Syllabus: GIS Applications

Geography 2050 - Fond du Lac Tribal and Community College - Spring 2022

Syllabus and schedule are subject to changes at the discretion of the course instructor.

Instructor

Dr. Carl M. Lemke Oliver Sack (Carl)

Contact Information

Email: carl.sack@fdltcc.edu. I reply to all student emails within 24 hours.
Cell Phone: (608) 712-8335. Call or text at any time; you will not bother or disturb me. If you call and I don't answer, please leave a voicemail. I generally reply to voicemails and texts within a few minutes to a few hours.

Office Hours

10:45 AM-12:45 PM Mondays and 1-3 PM Thursdays, or by appt., in Room W222 or via Zoom.

Class Meetings

9-11:40 AM Tuesdays & Thursdays. This is an in-person course that meets in Room 208 on campus; however, if you have difficulty or safety concerns with coming to campus, you may join class on Zoom at https://minnstate.zoom.us/j/97420335956. It is important to arrive on time, stay for the entire period, and fully participate in class meetings. Attendance and participation at each class meeting is graded on a 4-point scale: 4=arrive on time, stay until end, and fully participate; 3=arrive late or leave before being dismissed; 2=arrive very late or leave very early; 1=absent with prior notification; 0=absent with no prior notification.

Course Overview

If you're taking this course, you must have already taken Introduction to GIS (or an equivalent course elsewhere) and may be nearing completion of your GIS degree or certificate. This course will synthesize the skills you have learned into professional-level GIS products dealing with real world problems that interest you. Part of the course will introduce advanced GIS concepts through short lectures, discussion, and mini-assignments. Most of the course will focus on GIS project management and development of materials you can use in a job interview or application to a four-year college program.

Course Goals

1. Identify the needs of a GIS project including datasets, data sources, and time commitment

2. Appraise potential ethical and/or cultural issues associated with geospatial data and analysis for the project
3. Create, edit, and manage geospatial data
4. Choose, perform, and automate spatial analysis tasks to meet the requirements of a specific GIS project
5. Produce a professional-quality poster and presentation as the outcome of a GIS project
6. Develop a current résumé and portfolio tailored to your field of study

Learning Resources

We will make use of some tutorials on intermediate GIS topics from Law and Collins (2020), *Getting to know ArcGIS Pro 2.6,* which is available as a library e-book, so no purchase is needed. I will assign other online articles, reference documents, and activities as appropriate. These will likely include the ArcGIS Pro online reference, Esri Training and Learn ArcGIS websites, and *Geographic Information Science & Technology Body of Knowledge*.

What you can expect from me

I try to bring passion and enthusiasm to the topics I teach. I intend to lay out course expectations in a clear and concise manner, and to be open to constructive feedback. I will be proactive in providing assistance, assessing your work regularly, and helping you to improve your skills. I will respond as quickly as possible to all communications from students—you are my highest priority. If you need special accommodation, please follow the procedure in the Disabilities Notice below first, then let me know as soon as possible so I can work with your plan accordingly.

What I Expect from You

This is a capstone class. I expect you to be willing to take risks and to try new things. Failure is not only inevitable, it is the best kind of learning experience. I expect you to show up to class on time for each meeting and stay for the entire period unless you have a legitimate reason (e.g., time conflict with another class, child care disruption, family emergency, or medical issue) and have notified me in advance. I understand that things happen; please keep me up to date so it doesn't negatively impact your grade or cause you to fall too far behind in the coursework. I hope you will be enthusiastic about the subject matter and come to class prepared to learn something new.

Course Feedback

Your direct and timely feedback will help me improve the class. I am open to any suggestions you have both in person during class and more privately via email or an office hours visit. If you are experiencing a problem, the sooner you let me know, the easier it will be to address.

Course Structure and Activities

The topic sequence is listed in the schedule at the end of the syllabus. Course activities may include the following.

Class Meetings

We will use our class meeting time for lecture discussions, assistance with assigned topic activities, and to make progress on your GIS project and portfolio assignments. Since over half of the class is dedicated to your independent project work, we will spend significant amounts of each class period working one-on-one on tasks and problems that arise for you.

Lectures

Lectures and readings on intermediate-level GIS skills will be provided during the first ten weeks of the semester. Lectures will be presented in class and recorded for later re-watching *outside of class time*. You are expected to take notes on the lectures, preferably by hand, and will be asked to submit photos of your notes for a grade by the third class period after the lecture is given. *Do not spend extra class time watching lecture videos and taking notes.* If you miss a lecture, you must watch it and take notes as homework.

