, GEOG*4480 Applied Geomatics.

2. Course Calendar Description

This course focuses on the use of raster and vector-based geographic information systems to analyze spatial data. Topics include spatial data query and overlay, data quality, spatial statistics, multi-criteria evaluation and digital terrain analysis. This course requires some familiarity with numerical methods and computer operations.

3. Learning Outcomes

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

- Understand the foundational theories of GIS including 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.

4. Course Organization

Lectures and labs for the W21 semester are scheduled as “remote synchronous” (AD-S). Some lectures will be pre-recorded and made available to students via Courselink ahead of scheduled lecture times, while others will be held “live” via Zoom videoconferencing. A more detailed

schedule of asynchronous and synchronous sessions will be released at the beginning of the course, and may be revised as the course progresses. In addition, each student is registered for one remote, two-hour lab per week. Lab sessions will be held synchronously via Microsoft Teams videoconferencing.

5. Text and Other Resources

The main *recommended* text for this class is:

Burrough, PA, McDonnell, RA, Lloyd, CD (2015) *Principles of Geographical Information Systems 3rd Edition* Oxford University Press, ISBN-9780198742845.

6. Method of Evaluation

The lab material constitutes an integral part of this course, since this is where students receive hands on work with spatial datasets, and must apply the techniques they have learned. Labs must be handed in to the teaching assistant at the beginning of the lab section in the week they are due, with a late penalty of 10% of the total assignment grade per day. Lab material may be included on both the mid-term and final exams.

7. Grade Distribution

- Lab Assignments: 40%
- Mid Term Exam: 30%
- Final Exam: 30%

The dates of the mid-term and final exams will be announced at a later date. The mid-term exam will be held during scheduled class time.

8. Lecture Topics

The *tentative* schedule for topics to be covered in this course is as follows:

Week	**Lecture Topic(s)**
1	Introduction to GIS
2	Spatial data quality
3	Spatial Databases I
4	Spatial Databases II
5	Multi-Criteria Evaluation
READING WEEK	
6	Midterm Exam; Spatial Statistics I
7	Spatial Statistics II
8	Spatial interpolation
9	Digital Terrain Analysis I
10	Digital Terrain Analysis II
11	Future directions in GIS
12	Exam Review

9. Laboratory Exercises

The labs are designed to familiarize you with basic GIS operations, and to teach you problem solving skills. By completing the labs, you will gain practical experience in using GIS software to create and edit datasets, manipulate and analyze data, and generate maps that communicate spatial information effectively.

All lab assignments will be carried out using ArcGIS and Whitebox Tools. Lab work will be carried out on "Virtual Machines" provided by the Department of Geography, Environment and Geomatics. Students will need access to a reliable internet connection in order to connect to the Virtual Machines. Once connected, all of the required software will be made available, and students will not be required to download any additional GIS software on their local computers.

Lab attendance is mandatory and attendance will be recorded by the GTA each week. GTAs will not respond to the e-mail questions of students who fail to regularly attend a lab section.

The lab schedule will be announced at the start of the course. Lab due dates are subject to change in the event of unforeseen scheduling conflicts. Changes to this schedule will be posted on CourseLink if required.

10. Laboratory Times

TBA

11. Laboratory Fee

There is no laboratory fee for this course.

12. Software and Hardware Requirements

All labs will be conducted using Virtual Machines set up by the Department of Geography, Environment and Geomatics. Free Remote Desktop software is needed to connect to the Virtual Machines, but students will not need to install any additional GIS software. There are no software fees for this course.

The mid-term and final exams may include some calculations, so a scientific calculator will be needed for this course (either hand-held or software-based).

13. Exam Format

There will be one mid-term and one final exam in this course. The dates of the exams will be announced before the beginning of the course.

The mid-term and final exams will be assigned as open-book exams. The mid-term will be held during scheduled class time and the final exam will be held at a scheduled time during the final exam period. All students will be required to write the exams during their scheduled times via Courselink. The scheduled exams will be open book, and no monitoring software will be used. Each exam will be unique, with questions drawn at random from a pool of questions.

14. Final Exam Date

The date of the final exam will be announced before the start of the course.

15. Disclaimer
Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings and academic schedules. Any such changes will be announced via CourseLink and/or class email. All University-wide decisions will be posted on the COVID-19 website and circulated by email.

16. Illness
The University will not require verification of illness (doctor's notes) for the fall 2020 or winter 2021 semesters.

17. Territorial Acknowledgements
We acknowledge that the University of Guelph resides on the ancestral lands of the Attawandaron people and more recently, 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 our respect to our Anishinaabe, Haudenosaunee and Métis neighbours as we strive to strengthen our relationships with them.

Today, this gathering place is home to many First Nations, Métis and Inuit peoples and acknowledging them reminds us of our important connection to this land where we learn and work.

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

19. When You Cannot Meet a Course Requirement
Late assignments will be assessed a penalty of 10% per day (not including weekends). After the graded assignment has been handed back to the class no grade can be assigned on late work.

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.

20. Drop Date
The last date to drop one-semester courses, without academic penalty, is **Monday, April 12**. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar.

21. Copies of out-of-class assignments
Keep back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

22. 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 the Student Accessibility Services (SAS) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: http://www.uoguelph.ca/csd/

23. 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. **An example of academic misconduct that might occur in this course is a student copying an answer or using a map/image from another student. Students must create their own digital files for computer-based exercises.** 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.

24. 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.

25. 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.