Introduction to Geographic Information Systems
GIS 4010/5010 Section 52 — Fall 2024

Class Time: **Thursday, 4:15 – 7:00 PM**
Location: **Des Peres Hall - Room 113**

Instructors: Ryan Johnson, Haley Thompson (TA)
Office Hours: By appointment, Tuesday/Thursday, 2:00pm – 4:00pm
E-mail: thomas.johnson.1@slu.edu, haley.m.thompson@slu.edu
(please begin subject email with GIS_4010_5010!)

Catalog Course Description:
This class introduces concepts, science and theory of GIS with a focus on hands-on experience. After successful completion of the course, students will be able to demonstrate fundamental techniques of geospatial analysis and mapping.

Course Objectives:
- Develop a basic understanding of the concepts, science and theory behind GIS including organization, management, and visualization of geospatial data.
- Become familiar with ArcGIS desktop software, and basic introductory technical skills in this software.
- Become familiar with technical skills to design, implement and present a GIS project.
- Build student enthusiasm in continuing to work with GIS.

Required Texts:
GIS Tutorial for ArcGIS Pro 3.1, 2021. Paperback ISBN: 9781589487390, eText eISBN: 9781589487406

Supplemental Texts:
Christian Harder, Clint Brown (eds.). The ArcGIS® Book, 2nd Edition, 2017. eBook: www.thearcgisbook.com
Pinde Fu. Getting to Know Web GIS, 3rd Edition, 2018. ISBN: 9781589485211

Software (Lab):
ArcGIS Pro 3.3 (accessible from MySLU)
ArcGIS Online (web-based, no install necessary)

A Note about Instructor Communication
I care about you and your understanding of the material covered in this course. I will respond to your questions and email as quickly as possible, though this almost always means a response in the evening. I am available to meet you by appointment during my office hours after class. If you do not have an appointment but want to see me unscheduled, please ask me before or after class and I will do my best to make time for you. If those times do not work, then we can schedule an appointment over Zoom outside of normal office hours.

Assessment & Grading

Exams: There will be a **one-hour fifteen-minute-long midterm** and a **final project**. There will be no final exam. The final project will serve as confirmation you have learned all the material in the learning objectives for this course. The midterm will have a combination of conceptual questions and pseudo-coding.

Quizzes: There will be 12 quizzes (10 counted) throughout the course that will occur at the end of class. They are designed to be completed in class. Quiz questions will come from assigned readings and previous or current lectures. You will often be asked to pseudocode or provide an outline of the code you would write to solve the problem in the question. We will discuss this more in class. Several quiz questions will reappear on the midterm. If you miss a quiz, there will be no makeup.

Homework: You will have 13 homework assignments of which I will count the highest 12 grades. The first two homework assignments will not require you to use git, but after that, you should submit a direct GitHub link to your homework assignment through Canvas. If you submit your first two weeks of homework with a GitHub link you can earn a point of extra credit per assignment.

It is possible for everyone in the class to earn an A. No make-up will be allowed for any reason for the only exam in this course (the midterm), other than a verifiable, written doctor's note or permission granted by the instructor prior to the date of the exam. Be forewarned, it is HIGHLY UNLIKELY that I will grant that extension. In addition, I will make every attempt to have the midterm and quizzes graded within 1 week of the dates administered.

No late assignments will be accepted. All homework must be submitted online to the instructor. All assignments are due on the day indicated by 11:59 pm Central Time. You have one week to submit assigned homework, though I will make every attempt to post assignments early, so you have more than a week to work on them. Saint Louis University is in the Central Time Zone and all times noted are relative to that time zone, no matter the location of the student. Adjust your submission time accordingly. You will have to work on the assignments outside of class.

Saint Louis University uses the +/- system from A to C, with no plus or minus for grades of D or F. Plus and minus will be apportioned with a "+" assigned for the upper third of the letter grade range and a "-" for the lower third of the letter grade range.