Readings

You will be assigned articles on each lecture topic to read outside of class. Taking notes on readings is optional but encouraged.

Quizzes

For each topic, you will take an open-book online quiz covering the lecture and associated reading. You will be able to retake the quiz as many times as you like, but only the first attempt will be graded. You can earn missed points back by emailing me the *correct answer* and *an explanation of why it is correct* for each answer you got wrong on the first try. Quizzes will be due at the same time as lecture notes and will be worth equal grade points.

Lab Activities

You will complete seven lab activities on intermediate-level GIS skills during the first half of the semester. Each activity should take you no more than 2-3 hours to complete, leaving additional class time to work on your project. We will spend the last six weeks of the semester focusing exclusively on your project.

GIS Project

The major product of the course on which you will be graded will be an independent GIS project. We will go through the steps of the project design and execution process together as a class, including topic identification, research question and project goal design, needs assessment, study design, execution, evaluation of results, poster design, and presentation. You will choose your own topic and will be responsible for completing each stage of the process for your own project. You are expected to make progress on your project both in and out of class every week of the semester. We will workshop project proposals so you receive constructive peer and instructor feedback, and you will present a final product to the class at the end of the semester.

Résumé and GIS Portfolio

You will complete a résumé that reflects your job skills and experience in your career field(s), including your GIS experience. This will mostly be done as a homework assignment, but we will workshop résumés in class so you receive constructive feedback from your peers and the instructor. You will also use ArcGIS Story Maps to develop an online portfolio showcasing your project work and your résumé.

There will not be any exams in this course. You will be expected to attend the Final Exam session (9-10:50 a.m. on Tuesday, May 10) to present your project and portfolio.

Grading

Percentages of your final grade:

- Attendance and Participation: 10%
- Notes & Quizzes: 20%
- Exercises: 20%
- Project: 40%
- Résumé and Portfolio: 10%

Final grade breakdown:

A: 91-100%
B: 80-90%
C: 70-79%
D: 60-69%
F: <60%

I reserve the right to curve grades upward based on the class distribution of final grades. You will never get a lower grade based on your score than what is indicated above.

Late Work

All work is due at the start of class (9 AM) on the due date unless you have been granted an extension in advance. Late work will be discounted by 15%. Late work will not be accepted after 9 AM on Tuesday, May 11 (the finals period).

Plagiarism

You may not copy others' work without attribution/citation or have others complete your work for you. If you copy text, it must be in double-quotes ("") with credit given to the original author, and should account for a small minority of your submission. You must appropriately cite all data sources on your maps. There are no team-based assignments in this course; you must submit your own unique product for each assignment. Plagiarism, or presenting the work of another as your own (a.k.a. "copying"), results in an F for this course and is subject to any other disciplinary actions mandated by this institution and the Minnstate system.

Disabilities Notice

Fond du Lac Tribal & Community College is committed to providing equitable access to learning opportunities for all students. Under the Americans with Disabilities Act and Section 504 of the Rehab Act, Fond du Lac Tribal & Community College provides students with disabilities (e.g., mental health, attentional, learning, chronic health, sensory or physical) reasonable accommodation to participate in educational programs, activities or services. Students with disabilities requiring accommodation to participate in class activities or meet course requirements should first complete an intake form and necessary requirements with Nancy Olsen, Disability Services coordinator, to establish an accommodation plan. She can be reached at nancy.olsen@fdltcc.edu or 218-879-0819.

Sexual Violence

Fond du Lac Tribal & Community College is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence, gender or sex-based bullying and stalking. If you or someone you know has experienced gender or sex-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), know that you are not alone. Fond du Lac Tribal & Community College has staff members trained to support survivors in navigating campus life, accessing resources, providing accommodations, assistance completing with protective orders and advocacy. For more information regarding the Campus Security Report, the following link will give you a report on the Clery Compliance and Security Report at FDLTCC: http://fdltcc.edu/about-us/policies-reports/campus-security-policies-reports/

Please be aware that all Fond du Lac Tribal & Community College employees are required to report any incidents of sexual violence and, therefore it cannot guarantee the confidentiality of

a report, but it will consider a request for confidentiality and respect it to the fullest extent possible. If you wish to report sexual misconduct or have questions about school policies and procedures regarding sexual misconduct, please contact Anita Hanson, Dean of Student Services, at 218-879-0805 or anita.hanson@fdltcc.edu.

