

SSJ-376: Spatial Databases

Instructor: Prof. Yanan Wu (yanawu@clarku.edu)

Instructor Office Hours:

Tuesday & Thursday

1:30 pm – 2: 30 pm Or By appointment

Office Location: Jeff 220

TA: Vanchy Li (vali@clarku.edu)

TA Office Hours:

1:00 – 3: 00 PM Monday

TA Office location:

EORS, first floor of the geography building

Lecture Time:

Monday 10:25 – 11:40, Physics/Math BP310

Tuesday 14:50 – 16:40 , Jonas Clark Hall JC105

Lab

Friday 10:25 -11:40, Physics/Math BP310

Course Description

Spatial database development, a key component of GIS project management, focuses on the organization of location-based data. Participants will learn database development best practices, data collection and standardization, and how to apply topological rules to a database. Throughout the course, students will work on final database projects which will build skills required in professional GIS positions, with an emphasis on collaboration and real-world applications of data.

Prerequisites

Students are required to have introductory knowledge of GIS, basic map making and design principles, and spatial data handling.

Learning Objectives: Spatial Database Development in Practice

Student evaluation during this course will depend on understanding and applying fundamental spatial database development and interaction through assignments and class exercises.

By the end of the course, students will:

- Understand the foundational knowledge behind databases, specifically geodatabases;
- Interact with spatial data using different relationships across databases with SQL;
- Learn standard database management protocols, including data collection.

Student Responsibilities

Each student is responsible for the following:

- Completely reading the syllabus and understanding course requirements;
- Staying informed and up-to-date on all course-related work each and every week;
- Reading announcements and participating in Canvas and Course Website;
- Posting and answering questions about the course and assignments to Canvas for the benefit of other students.

Course Format

Mondays will consist of lecture format only. This is where the instructor will introduce this week's topic, readings, and slides. All materials will be posted to the course website before the start of class, with the exception of Week 1.

Tuesday Lecture session consist of partial lecture time and partial discussion time. This will be a great time to bring questions regarding the week's content or the assignment.

Friday lab section will introduce the assignment and its rubric, and provide an opportunity to begin working through it together.

Canvas will be used solely for Syllabus updates and grading. The Course Website will host all course materials. Email will be the primary methods of communication.

Technical Requirements

This course will incorporate the free and open source software package to explore a number of different cartographic principles. In addition to setting up the appropriate software, students will need to ensure they have adequate data storage for assignments and backups.

Software

- QGIS
- PostgreSQL
- PostGIS
- pgAdmin 4

Learning Source

- [Introduction to PostGIS](#)

Office Hours

The instructor holds student office hours on Tuesday & Thursdays (1:30 pm – 2:30 pm) or by appointment

Topics for our meeting can include (but not limited to) assignment questions, clarification of course/assignment expectations, pre- or post-submission in-person evaluation of your work, questions about grading or performance, or simply to just grab coffee and chat!

Communications Protocol

It is neither practical nor efficient to respond to technical questions via email. To ensure that questions are answered in a timely manner and to benefit all students, the following communication protocols for the course have been established.

Technical Difficulties

Direct questions about software issues, student accounts, Canvas, and Zoom to the ITS Help Desk at (508) 793-7745.

Emailing the Instructor

For questions about grading or confidential matters, contact the instructor and schedule a time to meet via Zoom or in person. The instructor will not discuss grades or grading via email. Students must schedule a time to meet in-person or via Zoom. Use “**ssj-376**” as the subject of the email, and please include in the message a description of the purpose of the meeting.

The instructor responds to emails within one business day (but usually same day) and from Monday through Friday between the hours of 9am and 6pm only. Do not expect a response to any email outside of these days and hours.

This means the instructor will not be available over the weekends or in the evenings. Please adhere to the suggested schedule provided in the syllabus, show up to Office Hours, and schedule any one-on-one meetings to avoid any last second assignment issues or submissions.

Accountability

The instructor highly encourages taking measures to ensure the student, instructor, and course assistant are held accountable. In addition to mid- and end-of-semester instructor evaluations, students are invited to request all one-on-one meetings are held in a public setting, or an all-party, consent-given, audio-recorded space.

Otherwise, the instructor will request that students follow up via email with a recap of any one-on-one conversations that are not confidential in nature. This recap should include a detailed summary of what was discussed, as well as bullet points covering any action items that the student, or instructor, are expected to complete with a clear deadline for each item.

