Syllabus: Introduction to GIS

Geography 2001 - Fond du Lac Tribal and Community College - Fall 2022

Syllabus and schedule are subject to changes at the discretion of the course instructor and in response to changes at the institutional and system levels due to the pandemic situation.

Instructor

Dr. Carl M. Lemke Oliver Sack (he/they). I prefer to be called Carl; if you feel more comfortable referring to me by my last name, just use Sack (as in Dr. Sack and Professor Sack).

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 & 1-3 PM Thursdays, or by appointment, in Room W222 on campus or via Zoom at https://minnstate.zoom.us/j/91632633584.

Class Meetings

9-11:20 AM Tuesdays & Thursdays, in Room 208 or by Zoom at https://minnstate.zoom.us/j/98343827617 (note this is different from the address for office hours above). Unless otherwise notified by email, you may choose to come to class in person or join by Zoom. If you come in person, you must follow any COVID protocols set by our campus administration. If I must quarantine or care for a sick family member, I will email everyone and we will hold class exclusively over Zoom as necessary.

I encourage you to also participate in **GIS Club**, which will meet at a time determined by club members and engage in fun GIS-related extracurricular activities like geocaching, orienteering, and group mapping projects.

Course Overview

This course introduces basic concepts of Geographic Information Systems (GIS). Students will apply GIS theory to hands-on laboratory activities and projects based on real-world scenarios and data. Industry standard online and desktop software is utilized to introduce data creation, acquisition, management, and editing, georeferencing, spatial analysis, symbolization, and map production workflows for a variety of professional GIS applications.

Course Goals

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

1. Describe several ways GIS can be used to analyze information and solve spatial problems in different domain fields
2. Describe the components of a GIS and how they interact
3. Critique the ontology of digital geospatial information as a product of dominant ways of thinking about the world
4. Download and process geospatial datasets for analysis and mapping
5. Edit spatial and attribute data using GIS software
6. Perform joins to create linkages between tabular and spatial datasets
7. Georeference raster and vector data that lack coordinate reference system information
8. Perform spatial and attribute queries
9. Choose, locate in the software, and perform a set of geoprocessing operations based on a given spatial analysis task

Technology

This is a technology-heavy course. All technology for the course will be provided to you in the computer lab in Room 208 on campus during class periods, and is available in the Open Computer Lab at other times. We also have laptop PCs equipped with GIS software available for checkout. Campus laptops are to be used for school purposes only, and their replacement cost is $1,200 if they are lost or damaged. If you prefer to use your own computer, it must be a Windows PC and meet the system requirements for ArcGIS Pro.

We will use Microsoft OneDrive for file transfer and cloud backup. On the first day of class, you will be asked to pick a computer in the lab for use throughout the semester, and sync OneDrive on that machine with your Office 365 campus account. It is recommended that you sync OneDrive with this account on other devices you own or may use for the course. Other software you will use in this course includes a web browser (preferably Chrome or Firefox), the D2L Brightspace learning management system, Windows File Explorer, 7-Zip File Manager, Microsoft Excel, ArcGIS Online, and ArcGIS Pro.

For general technological assistance, contact our Instructional Technology Specialist, Robin Anderson, at robin.anderson@fdltcc.edu. For questions specific to GIS software, contact the course instructor (Carl).

Learning Resources

Readings to accompany course lectures will be from free online sources. Most will come from two online textbooks: *Essentials of Geographic Information Systems* by Jonathan E. Campbell and Michael Shin (2011) and *Intro to GIS and Spatial Analysis* by Manuel Gimond (2021). A few additional articles from other sources will be assigned. Links to all readings will be posted on the D2L course site.

Lab activities will come from my workbook, *The Flexible GIS Workbook for ArcGIS Pro*. This online workbook is a work in progress, so any and all feedback is appreciated. Towards the end of the term, I will assign separate activities matching a few sections I have not yet completed.

What you can expect from me

I have a passion for mapping and GIS. I have a Master's Degree in Cartography and GIS and Ph.D. in Geography from the University of Wisconsin-Madison. I have over 16 years of teaching experience and 10 years of experience working with GIS. I intend to lay out course expectations in a clear and concise manner. I will monitor your participation and grades and give you feedback when appropriate. 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 required program class for GIS majors, Environmental Science—Geospatial Science majors, and GIS certificate-seekers. It is not a gen ed course, nor is the material easy. Expect to be confused and frustrated often at first; stick with it, though, and you will get the hang of these powerful mapping and analysis tools. I maintain high (but doable) expectations for this class to ensure that you come out of it competitive with your peers at other area schools. I expect you to put in **8-9 hours per week** on average, including class meetings and homework. I expect you to keep up with the course reading, take notes on lectures, attend *every* class meeting or let me know *in advance* if you can't make it, participate fully in class discussions, and turn in assignments on time or communicate *in advance* if you need an extension. *You MUST check your campus email DAILY* for communications regarding the course. I strongly encourage you to be curious about the material we are learning, ask lots of questions, and consider yourself part of an engaged community of learners.