Grade Composition: Grades will be made available on Canvas. I will push to post grades within two weeks of being turned in. Your grade will be calculated in the following manner:

1. 39% - Lab Work (13×3)
2. 25% - Homework (5×5)
3. 15% - Quizzes (3×5)
4. 21% - Project development
5. Class participation = Lab Work

Grading Scale: I will apply the following grading scale:

Grade	Grade Points	0-100% Scale
A	4.0	≥93%
A-	3.7	≥90%
B+	3.3	≥87%
B	3.0	≥84%
B-	2.7	≥80%
C+	2.3	≥77%
C	2.0	≥74%
C-	1.7	≥70%
D	1.0	≥60%
F	0.0	Below 60%
FQ	0.0	Fail Due to Quit

Class Project: The final project is 21% of your total grade. Your project should use sophisticated GIS processing and analysis, and present substantive results. If you are a graduate student, you are expected to present these results in a web application format. Both undergraduates and graduate students are expected to make their project available and reproducible via a GitHub repository.

Categories you will be measured on:

- Project idea/proposal (3)
- Final report (18):
  - GIS data and geoprocessing (3)
  - Analysis (5)
  - Report (5)
  - GitHub repository (5) (includes using figures and/or tables following scientific journal style and over all presentation of the work)

Example class projects:

- https://arcg.is/1eqLau
- https://storymaps.arcgis.com/stories/81532d6c03924e2c8376fdbf0eec6a30
- https://storymaps.arcgis.com/stories/87f65bd9772140aba8aff7dd0d359407
- https://slustl.maps.arcgis.com/apps/Cascade/index.html?appid=9199fbe6dfab4142b4922efaf478da36

Statement on Graduate Student Expectations

As a cross-listed course, graduate students registered at the 5000-level are required to demonstrate their mastery of course content through additional scientific communication requirements of writing a final paper and presenting your final project to the class. Undergraduate students are not required to fulfill this extra aspect of scientific communication.

Attendance: You are responsible for all the material and administrative announcements presented during class. Note that while attendance is not strictly mandatory, there is a quiz component of your grade that depends on being present to take it. Should you choose not to attend class, you will not earn points for the quiz, should it occur on that day.

Collaboration Policy: Unless explicitly stated otherwise, all work that you submit should be the result of your own effort. For ALL course work, you ARE NOT permitted to consult the solutions from another student (former or current), copy/consult the provided solutions from previous years, or look online for exact problem solutions. We will monitor results from ChatGPT and other AIs, and if you produce an answer that is the same as or nearly the same as what is produced, you will get a zero for that assignment. AI is a useful tool but it is often wrong, and your ability to critically think through hard problems will always be valuable no matter how good AI gets.

When working on course materials, you may discuss approaches to solving the problems with your classmates. However, you must work out all details of any solutions discussed and write up the solution completely on your own. When working with a student on an assigned homework problem you should do so verbally -- nothing should be written down. This will keep your discussion at a high-level so that everyone can work out the details on their own.

Your final project may be completed in groups of two or it may be completed on your own. I will check git to see that both students contributed roughly evenly to the project. There will be additional requirements for the project if you choose to work on a team, but it is designed to be less work for each person if you decide to partner. In industry and academia, collaboration is critical, and I want to foster that where it makes sense in this course.

Generative AI: Generative AI, including but not limited to ChatGPT, Gemini, Microsoft Copilot, Midjourney, DALL-E or GitHub Copilot may not be used for work in this class. The use of such generative AI tools may compromise your learning by undermining your responsibility to explain your process of analysis in your own language. You may not use generative AI as the foundation for any work you submit for this class, whether for written exposition or for code. You may not use generative AI in any way to augment your original work. For example, asking an AI to add comments to code is not allowed. Please review item three in the section labeled Plagiarism in the Saint Louis University Academic Integrity Policy.

Changes to Course Policies: The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be announced in class, via email, or posted to the course website.

