



GG5 550 – Geospatial Science Fundamentals
Fall 2023 – Tuesday – 4:30 to 7:10
Classroom – Exploratory Hall 2103

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

Course Materials (optional):

- “Introduction to Geospatial Technologies Fifth Edition” (2019), Introduction to Geospatial Technologies Fifth Edition, W. H. Freeman
- “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. This book is available online.

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
8/22/2023	Overview and Introduction	
8/29/2023	Coordinates and Coordinate Systems	Homework #1 Assigned
9/5/2023	Datums and Reference Systems	Homework #1 Due
9/12/2023	Geospatial Data Modeling	
9/19/2023	GPS	
9/26/2023	Electromagnetic Radiation	Homework #2 Assigned
10/3/2023	Data Collection	Homework #2 Due
10/10/2023	NO CLASS	
10/17/2023	Image Interpretation & Analysis	
10/24/2023	Statistics	Homework #3 Assigned
10/31/2023	Spatial Optimization	
11/7/2023	Social Media Analysis	Homework #3 Due
11/14/2023	Deep Learning	
11/21/2023	Deep Learning & Final Exam Review	
11/28/2023	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.

Recording and/or sharing class materials

- Unauthorized student recording of classroom or other academic activities (including advising sessions or office hours) is prohibited. Unauthorized recording is unethical and may also be a violation of University policy. Students requesting the use of assistive technology as an accommodation should direct such requests to the Office of Disability
- Sharing of instructor-created or other materials created or provided as part of the course (including recordings), and in particular materials relevant to assignments or exams, to public online “study” sites is considered a violation of Mason’s Honor Code. For more information, see the Office of Academic Integrity’s summary of information about online study sites

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.

Use of Generative-AI

Mason is an Honor Code university; please see the Office for Academic Integrity for a full description of the code and the honor committee process. Three fundamental principles to follow at all times are that: (1) all work submitted be your own, as defined by the assignment; (2) when you use the work, the words, or the ideas of others, including fellow students or online sites, you give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment or exam, ask for clarification. No grade is important enough to justify academic misconduct. Use of Generative-AI tools should be used following the fundamental principles of the Honor Code. This includes being honest about the use of these tools for submitted work and including citations when using the work of others, whether individual people or Generative-AI tools.

All work submitted in this course must be your own original work; use of AI writing tools, such as ChatGPT, are prohibited in this course and will be considered a violation of academic integrity. All academic integrity violations will be reported to the office of Academic Integrity.