Course Feedback

Your direct and timely feedback will help improve the class. I am open to any suggestions you have both during class meetings and via private communication. If you are experiencing a problem, the sooner you let me know, the sooner I will be able to address it and the easier it will be to solve.

Course Structure and Activities

The topic and activity sequence is given in the schedule at the end of the syllabus. Course activities will include:

Readings

You will be assigned reading homework to complete before each Tuesday class period. Readings will support and extend the lecture material. I recommend taking cursory notes on the reading, but will not require you to turn in these notes.

Lectures and Notes

Lecture material will be delivered in class each Tuesday. You are expected to **take notes on the lectures**. Each lecture includes prompts for discussion that you will answer in writing as well. You will submit photos of your hand-written notes and responses to prompts OR a document with typed notes and responses for a grade one week after the corresponding lecture.

Quizzes

For each topic, you will take an open-note quiz covering the lecture and associated reading a week after the lecture is given. You will be able to retake the quiz on your own 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. Notes and quizzes will be worth equal grade points each week.

Lab Activities

You will be assigned a section of the workbook or another activity to complete each week, due at the beginning of class on Tuesday. For each activity, you will submit responses to questions included in the instructions, a product you created, or both.

Class Participation

We will use our class meetings for lecture, topical discussion, demonstrations, and work on lab activities so you can receive assistance as you are completing them. **Whether you join class in person or via Zoom, you are expected to remain in the lab or on the meeting for the entire class period**. You will receive a participation grade for each class period: 4 points for arriving on time and staying until dismissed, 2 or 3 points for coming late and/or leaving early, 1 point if you need to miss class and inform me in advance, and 0 points for no show/no call.

Exams

There will be a Midterm Exam and a Final Exam. Both will be open-book/open-note and based on the concepts covered by prior quiz and lab questions, with the addition of some short answer analysis questions. The Final Exam will be open during our finals period (Thursday, December 15, 9-10:50 AM).

Grading

Percentages of your final grade:

- Attendance and participation: 10%
- Notes and quizzes: 20%
- Lab assignments: 50%
- Exams: 20%

Final grade breakdown:

A. 90-100%
B. 80-89%
C. 70-79%
D. 60-69%

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 by the start of class (9 AM) on the due date unless you have been granted an extension in advance. You can be granted an extension by requesting one before the due date for any reason. Work submitted late without an extension will be docked 15% of available points. I will not accept late work after 11:59 PM on December 17.

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. Unless otherwise noted in assignment directions, 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 automatic 0 on the assignment. Multiple instances of plagiarism may result in a F in the course and be 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

Subject to change by the instructor.

Class Date	Work due and class meeting agenda
Tu 8/23	**Agenda:** • Overview syllabus • Lecture 1: What Is GIS? • Overview Mental Map Assignment • Overview Who Uses GIS? Assignment • Sync OneDrive to campus accounts **Reading:** *Essentials of GIS* Chapter 1
Th 8/25	**Agenda**: Work on mental maps and Who Uses GIS? assignment
Tu 8/30	**Due:** • Lecture 1 notes • Mental Map Assignment • Who Uses GIS? Assignment **Agenda:** • Review Lecture 1 • Quiz 1 • Lecture 2: Doing GIS • Present mental maps • Overview Lab Assignment 1 • Complete ArcGIS Online account setup **Reading:** *Intro to GIS and Spatial Analysis* Chapter 9: Coordinate Systems
Th 9/1	**Agenda:** Work on Lab Assignment 1

