GEOG 3222A – Geographic Information Science II
Course Outline: Section 001 Fall 2023

1. Course Information

See Course Site in OWL.

2. Calendar Description

Methods and techniques in Geographic Information Science. Spatial data encoding from maps and geographic database implementation. Spatial interpolation and other modeling techniques. Integration of remote sensing, GIS, and Visualization. Hands-on experience using ESRI ArcGIS software.

Online lectures, 2 laboratory hours, 0.5 course

Antirequisite(s): N/A

Prerequisite(s): Geography 2210A/B or Biology 2244A/B or Statistical Sciences 2244A/B; and Geography 2220A/B. Adequate mathematical background is needed to be successful

Prerequisite checking is the student's responsibility

Senate Regulations

Senate Regulations state, "unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites."

3. Textbook

Main Textbook (available in the bookstore):

Peter A. Burrough, Rachael A. McDonnell, and Christopher D. Lloyd, 2015, Principles of Geographical Information Systems (3rd Ed.). Oxford University Press. (ISBN: 9780198742845)

Other GIS Textbooks

Longley, P.A., M.F.Goodchild, D.J.Maguire, and D.W.Rhind, 2016. Geographic Information Systems and Science (4th Ed.). John Wiley & Sons, Inc., 469 p. (978-1-119-03130-7 or ISBN : 978-1-118-67695-0).

Bolstad, Paul, 2016. GIS Fundamentals: A First Text on Geographic Information Systems (5th Ed.). XanEdu Publishing Inc., 770 p. (ISBN 1506695876 or 978-1506695877).

Chang, K.T., 2019. Introduction to Geographic Information Systems (9th Ed.). McGraw Hill, 448 p. (ISBN10: 1259929647 | ISBN13 9781259929649)

4. Course Objectives and Format

Course Objectives:

I. To gain new competencies for working with geographical data using GIS.
II. To become competent in vector and raster GIS analysis.
III. To improve cartographic and data visualization skills.
IV. To become confident in performing a variety of spatial analysis techniques.

Course Format:

Lectures: In person lectures, class presentations and readings

Labs: 2 hrs (In person delivery, demonstration and supported work time).

Expectations:

- Engagement with lecture and lab material is imperative to success in this course.
- The course material is cumulative.
- You should review lectures and readings weekly.
- It is the student's responsibility to cover any material missed by failure to attend lectures, please also see all material on the course OWL site.
- Students must be organized, especially with computer files, please seek help if you are struggling with this component.

All course material will be posted to OWL: http://owl.uwo.ca. Any changes will be indicated on the OWL site and discussed with the class.

Google Chrome or Mozilla Firefox are the preferred browsers to optimally use OWL; update your browsers frequently. Students interested in evaluating their internet speed, please click here.

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Evaluation

Evaluation Components	Percentage of Course Grade	Assignment Due Date
Lab Assignments (6 labs)	65%	See Course Schedule
Project Presentations	10%	See Course Schedule
Final project report	25%	Dec. 8, 2023

☒ All assignments are due at 11:55 pm EST unless otherwise specified

☒ Students are responsible for material covered in the lectures as well as assigned chapters in the textbook.

☒ Attendance and participation: Each student is required to attend all the lectures and labs. Additional material will be provided during classes, including in class exercises that will be important for understanding GISci and the theory in the labs.

☒ Written assignments will be submitted to Turnitin

☒ After an assessment is returned, students should wait 24 hours to digest feedback before contacting their evaluator; to ensure a timely response, reach out within 7 days

Click here for a detailed and comprehensive set of policies and regulations concerning examinations and grading. The table below outlines the University-wide grade descriptors.

Information about late or missed evaluations:

☒ Late assignments without approval of academic accommodation are subject to a late penalty. **The late penalty in percentage of the total mark of the assignment is 5% for one day late, 25% for two days late, 45% for three days late, 65% for four days late, not acceptable for 5 days and more.** (Weekend days are counted the same as weekdays).

☒ Late assessments with approval of academic accommodation (see below) are subject to an extension of 5-days unless otherwise discussed with the instructor. Students must contact the academic councillors in advance and provide proper documentations.

Grades will not be adjusted on the basis of need. It is important to monitor your performance in the course. Remember: *You* are responsible for your grades in this course.

