
ESC/GEO 405/505: Geographic Information System and Science-II

Department of Geography & Earth Science

University of Wisconsin-La Crosse

Fall 2020

Instructor:	Gargi Chaudhuri, PhD	Class Location:	Cowley Hall 245
Email:	gchaudhuri@uwlax.edu	Lecture Day/Time:	Mon/Wed-8:50-9:50AM
Office Hours:	TBD	Lab Location:	Cowley Hall 245
Office Location:	Cowley Hall 2022	Lab Day/Time:	Mon/Wed-9:55-10:50AM
Office Phone:	608-785-8338	Credit Hours:	3

COURSE DESCRIPTION

The purpose of this course is to reinforce and introduce intermediate level concepts and techniques related to the theory and application of geographic information system(GIS). Topics such as coordinate systems, geoprocessing, raster data processing and management, vector digitizing, spatial data analysis and problem solving, and various forms of spatial data management will be covered in this course. Spatial data literacy, data formats, and data manipulation practices are also emphasized. Students are trained in the use ESRI's ArcGIS Pro software platform. Students will learn how to implement GIS techniques through completion of practical exercises and a final project, which involve the use of GIS methods to address real-world scenarios. Weekly activities include completion of lab assignments, reviewing video lectures, video demonstrations, and readings.

STUDENT LEARNING OUTCOMES

A successful ESC/GEO 405/505 student will learn:

- **Concepts:** Spatial reasoning and thinking; Concepts of spatial data; Visualize and identify spatial problems; Various spatial analytical techniques. .
- **Technical Skills:** How to handle spatial data; How to use ArcGIS Pro 2.X software; Apply problem solving using software; Develop customized map and visual products.

PREREQUISITES

ESC/GEO 305 and STAT 145. It will be assumed that students will know the following: Desktop computers and Windows operating system; Web Browsing, MS Excel, MS Word, MS Powerpoint, Save a file to a given drive, create, name and rename files and folders, drag and drop files, send an email attachment, know/how of Canvas, know how/when to log-off/ shutdown, find a file or folder, know when it is appropriate to use 'Save as' instead of 'Save', download files from the web to a given folder, move files between drives, Zip/Unzip a file, use the start menu to locate and start a software, copy, paste and delete files, Select & print to a printer from Windows application, make a new folder in an existing folder, place an image in Microsoft Word/PowerPoint, and use "Help" from within a Windows application.

TEXTBOOK & READINGS: *Paul Bolstad (2012), GIS Fundamentals, 4th Ed., Eider Press, White Bear Lake, Minnesota.* Additional readings will be posted on Canvas course site.

EXPECTATIONS FROM THE STUDENT

To be successful in this course, a student must

- Read assigned readings and go through the lecture materials regularly
- Listen to lectures carefully and take notes over written materials.
- Attend class regularly.

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- Submit completed assignments, exams, homeworks, final projects and any other class activity within due dates.
 - Ask questions and discuss topics within the lecture session. Clarify issues within class itself while the topic is being taught.

