

Geography 1103: Spatial Thinking

Lecture: MTWRF 9:45-11:15 am @ McEniry 420

Lab: TBA

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Office Hours: Tuesday and Thursday 14:00 – 15:15. Or by appointment

1. Course Overview: This course is intended to provide students with an overview of spatial thinking fundamentals and introduces geospatial technology as a means for illustrating these concepts. Spatial thinking is a set of cognitive skills aimed at identifying, analyzing, and understanding the location, scale, patterns, and trends of geographic and temporal relationships among data, phenomena and issues. The most critical question spatial thinkers ask is “the why of where”. This course will explore this question in relation to a number of applications within the natural world, and in regards to human-environment interactions

Students will have hands on experience working with these concepts in a geospatial environment through laboratory exercises. Throughout the semester, the notion and steps of geographic inquiry are reinforced. This spatial expansion upon the scientific method will form the framework to which students will perform a final research project.

2. Learning Outcomes: Upon completion of this course, students can be expected to:

- Understand what role spatial thinking plays in the natural world and in respect to human-environment interactions.
- Be competent in the process of “geographic inquiry”.
- Apply critical spatial thinking to issues present in the real world.
- Explain how geospatial technology enables spatial thinking and problem solving.
- Understand the basic foundations of representing spatial phenomena in a geospatial environment.
- Have a basic understanding of how spatial data are collected, displayed, and analyzed, and gain an understanding of their limitations and the inherent uncertainty in empirical analyses.

4. Student Assessment: Final grades will be determined based on the following types of assessments:

Laboratory Exercises – A series of 8 laboratory assignments worth 15 points each will be assigned. Considering the limited in-class time of summer course, students will spend time of their own to finish the rest of the assignments. Late assignments will be penalized as follows:

- Up to 1 day late (24h): -25%
- 1 – 2 days late: -50%

- **More than 2 days late: No Longer Accepted**

Exams: 1 midterm (40 points) and 1 final exam (40 points) will be given. Plan to attend.

Reading Assignments: There will be 8 assigned readings throughout the semester. Please read the article and answer the corresponding questions that will be posted with the readings on Moodle. Please be aware of the due date on Moodle. **Late submissions will not be accepted.** Each assignment is worth 5 points.

Final Project: Each student will complete a research project and paper on some geographic problem that follows the five steps of geographic inquiry: 1. Ask a geographic question; 2. Acquire geographic resources; 3. Explore geographic data; 4. Analyze geographic information; and 5. Act upon geographic knowledge. Students will be responsible for posing a question with spatial relevance, formulating a hypothesis, collecting data, and analyzing results using the spatial techniques taught throughout the semester. Students will create a web-based spatial visualization to illustrate the problem under study, the results, possible long-term implications, and the limitations of their study due to omitted factors or inherent uncertainty in their data. More details on the project will be provided later in the semester. The project will be worth a total of 50 points.

Attendance: Attendance to the lecture and lab are critical to your success in this course. Two 'unexcused' (an excused absence includes a note from a doctor, a religious observation that was I was informed about at the start of the semester) absences will be permitted for the combined labs\lectures. Any unexcused absence beyond two will result in a 10 point deduction from your final total points.

Final score = Midterm Exam (40) + Final Exam (50) + Final Project (50) + 8 readings (8*5)

+ 8 labs (15*8) = 300

Scale: A: > 90%, B: 80-89.5%, C: 70-79.5%, D: 60-69.5%, F <60%

4. Course Material

All readings and material will be posted on Moodle; there is no required textbook to be purchased.

5. Class Behavior: Please turn off and put away your cell phone before entering the classroom

6. Ethics: If you are contemplating an ethical failure please read the code of student academic integrity: <http://www.legal.uncc.edu/policies/ps-105.html>, so you can plan for the consequences. Students are encouraged to work on their own, yet helping each other understanding the concepts is fine. In other words, you may work with other students on lab assignments but you may not copy projects or written answers to questions from another student.

7. Disabilities: UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office at Fretwell 230.

8. Tentative Schedule. Note the Syllabus and Course Schedule are subject to modification. Please follow on Moodle for any updates.

Week	Date	Lectures	Assignments (Lab/Readings)
1	M June 29	Spatial Thinking & The Geographic Inquiry Process	Read Syllabus Carefully (no submission)
	T June 30	The Geospatial Revolution and Technologies	Readings 1: "The Digital Earth" & "The Web-Wide World"
	W July 1	The Power of Maps: Cartographic Basics	Lab 1: 'The Why of Where': Mapping Your Footsteps
	R July 2	Intro to Excel Power Map	Reading 2: "How Maps Lie" Lab 2: Excel Power Map
	F July 3	July 4th Holiday – No Class	
2	M July 6	Mapping Basics & Map Design	
	T July 7	Map Projections	Lab 3: Master the Power of Maps: Create Your Own Deceptive Maps
	W July 8	Where are we? Coordinate Systems	
	R July 9	Spatial Data I: GPS	
	F July 10	Lab 4: Collecting Data 1 – GPS Scavenger Hunt"	Lab 4: GPS Scavenger Hunt"
3	M July 13	Spatial Data II: Remote Sensing.	Reading 3: Collect Info of Remote Sensing Satellite
	T July 14	Aerial Photo Processing	Lab 5: Mapping with Aerial Images
	W July 15	Midterm Review & Student Presentation	
	R July 16	Midterm Exam	
	F July 17	Midterm Comments & Spatial Data III: Citizen Science, VGI, Social Media	Reading 4: Crowd Science
4	M July 20	Crowdsourcing Continued & Final Project Overview	Lab 6: Social Media Mapping. What can we infer?
	T July 21	Intro to GIS, Spatial Data Models, & Spatial Relationships	
	W July 22	Point Patterns Analysis	Lab 7: Point Patterns of earthquakes
	R July 23	Change over time: Space-Time Patterns	Reading 5: "Restored Forests Breathe Life into Efforts Against Climate Change"
	F July 24	Satellite\Land Cover Change	Lab 8: Land Cover Changes based on Satellite Images
5	M July 27	Networks, Groundwater Contamination Potential	Reading 6: "Quantifying the impact of human mobility on Malaria"
	T July 28	Spatial and Spatio-Temporal Association (correlation)	
	W July 29	Spatial and Spatio-Temporal Association (correlation) – Climate Change & Disease Outbreaks	Reading 7: "Global Water Resources: Vulnerability from Climate Change and Population Growth"
	R July 30	Multi-Criteria Decision Making – Planning for sustainable future	
	F July 31	Final Review & Final Projects	

6	M Aug 3	Work on Final Projects	Due of Final Project
	T Aug 4	Final Exam	