Class Date	Work due and class meeting agenda
Tu 9/6	**Due:** • Lecture 2 notes • Lab Assignment 1 **Agenda:** • Review Lecture 2 • Quiz 2 • Lecture 3: Coordinate Systems • Discuss Workbook Teachbacks 1-4 • Overview Lab Assignment 2 **Reading:** *Essentials of GIS* Chapter 2
Th 9/8	**Agenda:** Work on Lab Assignment 2
Tu 9/13	**Due:** • Lecture 3 notes • Lab Assignment 2 **Agenda:** • Review Lecture 3 • Quiz 3 • Lecture 4: Mapping Basics • Discuss Workbook Teachbacks 5-15 • Overview Lab Assignment 3 **Reading:** *Intro to GIS and Spatial Analysis* Chapter 6: Good Map Making Tips
Th 9/15	**Agenda:** Work on Lab Assignment 3
Tu 9/20	**Due:** • Lecture 4 notes • Lab Assignment 3 **Agenda:** • Review Lecture 4 • Quiz 4 • Lecture 5: Map Publication and Transfer • Discuss workbook Teachbacks 16-25 • Overview Lab Assignment 4
Th 9/22	**Agenda:** Work on Lab Assignment 4

Class Date	Work due and class meeting agenda
Tu 9/27	**Due:** • Lecture 5 notes • Lab Assignment 4 **Agenda:** • Review Lecture 5 • Quiz 5 • Discuss Workbook Teachbacks 26-30 • Overview Lab Assignment 5
Th 9/29	**Agenda:** Work on Lab Assignment 5
Tu 10/4	**Due:** Lab Assignment 5 **Agenda:** • Discuss Workbook Teachbacks 31-38 • Submit final map products • Exam Review
Th 10/6	MIDTERM EXAM
Tu 10/11	**Agenda:** • Lecture 6: Vector Data and Geocoding • Overview Lab Assignment 6 **Reading:** • *Essentials of GIS* Chapter 3 • *Directions Magazine:* "Three Standard Geocoding Methods"
Th 10/13	NO CLASS (Carl at MNGIS/LIS Conference)
Tu 10/18	**Agenda:** Work on Lab Assignment 6
Th 10/20	NO CLASS (MEA)

Class Date	Work due and class meeting agenda
Tu 10/25	**Due:** • Lecture 6 notes • Lab Assignment 6 **Agenda:** • Review Lecture 6 • Quiz 6 • Lecture 7: Raster Data and Georeferencing • Discuss Workbook Teachbacks 2-7 • Overview Lab Assignment 7 **Reading:** • *Essentials of GIS* Chapter 4 • *ArcGIS Pro Help:* "Overview of georeferencing"
Th 10/27	**Agenda:** Work on Lab Assignment 7
Tu 11/1	**Due:** • Lecture 7 notes • Lab Assignment 7 **Agenda:** • Review Lecture 7 • Quiz 7 • Lecture 8: Vector Data Structures, Attributes, and Digitizing • Discuss Workbook Teachbacks 18-21 • Overview Lab Assignment 8 **Reading:** • *Essentials of GIS* Chapter 5 • *GIS Lounge:* "Digitizing Errors in GIS"
Th 11/3	**Agenda:** Work on Lab Assignment 8
Tu 11/8	**Due:** • Lecture 8 notes • Lab Assignment 8 **Agenda:** • Review Lecture 8 • Quiz 8 • Lecture 9: Selections and Queries • Discuss Workbook Teachbacks 22-25 • Overview Lab Assignment 9 **Reading:** *Essentials of GIS* Chapter 6

Class Date	Work due and class meeting agenda
Th 11/10	**Agenda:** Work on Lab Assignment 9
Tu 11/15	**Due:** • Lecture 9 notes • Lab Assignment 9 **Agenda:** • Review Lecture 9 • Quiz 9 • Lecture 10: Joins and Relates • Discuss Lab Assignment 9 responses • Overview Lab Assignment 10
Th 11/17	**Agenda:** Work on Lab Assignment 10
Tu 11/21	**Due:** • Lecture 10 notes • Lab Assignment 10 **Agenda:** • Review Lecture 10 • Quiz 10 • Lecture 11: Thematic Data Visualization • Discuss Lab Assignment 10 responses • Overview Lab Assignment 11 **Reading:** *GIS&T Body of Knowledge:* Statistical Mapping
Th 11/24	NO CLASS (Thanksgiving)
Tu 11/29	**Agenda:** Work on Lab Assignment 11
Th 12/1	**Due:** • Lecture 11 notes • Lab Assignment 11 **Agenda:** • Review Lecture 11 • Quiz 11 • Discuss Lab Assignment 11 responses • Overview Lab Assignment 12
Tu 12/6	**Agenda:** Work on Lab Assignment 12

Class Date	Work due and class meeting agenda
Th 12/8	**Due:** Lab Assignment 12 **Agenda:** • Present Lab Assignment 12 maps • Final Exam review
Th 12/15	FINAL EXAM