Month	Date	Day	Course Topic	Submission Deadlines
JAN	13	M	Introduction to the Course	
	14	T	Software Installation	
	17	F	Software Installation	
	20	M	University holiday	
	21	T	Intro to PostGIS& PostgreSQL&pgAdmin	
	24	F	Lab 01	Lab 01 Due by Jan 30
	27	M	Spatial data and geodatabases	
	28	T	Spatial data and geodatabases	
	31	F	Lab 02	Lab 02 Due by Feb 06
FEB	3	M	Introduction to SQL	
	4	T	Introduction to SQL	
	7	F	Lab 03	Lab 03 Due by Feb 13
	10	M	Advanced SQL for spatial data	
	11	T	Advanced SQL for spatial data	
	14	F	Lab 04	Lab 04 Due by Feb 20
	17	M	Wellness Day – No classes	
	18	T	Proximity Analysis	
	21	F	Lab 05	Lab 05 Due by March 6
	24	M	Proximity Analysis	
	25	T	Proximity Analysis	
	28	F	Lab 05	
MAR	3	M	SPRING BREAK	
	4	T	SPRING BREAK	
	7	F	SPRING BREAK	
	10	M	Geometry Processing	
	11	T	Geometry Processing	

	14	F	Lab 06	Lab 06 Due by March 20
	17	M	Raster Processing	
	18	T	Raster Processing	
	21	F	Lab 07	Lab 07 Due by April 3
AAG	24	M	AAG Conference	
	25	T	AAG Conference	
	28	F	No Lab	
	31	M	PostgreSQL and ArcGIS	
APR	1	T	PostgreSQL and ArcGIS	
	4	F	Lab 08	Lab 08 Due by April 11
	7	M	PostGIS with Python	
	8	T	PostGIS with Python	
	11	F	Lab 09	Lab 09 Due by April 18
	14	M	PostGIS in Web Application	
	15	T	PostGIS in Web Application	
	18	F	No Lab	
	21	M	Working on final project	
	22	T	Working on final project	
	25	F	Working on final project	
	28	M	Final presentations	
	29	T	Final presentations	
MAY	2	F	Final presentations	
	5	M	Final report due	

*Course content may vary or be adjusted in order to meet the needs of the class. The instructor reserves the right to adjust the schedule or amend the content of this syllabus at any time and without notice.

Grades

Assignments 80% = nine labs
Final Project 20% = 15% oral + 5% written

A standard plus/minus letter grading scheme is used to assign final course grades for all students who take this course on a letter grading basis. Grades will be assigned according to the following scheme, with the percentages corresponding to final weighted grades following the evaluation procedures described in the section below:

A (93.0 to 100.0)	B (83.0 to 86.9)	C (73.0 to 76.9)	D (63.0 to 66.9)
A- (90.0 to 92.9)	B- (80.0 to 82.9)	C- (70.0 to 72.9)	D- (60.0 to 62.9)
B+ (87.0 to 89.9)	C+ (77.0 to 77.9)	D+ (67.0 to 69.9)	F (0.0 to 59.9)

A student who enrolls in this course on a pass/no-pass grading basis will earn a passing grade only if their final course grade is equivalent to a “C” or better.

Breakdown of Final Grade

Assignments (80%): Nine labs will have an associated rubric and the total points earned from all assignments will be weighted to 80% of the student’s grade.

Final Project (20%): The final project will consist of an oral presentation and final report. The final presentation earned on the project will be weighted to 15% of the student’s grade. The final report will be weighted to 5% of the students’ grade.

Late Policy

Grades for Lab Assignments will be reduced by 10% for each day they are late (e.g. 1-24 hrs. past deadline, 25-48 hrs. past deadline, etc.). No submissions greater or equal to 10 days late will be accepted without direct permission from the instructor based on valid and confirmable extenuating circumstances.

Academic Honesty and Integrity

Students are encouraged to collaborate with one another in reviewing course material and working on assignments. However, every student must turn in an original, unique, and individual creation for every assignment; students working together may not submit the same work. Collaboration with another student on an assignment will require students cite their collaborators and external sources by providing the names of collaborators either within the assignment or alongside the link that you submit to the course website. Students are also required to provide the URL to any external resources or code used in the assignment and comment this code thoroughly to demonstrate an understanding of its function and logic. Failure to cite your sources will trigger this section of the Syllabus.

