



**GG5 550 – Geospatial Science Fundamentals**  
**Fall 2022 – Tuesday – 4:30 to 7:10**  
**Classroom – Exploratory Hall 2310**

**Instructors:** Mike Wolf, PhD; Adjunct Professor  
**Email:** mwolf7@gmu.edu (best way to reach me)  
**Office:** Exploratory Hall 2205  
**Office Hours:** By appointment; virtual or office

**Course Materials (required):**

- “Manual of Geospatial Science and Technology, 2nd Edition” (2010), edited by J. D. Bossler, J. B. Campbell, R. B. McMaster, and C. Rizos, CRC Press. (Available for download in PDF)

**Course Description:**

Spatial data and geospatial science have become a fundamental component in numerous application areas, ranging from homeland security, environmental, transportation, health, and marketing applications. The primary objective of this course is to review key foundations and principles in geospatial sciences, with a particular emphasis on both the theoretical and methodological aspects of spatial data acquisition, modeling, interpretation, and analysis. In particular, the goals of this course are:

- Provide an understanding of the fundamentals and theory of geospatial sciences
- Introduce key analytical techniques and tools that are used in geospatial science
- Develop the ability to describe, evaluate and apply selected processing methods
- Identify and gain insight into some of the emerging trends in geospatial sciences
- Demonstrate how these acquired skills can be applied to other disciplines

**Course Objectives:**

By the end of the course each student will:

- Have a broad knowledge base of fundamentals, theory, and techniques in geospatial science
- Be able to articulate and effectively communicate the basic concepts and ideas related to spatial data and geospatial science to domain experts, non-experts, and other professionals
- Appropriately apply principles and perform basic computation and analysis tasks for various hypothetical and real-world problems in geospatial science
- Most importantly, learn how to learn from each other in a collaborative environment

## Planned Schedule:

Date	Topic	Lecture Scope
8/23/2022	Overview and Introduction	
8/30/2022	Coordinates and Coordinate Systems	Homework #1 Assigned
9/6/2022	Datums and Reference Systems	Homework #1 Due
9/13/2022	Geospatial Data Modeling	
9/20/2022	GPS	
9/27/2022	Electromagnetic Radiation	Homework #2 Assigned
10/4/2022	Data Collection	Homework #2 Due
10/11/2022	NO CLASS	
10/18/2022	Image Interpretation & Analysis	
10/25/2022	Statistics	Homework #3 Assigned
11/1/2022	Spatial Optimization Part 1	
11/8/2022	Spatial Optimization Part 2	Homework #3 Due
11/15/2022	Deep Learning	
11/22/2022	Deep Learning & Final Exam Review	
11/29/2022	Final Exam	

## Grading Policy:

### ***Homework Assignments (45%):***

All homework is due at the beginning of class on Blackboard. Homework that is turned in late is subject receiving a maximum grade no higher than the lowest mark received by assignments turned in on time.

### ***Final Exam (30%)***

The final exam will count for 30% of the student's grade. The final exam will be the last day of class.

### ***Class Participation (25%):***

Students are expected to attend the class. In-class participation is important not only to the individual student, but also to the class as a whole. Instructor may use absence, tardiness, or early departure as de facto evidence of non-participation.

### ***Expectations for Participation:***

- Students prepare for and actively engage in class discussion (e.g., demonstrate active listening, not distracted by electronics or peers)
- Students thoughtfully engage in in-class assignments and activities
- Students participate in class discussion by:
  - raising informed discussion points
  - connecting discussion to reading material, news, and relevant experiences
  - asking questions
  - listening to other perspectives

- sharing the floor with others

**GMU Email Accounts & Blackboard:**

You must use and regularly check your GMU email account and Blackboard to receive information for this class. Please do not send emails from non-GMU accounts, they will be ignored. I will normally respond within 24 hours.

**Honor Code:**

You are expected to follow the George Mason University rules of student conduct as noted in the catalog.

**Office of Disability Services:**

If you require academic accommodations due to a permanent or temporary disability, please contact the Office of Disability Services (ODS) at (703)993-2474, <http://ods.gmu.edu>. GGS will then contact me to arrange appropriate accommodations.

**Classroom Expectations and other Miscellaneous:**

Students are expected to be on time for class (I know, traffic can be a problem).

1. In the event of any class cancellation, including changes in the pandemic situation, inclement weather (e.g. snow), the class will resume where we left off, adjustments, if necessary, will be made later.
2. Please turn cell phone sounds off and do not text or talk on your cell phone during class.
3. Please be respectful of your peers and your instructor and do not engage in activities that are unrelated to the class. Such disruptions show a lack of professionalism and may affect your participation grade.
4. Lecture materials will be posted on Blackboard within 24 hours after the lecture. If you feel note taking is necessary, research has shown that pen and paper is the most effective.

**Special Notice**

This syllabus is subject to change based on the needs and desires of the students taking the class. An updated syllabus will be posted if changed and the changes clearly described to the students.