Tentative Course Schedule

Week	Date		Subject	Reading
0	Thursday	Aug. 22	Syllabus, ArcGIS Pro and Python Fundamentals	
1	Tuesday	Aug. 27	Introducing ArcGIS	G&K Chap. 1
	Thursday	Aug. 29	Lab: Chapter 1 Tutorials	
2	Tuesday	Sep. 3	Map design	G&K Chap. 2
	Thursday	Sep. 5	Lab: Chapter 2 Tutorials	
			Homework #1 Assigned	
3	Tuesday	Sep. 10	Maps for end users	G&K Chap. 3
	Thursday	Sep.12	Lab: Chapter 3 Tutorials	
			Homework #2 Assigned	
4	Tuesday	Sep. 17	File geodatabases	G&K Chap. 4
	Thursday	Sep. 19	Lab: Chapter 4 Tutorials	
			Quiz #1	
5	Tuesday	Sep. 24	Spatial data	G&K Chap. 5
	Thursday	Sep. 26	Lab: Chapter 5 Tutorials	TAB Chap. 4
			Getting Started with the Geodatabase	
6	Tuesday	Oct. 1	Geoprocessing	G&K Chap. 6
	Thursday	Oct. 3	Lab: Chapter 6 Tutorials	
			Basics of Geographic Coordinate Systems	
7	Tuesday	Oct. 8	Digitizing	G&K Chap. 7
	Thursday	Oct. 10	Lab: Chapter 7 Tutorials	
			Homework #3 Assigned	
8	Tuesday	Oct. 15	Geocoding	G&K Chap. 8
			Take Home Exam Issued by 12pm on Tuesday, Oct. 15	TAB Chap. 5
	Thursday	Oct. 17	Lab: Chapter 8 Tutorials	
			Quiz #2	
9	Tuesday	Oct. 22	Exam Review	
			Homework #4 Assigned	
	Thursday	Oct. 24	***Fall Break, No Class***	
10	Tuesday	Oct. 29	Spatial analysis	G&K Chap. 9
	Thursday	Oct. 31	Lab: Chapter 9 Tutorials	
			Homework #5 Assigned	
11	Tuesday	Nov. 5	Raster GIS	G&K Chap. 10
	Thursday	Nov. 7	Lab: Chapter 10 Tutorials	
12	Tuesday	Nov. 12	3D GIS	G&K Chap. 11
			Project Proposal Due	
	Thursday	Nov. 14	Lab: Chapter 11 Tutorials	TAB Chap. 6-8
			Quiz #3	
			3D Visualization Techniques Using ArcGIS	

13	Tuesday	Nov. 19	Getting to Know Web GIS - Story Maps	WG Chap. 1,2
	Thursday	Nov. 21	Lab: Story Maps Tutorials	
14	Tuesday	Nov. 26	Web AppBuilder and Mobile GIS	WG Chap. 3,4
	Thursday	Nov. 28	***Thanksgiving, No Class***	
15	Tuesday	Dec. 3	Project & Presentation***	
			*****NOTE: Projects due on Dec. 3**	
	Thursday	Dec. 5	Project & Presentation	

NOTE: Section 52 will follow the schedule for the week on Thursday. For weeks 9 and 14, we will shuffle lecture topics and due dates of assignments depending on how closely we follow the schedule.

College Policies

Title IX
Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of discrimination on the basis of sex, including sexual harassment, sexual assault, stalking, domestic or dating violence, we encourage you to report this to the University. Discrimination on the basis of sex includes discrimination on the basis of assigned sex at birth, sex characteristics, pregnancy and pregnancy related conditions, sexual orientation and gender identity. If you speak with a faculty member about an incident that involves a Title IX matter, **that faculty member must notify SLU's Title IX Coordinator that you shared an experience relating to Title IX.** This is true even if you ask the faculty member not to disclose the incident. The Title IX Coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you are pregnant or experiencing a pregnancy related condition, the Title IX Coordinator can assist you in understanding your rights and options as well as provide supportive measures.

Anna Kratky is the Title IX Coordinator at Saint Louis University (DuBourg Hall, room 36; anna.kratky@slu.edu; 314-977-3886). If you wish to speak with a confidential source, you may contact the counselors at the University Counseling Center at 314-977-TALK or make an anonymous report through SLU's Integrity Hotline by calling 1-877-525-5669 or online at http://www.lighthouse-services.com/slu. To view SLU's policies, and for resources, please visit the following web addresses: https://www.slu.edu/about/safety/sexual-assault-resources/index.php.

Disability Accommodations
Students with a documented disability who wish to request academic accommodations must formally register their disability with the University. Once successfully registered, students also must notify their course instructor that they wish to use their approved accommodations in the course.