All students are expected to demonstrate integrity in all academic endeavors. Students are evaluated on their own merits. Cheating, plagiarism, unauthorized and/or inappropriate collaborative work, or any

other form of academic dishonesty are considered unacceptable behavior and will result in a failing grade for the assignment, and a second offense will result in a failing grade for the course and a referral to university administration for disciplinary action.

Use of Large Language Models

Large language models, or generative AI like ChatGPT, are incredibly useful learning tools if used responsibly. This course will not cover their use or application to GIS in detail, but using LLMs for assignments and the final project may be tempting. As beginners in a new technical skill, LLMs may seem magical in their ability to provide answers and ideas, but they should be treated as overzealous interns from which students can test their newly acquired knowledge.

Despite having access to massive datasets (e.g. the internet) to mimic speech based on user-specified prompts, as well as the recent ability to query the internet to search for answers, the models may cherry-pick data for you based on the quality of your prompt. A low quality prompt will produce low quality outputs. Even a detailed, descriptive, and clear prompt may still yield errors in accuracy.

They should not replace existing internet or library search protocols, and whatever LLMs produce will contain “hallucinations” or errors in accuracy. Only individuals with advanced knowledge in a technical or theoretical skill will notice these errors.

The instructor placed the LLM section after the “Academic Honesty and Integrity” section purposefully. If the instructor suspects LLMs have done the work for the student, similar consequences will follow if proven. Likewise, students are required to provide the URL to the chat used to generate any code or writing outputs and follow the same procedures for citing their sources as in the previous section.

Additional Campus Resources

Students with Disabilities

Clark University is committed to providing students with documented disabilities equal access to all university programs and facilities. Students are encouraged to register with **Student Accessibility Services** (SAS) to explore and access accommodations that may support their success in their coursework. SAS is located on the second floor of the Shaich Family Alumni and Student Engagement Center (ASEC). Please contact SAS at accessibilityservices@clarku.edu with questions or to initiate the registration process.

FERPA

Clark’s policy regarding student privacy under the **Family Education Rights and Privacy Act**

Title IX

Clark University and its faculty are committed to creating a safe and open learning environment for all students. Clark University encourages all members of the community to seek support and report incidents of sexual harassment to the Title IX office (titleix@clarku.edu). If students or someone students know has experienced any sexual harassment, including sexual assault, dating or domestic violence, or stalking, help and support is available.

Please be aware that all Clark University faculty and teaching assistants are considered responsible employees, which means that if students tell the instructor about a situation involving the aforementioned offenses, the instructor must share that information with the Title IX Coordinator, Brittany Rende (titleix@clarku.edu). Although, the instructor has to make that notification, the student will, for the most part, control how their case will be handled, including whether or not they wish to pursue a formal complaint. Our goal is to make sure they are aware of the range of options available to them and have access to the resources they need.

If students wish to speak to a confidential resource who does not have this reporting responsibility, they can contact Clark's Center for Counseling and Professional Growth (508-793-7678), Clark's Health Center (508-793-7467), or confidential resource providers on campus:

- Prof. Stewart (als.confidential@clarku.edu)
- Prof. Palm Reed (kpr.confidential@clarku.edu)
- Prof. Cordova (jvc.confidential@clarku.edu)

GIS Help Desk



GIS HELP DESK

NEW SPRING 2025 HOURS:

Need help with GIS? Can't make it to visit your professor or TA for office hours? Stop by our GIS Help Desk in the Jefferson Tower (6th floor), or in Jefferson 220A (2nd floor Jefferson building, Geog Main office) on Wednesdays, and visit one of our Help Desk Assistants!

MONDAYS	SASHA 9 AM - 11 AM
TUESDAYS	SASHA 9 AM - 12 PM
WEDNESDAYS @ JF220A	SASHA 9 AM - 12 PM WYNNIE 2 PM - 5 PM
THURSDAYS	WYNNIE 2 PM - 5 PM
FRIDAYS	WYNNIE 3 PM - 5 PM

GIS Help Desk hours follow a University schedule. If the University is closed from remote/online operations for any reason, the GIS Help Desk may also be unavailable. GIS Help Desk Assistants operate on a first-come, first-serve drop-in basis. Contact Marjorie Miller (marmiller@clarku.edu) with any questions, or call the Geography Main Office at 508-793-7336 for more information. The GIS Help Desk is sponsored by the Graduate School of Geography at Clark University.