6. Learning Outcomes

Upon successful completion of this course, students will be able to:

- Deal with various forms of geospatial data
- Understand projections and coordinate systems
- Perform vector and raster GIS analyses
- Make high quality and informative maps
- Apply different spatial analysis techniques
- Oral presentation skills
- Visualization and writing using ArcGIS online.

7. Lab assignments

Lab #	Topic	Weight
Lab 1	Introduction to ArcGIS Pro and downloading geospatial data	5%
Lab 2	Mini GIS Project	12%
Lab 3	Multi-Criteria Evaluation (MCE) with GIS	12%
Lab 4	ArcGIS Model Builder and Finding the Least-cost Path	12%
Lab 5	3D Building Model Generation from LiDAR data	12%
Lab 6	Network Analysis	12%

8. Course Readings and Schedule

Topics and Recommended Readings

Part 1. Introduction - GIS Overview
Readings: Burrough, *Principles of GIS* (3rd Ed.) Chapter 1

Part 2. Datum, Coordinate Systems and Map Projection
Readings: Bolstad, 4th Ed.: Chapter 3

Part 3. Geospatial Data
Readings: Burrough, *Principles of GIS* (3rd Ed.) Chapter 2; Chapter 3.

Part 4. Spatial Data Modeling
Readings: Bolstad, 4th Ed. Chapter 13; ArcGIS online help.

Part 5. Digital Elevation Models
Readings: Burrough, *Principles of GIS* (3rd Ed.) Chapter 11

Part 6. Cost Distance and Least Cost Path
Readings: ArcGIS online help.

Part 7. Spatial Interpolation
Readings: Burrough, *Principles of GIS* (3rd Ed.) Chapter 8; Chapter 9.

Part 8. Network Analysis
Readings: Chang, K.T., 2016. Introduction to GIS (8th Ed.) Chapter 17.

Part 9. Remote Sensing and GIS Integration
Reference: Bolstad, 4th Ed.: Chapter 6.

Part 10. GIS Case Studies – Guest lectures

Tentative Course Schedule

Week #	Dates	Weekly Lecture Themes	Lab	Lab due (Friday)
Week 1	Sept 7-8	No class	No lab	
Week 2	Sept 11-15	Introduction to the course; 1. GIS Overview 2. Datum, coordinate systems and map projection	Lab 1	
Week 3	Sept 18-22	2. Datum, coordinate systems and map projection 3. Geospatial data collection	Lab 2	Lab 1
Week 4	Sept 25-29	4. Spatial data modeling	Lab 2	Lab 2
Week 5	October 2-6	5. Digital Elevation Models 6. Cost distance and least cost path	Lab 3	
Week 6	October 9-13	7. Spatial interpolation	Lab 3	Lab 3
Week 7	October 16-20	7. Spatial interpolation	Lab 4	
Week 8	October 23-27	8. Network analysis 9. Remote sensing and GIS integration Discussion of projects titles/topics/data collection Story Maps	Lab 4	Lab 4
Week 9	October 30-Nov 3	**Reading week (no lecture)**	**No Lab**	
Week 10	November 6-10	10. GIS/RS case studies	Lab 5	Presentation ppt due Nov. 10, 2023
Week 11	November 13-17	GIS project presentations	Lab 5	Lab 5
Week 12	November 20-24	GIS project presentations	Lab 6	
Week 13	Nov 27- Dec 1	GIS project presentations	Lab 6	Lab 6
Week 14	December 4-8	GIS project presentations	additional presentations (if needed)	Final project report due Dec.8,2023

9. Course requirements

Attendance and participation: Students are expected to complete all lectures and labs. Additional material will be provided via OWL. Students are responsible for material covered in the lectures as well as the assigned chapters/sections in the text.

a) Participating at the lab is crucial to success in this course.
b) You should observe all the due dates/times for assignments (labs/presentations/term project reports). Assignments are due to be submitted online (via OWL) before 11:59 pm on the specified assignment due date. Plagiarism or copying is unacceptable. If there are two identical answers to an assignment submission, or parts of the assignment, both students will be given a mark of 0 for that assignment.
c) Please follow instructions for lab, presentation and project submission. Please write the course number, the instructor and TA name on your assignment.
d) Late assignments will be accepted for up to four days after the due date. After that the late work is no longer accepted regardless of whether the OWL assignment submission is open or not. **The late penalty in percentage of the total mark of the assignment is 5% for one day late, 25% for two days late, 45% for three days late, 65% for four days late, not acceptable for 5 days and more.** (Weekend days are counted the same as weekdays). Lateness is based on the time the assignment is received through OWL, not on the time it was created on student's own computer.

e) Students with special accommodation should get in contact with the instructor and the student services desk for Social Science. Please see Additional Statements below

10. Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: Academic Accommodation for Students with Disabilities.

