GGS 463: GIS ANALYSIS AND APPLICATION
COURSE SYLLABUS, FALL 2025, 3 CREDITS

INSTRUCTOR	COURSE STRUCTURE	
Name: Dr. Timothy Leslie	Meeting time(s) and Modality	MW 3:00-4:15pm, 100% in-person
Email: tleslie@gmu.edu	Location:	Exploratory Hall 2103
	Course URL:	canvas.gmu.edu
	Pre-Requisites:	C or better in GGS 300 and GGS 311
	Textbook(s):	None, Readings available electronically

COURSE OVERVIEW & OBJECTIVES

Applying GIS through analysis is the art and science of investigating and sharing patterns in spatial data. This course will serve as a set of scaffolding elements to guide you in conducting a geospatial intelligence investigation. You will learn how to use spatial analysis to explore a specific geographic problem and communicate your findings effectively. The content of this course was developed in alignment and with the support of the Mason Impact *Research and Scholarship Intensive* curriculum. This curriculum emphasizes the importance of student-led research projects and the development of the associated critical thinking and analysis skills. Below is a list of specific set of learning objectives this course is designed to guide you towards obtaining:

Objective 1: Articulate and Refine a Geographic Research Question. A successful geospatial investigation begins with a well-defined research question. This objective focuses on using geographic information analysis to strategically define a problem and build technical and transferable skills. You will work with a topic of your choosing, focused on a meaningful real-world problem, and learn how to scope it appropriately for a semester-long project.

Objective 2: Gather and Manage the Spatial Data Necessary to Answer a Geographic Research Question. To support your development as a GIS analyst, we will investigate the process of identifying and acquiring open-source information necessary to answer geographic problems in a robust and scientific manner. This includes practical problem-solving for data acquisition, vetting, and preparation.

Objective 3: Identify Appropriate Spatial Methods and Execute Them Properly. A substantive portion of class will delve into the methods and tools of spatial intelligence, including spatial statistical analysis, temporal analysis, and data visualization. You will be expected to utilize these methods in a manner consistent with scholarly and industry literature to effectively analyze your data.

Objective 4: Apply Appropriate Scholarly and Geospatial Presentation Conventions. Presenting information is crucial to its impact outside of the analyst space. You will conclude your project by creating two separate deliverables to convey what your analysis tells us about the world around us. These deliverables will be designed to be useful for disciplinary scholars and external stakeholders, bringing together your academic context, spatial methods, and results into a cohesive geospatial report. Your final products should be suitable for both a technical audience and an informed non-specialist such as policy makers, NGO staff, or journalists.

ASSESSMENTS AND GRADE WEIGHTS

Technical Mastery

Students will complete a series of practical exercises focusing on core GIS skills, such as data manipulation, spatial analysis, and map creation. These exercises are critical for building the technical foundation necessary for the geospatial intelligence project and for future professional work. This class will teach the technical application elements in ESRI ArcPro. You are free to use open source (QGIS), command line (R), or other software of choice. **15%**

Learning Exercises

Students will participate in various in-class activities, ranging from quizzes to group discussions to hands-on GIS tasks. These activities are designed to be interactive and encourage critical thinking, collaboration, and the application of course concepts in a geospatial intelligence context. 10%

Geospatial Intelligence Briefs

Throughout the semester, students will give concise presentations on real-world GIS applications they have discovered. These will showcase how publicly available data and geospatial analysis are used to investigate and solve geographic problems, fostering a shared understanding of the diverse and impactful role of geospatial analysis. 5%

Exam

The exam will be a mix of multiple choice, true/false, fill in the blank, and free response. I do not provide review sheets for exams. The exam will test both application elements and the conceptual understanding of geospatial intelligence principles covered in the course. 20%

Project		
	Project Step 1 – Group, Context, and Data	5%
Each student will participate in a course project that serves as a semester-long geospatial intelligence investigation. Evaluation of the project will be distributed throughout several updates and milestone submissions that come together to make a cohesive product. Each milestone submission is accompanied by a conversation and discussion with the course instructor.	Project Step 2 – Analysis Plan	5%
	Project Step 3 – Results	10%
	Project Step 4 – Draft	5%
	Project Step 5 – Primary Delivery	20%
	Project Step 6 – Secondary Delivery	5%