ASSIGNMENTS

- **Lab Assignments:** You need to complete all lab assignments and submit in required format by its due date to be considered for full grades in each assignment. If you fail the lab assignments, you will fail the course. Late submission of any assignment is strongly discouraged. However, turning a lab late is encouraged over not doing it at all. Late submissions will be accepted until the last day of classes. **One week late submission will lose 25%** of their value and **more than one week late submission will lose 50%** of their value if more than one week late. In case of sickness or emergency, appropriate proof should be provided during late submission otherwise points would be deducted. You will have enough time to complete each assignment within assigned lab time with help from me and/or lab assistant. If you choose not to complete your work within lab time, it's your responsibility to finish on time by yourself.
- **Homeworks:** There will be few homeworks that you will be provided based on some lecture materials. Homeworks are meant to be done on your own and submit it by the due date.
- **Review presentations:** Students will be assigned reading materials from the text book or scientific articles to critically evaluate and present in class.
- **Exams:** There will be **three exams on the dates listed in the syllabus** and are designed to assess your comprehension of the presented materials. Two exams will be based on lecture materials and readings and will be named as Mid-term and Final exams. One exam will be based on hands-on problem solving called Lab Exam. Make-up exams will be given **ONLY** during exceptional circumstances, such as illness or university-approved event, and proof will be required. In cases where you have a scheduling conflict with a university-approved event, it is **YOUR** responsibility to notify the instructor at least two weeks before the exam. In the case of emergencies, it is **YOUR** responsibility to notify the instructor that you will be unable to attend, preferably before the exam or within 24 hours after the exam.
- **Final Project:** More information about the final project can be found in Final Project module in canvas. In the final project, students propose a real world case study that they would like to explore. The student will pose some objectives or research questions that they will address by using geospatial data and analytical techniques learned in this course. The whole process of final projects takes last few weeks, and students are guided by few milestones which help them accomplish their task on time. **The final project submission items are not eligible for late submission.** If you fail to turn in any of the items by the due date then you will not receive any points for that item.
- **For graduate students and Writing Emphasis:** In addition to the items above, graduate students and undergraduate students with writing emphasis are required to write an academic paper and scientific report, respectively based on their final project. Graduate students are strongly suggested to focus their final project topic within the context of their thesis work.

ATTENDANCE

Due to COVID-19 and hybrid nature of the class, the scheme to assess attendance may change. Currently, the short lecture quizzes will serve as lecture attendance and lab attendance will be taken in class.

FORMAT & COURSE ACCESS

This is a hybrid course. Due to the number of enrollments versus room capacity issue to maintain required physical distance, the student attendance in class will be split into two groups. The first group will attend the Monday/Wednesday 8:50 – 9:50AM session and the second group will attend the 9:55 – 10:50AM session. In the hybrid format, the lectures will be posted online and the students will be in class to work on their assignments. The students are responsible to study the online lectures on their own and take the associated quizzes. You need to complete the lecture quizzes every week to move on further. You can ask questions and clarify doubts with the instructor via discussion forum on in class during your session. You will need your UWL NetID to login to the course from the CANVAS homepage. All course materials will be available online, including lectures, lab assignments handouts, video demonstrations for assignments, quizzes, assignment dropboxes, and other miscellaneous instructions. The lab assignment data will be available via Geography server folders. In class, the instructor will be there primarily to help them with assignments, troubleshoot and discuss. Access to course materials in CANVAS will cease after the term ends. If you wish to archive materials for your personal records or portfolio you should do so as you progress through the course. As a general rule, you should always save local copies of course-related work. To avoid disasters, you should also save important files to external media or cloud storage.

TECHNICAL SUPPORT

For tips and information about Canvas visit the Canvas Guide for Student. You can also contact the ITS Support Center at (608) 785-8774 or helpdesk@uwlax.edu for questions about Canvas or any other technological difficulties. The hours for ITS are Monday through Thursday from 7:30 am to 6:30 pm, and Friday from 7:30 am to 4:30 pm, Central Time. For GIS software and computer issues in the lab please contact the GIS Lab Administrator Steve Fulton.

GRADING SCHEME

Grade	Range
A	93 – 100
AB	88 – 92
B	83 – 87
BC	78 – 82
C	70 – 77
D	60 – 69
F	59 & below

GRADE DISTRIBUTION

Lab Assignments - 40%*

Exams - 25%

Other Assignments - 20%

Final Project - 15%*

**Graduate Students*– The lab assignment section is 35% and the final project is 20%. The final project part also includes a final paper for graduate student only. The graduate students are encouraged to develop final project on based on application of GIS knowledge gained in this class on their thesis topic.

STUDENT SUPPORT SERVICES

A GIS Lab Assistant will be available in the classroom and/or online to help students with the lab assignments. More details will be provided on canvas.