Academic Consideration for Student Absence

The University recognizes that a student's ability to meet their academic responsibilities may, on occasion, be impaired by medical illness. Illness may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. The University further recognizes that medical situations are deeply personal and respects the need for privacy and confidentiality in these matters. However, in order to ensure fairness and consistency for all students, academic accommodation for work representing 10% or more of the student's overall grade in the course shall be granted only in those cases where there is documentation indicating that the student was seriously affected by illness and could not reasonably be expected to meet their academic responsibilities.

Policy on Academic Consideration for Medical Illness - Undergraduate Students

Student Medical Certificate (SMC)

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar.

11. Use of Electronic Devices

For the computer labs, computer storage devices are required: One or two USB memory key, or a portable hard drive for storing data and results. I suggest that you double backup your work on two USBs, in case one USB has problems. Please note: do not insert your USB with the data from the Windows system to a Mac computer, since this may cause errors on your data.

12. How to Be Successful in this Class:

Students enrolled in this class should understand the level of autonomy and self-discipline required to be successful.

1. Invest in a planner or application to keep track of your courses. Populate all your deadlines at the start of the term and schedule time at the start of each week to get organized and manage your time.
2. Make it a daily habit to log onto OWL to ensure you have seen everything posted to help you succeed in this class.
3. Follow weekly checklists created on OWL or create your own to help you stay on track.
4. Take notes as you go through the lesson material. Keeping handwritten notes or even notes on a regular Word document will help you learn more effectively.
5. Connect with others. Try forming a study group and try meeting on a weekly basis for study and peer support.
6. Do not be afraid to ask questions. If you are struggling with a topic, check the online discussion boards or contact your instructor(s) and or teaching assistant(s).
7. Reward yourself for successes. It seems easier to motivate ourselves knowing that there is something waiting for us at the end of the task.

13. Continuity of Education Plan (in-person class pivoting to online learning)

In the event of a COVID-19 resurgence during the course that necessitates the university to direct courses move away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

14. Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Please refer to the Western webpage on the use of AI such as ChatGPT.
Within this course, students are permitted to use AI tools exclusively for information gathering and preliminary research purposes. These tools are intended to enhance the learning experience by providing access to diverse information sources. However, it is essential that students critically evaluate the obtained information, exercise independent thinking, and engage in original research to synthesize and develop their own ideas, arguments and perspectives. The use of AI tools can serve as a starting point for exploring a topic, with students expected to uphold academic integrity by appropriately attributing all sources of information and avoiding plagiarism. Essays, written assignments and/or lab reports should reflect the student's own thoughts and independent written work. Students should also generate their own figures (e.g., graphs, diagrams) rather than using AI generated ones. By adhering to these guidelines, students contribute to a responsible and effective learning environment that promotes critical thinking, independent inquiry and all them to produce original written contributions. The same principles also apply to the use of translation software to support the writing the essays and other written assessments.

15. Western's Commitment to Accessibility

The Department of Geography strives at all times to provide accessibility to all faculty, staff, students and visitors in a way that respects the dignity and independence of people with disabilities.

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2147 for any specific question regarding an accommodation. Information regarding accommodation of exams is available on the Registrar's website.

More information about "Accessibility at Western" is available.

16.Mental Health

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit Western's Health and Wellness website for more information on mental health resources.

17. Support Services

Student Support Services
Student Development Services

18.Technical Requirements

Recommended technical specifications are available at:
https://registrar.uwo.ca/academics/timetables.html

19. Important Dates

September 7: Classes resume
September 15: Last day to add a first term half course
October 9: Thanksgiving Holiday – Department Office Closed
October 30-November 5: Fall Reading Week (No classes; Department Office open)
November 13: Last day to drop a first term half course without penalty
November 30: Last day to drop a full course without penalty
December 8: Classes end
December 9: Study day
December 10-22: Examination Period