TENTATIVE SCHEDULE
(SUBJECT TO CHANGE)

MONTH	DATE		TOPIC
AUG	T	26	Welcome to the World of Geospatial Intelligence
	R	28	
SEP	T	2	Problem Solving and the Ethical Compass
	R	4	
	T	9	Quantifying Spatial Patterns
	R	11	
	T	16	Correlation and Regression in Space
	R	18	
	T	23	Spatial Autocorrelation
	R	25	**No Class - Project Work Day**
OCT	T	30	Advanced Techniques
	R	2	
	T	7	Categorical and Temporal Analysis
	R	9	
	T	14	**Exam**
	R	16	Spatial Network Analysis
	T	21	Presentation and Industry
	R	23	
	T	28	Analyst Workshopping
	R	30	
NOV	T	4	**No Class - Election Day**
	R	6	Geospatial Intelligence Briefings
	T	11	Technical Analytic Upgrades
	R	13	
	T	18	Automation and The Spatial Analyst's Future
	R	20	
	T	25	**No Class - Project Work Day**
	R	27	**No Class - Thanksgiving**
DEC	T	2	Virtual Project Consultations
	R	4	In Class Project Presentations
	R	11	1:30pm Start, Final Project Submission

GRADING

The expected grade breaks are the following:

A	A-	B	B-	C	D
100 - 92	91.9 - 87	86.9 - 82	81.9 - 77	76.9 - 71	70.9 - 65

Submission Policies:
- Assignments and activities will (primarily) be conducted through Canvas. Students should familiarize themselves with its features, including file submission, to ensure smooth participation. Assignments should only be emailed to the instructor if explicitly requested.
- For assignments allowing multiple submissions, only the most recent submission will be graded, so ensure the final version is correct and complete, as earlier versions will not be reviewed.
- Unless otherwise specified, assignments should be submitted as PDFs with in-line text and tables, not screenshots of tables. Links to documents stored on external services such as Google Docs or Drive will be treated as non-submissions.
- Files must be readable and formatted according to the guidelines. Corrupted or improperly formatted files, such as those with missing visual elements or unclear tables, may result in deductions or be treated as non-submissions.

Late Submission Policy:
- Late submissions will incur a deduction, which increases every 24 hours after the deadline. These deductions are based on the total points possible for the assignment.
- Extensions require valid documentation and timely communication. If extraordinary challenges arise, please reach out promptly to discuss options.
- All submissions must meet the posted end-of-semester cutoffs to be graded.

Grade Concerns and Opportunities:
- All requests for grade reconsiderations must be made via email. When requesting reconsideration, refer to specific points of objection and provide specific examples or references, such as rubric criteria or feedback points. This ensures a focused discussion and equitable grading practices. Assignments will be evaluated uniformly, consistent with university accommodation policies. For further grade disputes beyond the instructor's review, students should refer to the university's grade appeal policy.
- Extra credit opportunities are rare and not provided upon individual request. If they arise, they will be announced to the entire class and made available equitably.
- If you are not satisfied with your progress during the semester, please see me as early as possible to discuss concerns.

Feedback and Grading Timeline:
- Grades for submitted material will typically be provided within 4 business days of submission, though the timeline may extend to 7 business days for larger assignments such as projects or labs. If you have questions about your grade or need additional clarification, please wait at least 4 business days before contacting me to allow for grading and review.
- General feedback is concise; for detailed discussions, please follow up in class or during office hours.
- Grades are calculated according to the syllabus criteria, and students are graded equitably based on their performance. Requests for rounding up grades cannot be accommodated to maintain fairness for all.

GENERATIVE AI AND ACADEMIC STANDARDS

The use of content-generating AI tools is prohibited unless explicitly allowed in an assignment. Unauthorized use of generative AI tools will be treated as academic misconduct. Where AI use is permitted, guidelines will clarify acceptable applications to ensure fairness and uphold integrity. If you are unsure about whether generative AI is permitted for an assignment, please ask for clarification before submission.