TENTATIVE SCHEDULE

Additional due dates are available on Canvas

Date	Topic	Reading
9/9-11	GIS Overview Review: Map Scale and Projections Lab 0- Intro. to ArcGIS Pro. Due:9/11 @5PM	Ch. 3
9/14-18	Review: Coordinate System Public Land Survey System Raster Data Lab 1-Working with Raster Data. Due:9/18 @5PM	Ch.2(44-52; 58-63) Ch.6(250-264)
9/21-25	Vector Data & Topology Existing Data Homework 1-Explore existing data Lab 2-Working with Vector Data. Due:9/25 @5PM	Ch.2(25-43; 53-56), Chrisman Ch.3(62-64) Ch.4
9/28-10/2	Data development and maintenance Geovisualization & Map Design Lab 3-Advanced Digitization and Topology Due: 10/9 @5PM	Ch. 7 Clarke Ch.8 & Chang Ch.9
10/5-9	Database Management System ESRI Data Types and Formats Homework 2-Explore Geodatabase Structure Due: 10/9 @ 5PM Lab 3 continues. Due: 10/9 @ 5PM	Ch. 8 ArcGIS Help Docs & handouts
10/12-16	Review for mid-term by students-10/12 Mid-term Exam on Canvas; Date-10/14; Time-8:50-10:50AM Final Project discussion-Part 1: Ideas and Data Hunt Lab 4: Data entry, query and management Due: 10/16 @ 5PM	
10/19-23	Descriptive Spatial Statistics-I Descriptive Spatial Statistics-II Lab 5: Descriptive Spatial Stats. Due: 10/23 @ 5PM	Clarke Ch.6
10/26-30	Terrain Analysis Data and Errors Lab 6: Terrain Analysis. Due: 10/30 @ 5PM	Ch.11 Ch.14
11/2-6	Geoprocessing Spatial Analysis-I Final Project discussion-Part 2: Data Finalize and Explore Analytical tools	Ch. 9, 10(407 – 411; 415-416; 418 - 423), 13(521-544)

	Lab 7: Georrocessing. Due: 11/6 @ 5PM	
11/9-13	Spatial Analysis-II Ethics in GIS Homework 3: Evaluate ethical decision-making Due:11/13 @ 5PM Lab 8: Spatial Analysis. Due: 11/21 @ 5PM	same as above GIS Code of Ethics
11/16-20	Review case studies in GIS by students GIS Software, Functionality & WebGIS	Ch.1 & Clarke Ch.9
	Lab 8 continues. Due: 11/21 @ 5PM	
11/23-27	Present and Future of GIS No class on 11/25 (Friday Schedule) Final Project Proposal. Due: 11/25 @ 5PM Lab 9- Working with ArcGIS Online. Due: 11/27 @ 5PM	Ch.15 & Harvey Ch.15
11/30-12/4	Final Project Work time Draft presentation and paper due 12/4 @ 5PM	
12/7-11	Final presentation and paper due 12/11 @ 5PM	
12/14-16	Lab Exam Date-12/14; Time-8:50-10:50AM Review for final exam by students-12/16	

The instructor reserves the right to change the content of the course material if she perceives a need due to pandemic, instructor illness or due to the pace of the course. Students are responsible for any announcement made in class.

HOW TO CONTACT THE INSTRUCTOR:

If you have any issues talk to your instructor during office hours or before or after the class. Do not completely rely on emails. If you have to send an email, email with clear subject, course and section number, and sign off with your name.

EXPECTATIONS FOR GRADED WORK:

Generally, I return graded assignments with individualized feedback, if needed, within 21 days from the due date of the assignment. I will notify you if I am unable to grade the work within the 21-day timeframe, and will identify a revised return date. If you submit work after the due date, it may not be returned within 21 days. The grades for any work that is graded electronically, such as scanned examinations or automated quiz, will be accessible to you within 21 days of the due date. If you submit electronically graded work after the due date, it may not be accessible within 21 days. Your graded coursework will be returned in compliance with FERPA regulations, such as in class, during my office hours, or via the course management system through which only you will have access to your grades.

UWL Syllabus Policy Information & Statements:

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