Please contact the Center for Accessibility and Disability Resources (CADR) to schedule an appointment to discuss accommodation requests and eligibility requirements. Most students on the St. Louis campus will contact CADR, located in the Student Success Center and available by email at accessibility_disability@slu.edu or by phone at 314.977.3484. Once approved, information about a student's eligibility for academic accommodations will be shared with course instructors by email from CADR and within the instructor's official course roster. Students who do not have a documented disability but who think they may have one also are encouraged to contact to CADR. Confidentiality will be observed in all inquiries.

University Counseling Center
The University Counseling Center (UCC) offers free, short-term, solution-focused counseling to Saint Louis University undergraduate and graduate students. UCC counselors are highly trained clinicians who can assist with a variety of issues, such as adjustment to college life, troubling changes in mood, and chronic psychological conditions. To make an appointment for a wellness consultation, call 314-977-8255 (TALK), or visit the clinic on the second floor of Wuller Hall. For after-hours needs, please press #9 after dialing the clinic number.

Wellness
All students experience stressors and challenges at some point, and seeking support is both normal and beneficial. Such challenges may be the result of academic concerns (such as those related to assignments or content in a course), or they may be more personal in nature (such as concerns related to relationships, mental health, medical issues, loss, identities, alcohol or drugs, housing or food security, finances, or local/world events, among other things). If you experience these or other difficulties that are impacting your well-being and/or academic work, please consider seeking support from the resources available to you.

- For questions or concerns related to this course, please contact me. I am invested in your success and will support your success in the ways I can.
- Additionally, you have access to the many resources SLU provides in support of your personal wellness. You will find a list of available resources on the Well-being page of the SLU website.

If you or someone you know is experiencing a crisis: please consult Crisis Support and Warning Signs on the University Counseling Center website or call the University Counseling Center at 314-977-TALK (8255) and press #9 to be connected to a behavioral health nurse 24/7.

Basic Needs Security
Students in personal or academic distress and/or who may be specifically experiencing challenges such as securing food or difficulty navigating campus resources, and who believe this may affect their performance in the course, are encouraged to contact the Dean of Students Office (deanofstudents@slu.edu or 314-977-9378) for support. Furthermore, please notify the instructor if you are comfortable in doing so, as this will enable them to assist you with finding the resources you may need.

Academic Integrity
Academic integrity is the commitment to and demonstration of honest and moral behavior in an academic setting. Since the mission of the University is "the pursuit of truth for the greater glory of God and for the service of humanity," acts of integrity are essential to its very reason for existence. Thus, the University regards academic integrity as a matter of serious importance. Academic integrity is the foundation of the academic assessment process, which in turn sustains the ability of the University to certify to the outside world the skills and attainments of its graduates. Adhering to the standards of academic integrity allows all members of the University to contribute to a just and equitable learning environment that cultivates moral character and self-respect. The full University-level Academic Integrity Policy can be found on the Provost's Office website at: https://www.slu.edu/provost/policies/academic-and-course/academic-integrity-policy.pdf.

Additionally, each SLU College, School, and Center has its own academic integrity policies, available on their respective websites.

Generative AI
Generative AI, including but not limited to ChatGPT, Gemini, Microsoft Copilot, Midjourney, DALL-E or GitHub Copilot may not be used for work in this class. The use of such generative AI tools may compromise your learning by undermining your responsibility to explain your process of analysis in your own language. You may not use generative AI as the foundation for any work you submit for this class, whether for written exposition or for code. You may not use generative AI in any way to augment your original work. For example, asking an

AI to add comments to code is not allowed. Please review item three in the section labeled Plagiarism in the Saint Louis University Academic Integrity Policy.

University Writing Services

Students are encouraged to take advantage of University Writing Services in the Student Success Center, getting feedback benefits writers at all skill levels. Trained writing consultants can help with writing projects, multimedia projects, and oral presentations. University Writing Services offers one-on-one consultations that address everything from brainstorming and developing ideas to crafting strong sentences and documenting sources. For more information, visit https://www.slu.edu/life-at-slu/student-success-center/ or call the Student Success Center at 314-977-3484.

Student Success Center

In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. The Student Success Center assists students with academic-related services and is located in the Busch Student Center (Suite, 331). Students can visit https://www.slu.edu/life-at-slu/student-success-center/ to learn more about tutoring services, university writing services, disability services, and academic coaching.