ATTENDANCE AND PARTICIPATION

- Your active presence in class is a key component of your success. Our sessions are designed for hands-on learning, collaborative problem-solving, and direct engagement with the material, which are difficult to replicate if missed. You are responsible for reviewing any missed material and staying up to date.
- ***Notify me only if your absence involves an exam or major assignment.*** For excused absences due to illness or valid reasons, provide a general doctor's note specifying the period covered. If you will miss classes due to a religious observance or participation in a university activity, you are obligated to notify me within the first two weeks of the semester (University Policy AP.1.6.1). In such cases, a reasonable alternative opportunity will be provided.
- Arriving on time shows respect for your classmates and helps maintain the flow of our class activities. Please make every effort to be punctual, as quizzes and exams will begin at the scheduled class start time, regardless of when you arrive. Late arrivals will not receive additional time to complete timed assessments.
- In the rare event that I need to cancel class; I will notify you via email or Canvas as soon as possible. Please check these platforms regularly for updates. In case of an unexpected absence, I appreciate your patience and understanding while arrangements are made.
- To maintain a focused learning environment, please avoid bringing unauthorized guests to class and ensure technology use remains course related.

FOSTERING A COLLABORATIVE AND RESPECTFUL ENVIRONMENT

At George Mason University, we deeply value the diversity of backgrounds, experiences, and perspectives each student brings to the classroom. This breadth of viewpoint enriches our learning and strengthens our ability to analyze complex geographic challenges.

This course may involve discussions on sensitive or controversial topics, and all students are expected to approach these conversations with openness, empathy, and respect. We aim to create a collaborative and supportive atmosphere that values curiosity, constructive dialogue, and mutual respect. Thoughtful contributions, whether sharing ideas, asking questions, or offering insights, enhance learning for everyone.

- Please use professional and considerate language in all interactions, as tone and word choice significantly impact how messages are received.
- I am committed to ensuring that every student feels supported and can thrive in this course. If something said or done in the classroom, by myself or others, causes discomfort, offense, or concern, I encourage you to bring it to my attention.
- Students are encouraged to use their chosen first name and pronouns. I use male pronouns (he/him), and my last name is pronounced LESS-LEE. My preference is that you address me as 'Professor,' 'Professor Leslie,' or 'Dr. Leslie.' Please inform me of your preferences and update your Mason file in PatriotWeb for consistency.

TECHNICAL EXPECTATIONS

- Regular access to a computer with an updated operating system and a stable internet connection is required to participate in and complete course activities successfully. Test your setup early to avoid disruptions during assignments or exams.

- Materials on Canvas or other platforms are intended for students' use only. Sharing materials (e.g., lecture slides, recordings) with anyone not enrolled in the course is strictly prohibited.

- If students need to use ESRI proprietary software off-campus or on non-Windows machines, they can access it through the Patriot Virtual Computing & Labs (PVCL). Instructions are provided upon request. Students new to certain software packages are encouraged to review introductory tutorials before starting lab activities to build confidence and minimize delays.

- If students anticipate challenges in meeting technical requirements (e.g., lack of reliable internet access or appropriate hardware), they should inform me early in the semester so we can explore alternative solutions.

- Ensure your work is saved and backed up using reliable storage options such as OneDrive or Dropbox.

- Video or audio recordings are permitted only with prior written consent or as part of an approved accommodation plan. Recorded sessions are for personal, private use only and must not be shared with others without explicit permission.

CONTACTING ME

I am here to support your learning and help you with any challenges you may encounter during the course. You can reach me outside of class in the following ways:

1. <u>Zoom Appointments</u>: Schedule a meeting through my [Calendly - Office Hours](). If no available times fit your schedule, email me with at least three alternative meeting times, and I will do my best to accommodate you. Appointments are ideal for complex questions, such as in-depth assignment guidance or feedback on your work. A device with a functional microphone is required for participation. While using cameras during conversations is not mandatory, it is appreciated when speaking to facilitate communication.

2. <u>Email:</u> I respond to emails promptly Monday through Thursday. For weekend inquiries, expect a reply by noon on Monday. Before emailing, review the syllabus for common answers and include relevant details such as assignment names or due dates. For complex issues, consider scheduling a meeting through my Calendly link for in-depth discussion. Email is best for quick questions, while detailed discussions should be addressed in a scheduled meeting.

MODIFICATIONS

Occasionally, circumstances may require adjustments to the course schedule or policies. Any changes will be communicated promptly via email or Canvas. Students are responsible for regularly checking Canvas or email for updates, as all changes will take effect immediately upon notification.