Course Schedule

This schedule is subject to adjustment by the instructor.

Date	Activities
Tu 1/11	**In Class:** • Course overview • Project overview and examples • Lecture 1: GIS Data • Activity 1: Directory Setup and Finding Data Online overview **Reading Assignment:** Getting to Know ArcGIS Pro pages 1-11 **Project Assignment:** Research Question or Goals
Th 1/13	**In Class:** Work on Activity 1 and Project Research Question or Goals
Tu 1/18	**In Class:** Check-ins and work time
Th 1/20	**DUE:** • Lecture 1 notes and quiz • Activity 1: Directory Setup and Finding Data Online • Project research question or goals draft **In Class:** • Lecture 2: Workflows and Automation in GIS • Activity 2: Workflows overview **Reading Assignment:** GIS&T Body of Knowledge: Visual Programming for GIS Applications **Project Assignment:** Proposal
Tu 1/25	**In Class:** Check-ins and work time
Th 1/27	**In Class:** Check-ins and work time

Date	Activities
Tu 2/1	**DUE:** • Lecture 2 notes and quiz • Activity 2 • Project final research question or goals **In Class:** • Lecture 3: Python and ArcPy • Activity 3: Scripting with ArcPy **Reading Assignment:** Think Python Chapter 1
Th 2/3	**In Class:** Check-ins and work time
Tu 2/8	**In Class:** Check-ins and work time
Th 2/10	**DUE:** • Lecture 3 notes and quiz • Activity 3 • Project proposal draft **In Class:** • Lecture 4: Vector Spatial Analysis • Activity 4: Vector Geoprocessing overview **Reading Assignment:** Essentials of GIS Chapter 7: Vector Operations **Project Assignment:** Report, map, tables, and graphics
Tu 2/15	**In Class:** Check-ins and work time
Th 2/17	**In Class:** Check-ins and work time
Tu 2/22	**DUE:** • Lecture 4 notes and quiz • Activity 4 • Project final proposal **In Class:** • Lecture 5: Spatial Autocorrelation and Geostatistics • Activity 5: Geostatistical Analysis overview **Reading Assignment:** • GIS&T BOK: Global Measures of Spatial Association • ArcGIS Pro Help: What is a z-score? What is a p-value?
Th 2/24	**In Class:** Check-ins and work time
Tu 3/1	**In Class:** Check-ins and work time

Date	Activities
Th 3/3	**DUE:** • Lecture 5 notes and quiz • Activity 5 **In Class:** • Lecture 6: Raster spatial analysis • Activity 6: Raster Analysis and Modeling overview **Reading Assignment:** Essentials of GIS Chapter 8: Raster Operations
Tu 3/8	**In Class:** Check-ins and work time
Th 3/10	**In Class:** Check-ins and work time
	SPRING BREAK
Tu 3/22	**DUE:** • Lecture 6 notes and quiz • Activity 6 **In Class:** • Lecture 7: Web GIS • Activity 7: Web GIS **Reading Assignment:** • GIS&T Body of Knowledge: Web GIS • Getting to Know Web GIS pages 1-11
Th 3/24	**In Class:** Check-ins and work time
Tu 3/29	**In Class:** Check-ins and work time
Th 3/31	**DUE:** • Activity 7: Web GIS • Project report, map, tables, and graphics **In Class:** Poster design overview **Project Assignment:** Poster
Tu 4/5	**In Class:** Check-ins and work time
Th 4/7	**In Class:** Check-ins and work time
Tu 4/12	**In Class:** Check-ins and work time

Date	Activities
Th 4/14	**DUE:** Project poster draft **In Class:** • Print poster drafts • Present and workshop poster drafts **Résumé and Portfolio assignment**
Tu 4/19	**In Class:** Check-ins and work time
Th 4/21	**In Class:** Check-ins and work time
Tu 4/26	**In Class:** Check-ins and work time
Th 4/28	**DUE:** Résumé and Portfolio drafts **In Class:** Workshop résumés and portfolios
Tu 5/3	**In Class:** Check-ins and work time
Tu 5/10	**DUE:** • Résumé and Portfolio • Project final poster **In Class:** • Print final posters • Final project and portfolio presentations