GIS and Spatial Analysis, M.S.

Degree Offered

- Master of Science

Nature of the Program

The Master's in Geographic Information Science and Spatial Analysis is a fully online program that offers training in a variety of spatial analysis, quantitative analysis, remote sensing, computational, and spatial programming techniques to investigate problems with a spatial component. Ideal for new students seeking a master's level degree or working professionals hoping to expand their credentials, the major offers a strong focus on the applications of geospatial science in the environmental sciences and resource management as well as applications for spatial analytics, geocomputation and coding, and digital cartography. The program is completed with a combination of required coursework electives, and a professional level project. Students who remain in good standing and continue to make degree progress may be able to complete the degree in four semesters.

FACULTY

CHAIR

- Brent McCusker - Ph.D. (Michigan State University)

ASSOCIATE CHAIR

- Jaime Toro - Ph.D. (Stanford University)

PROFESSORS

- Kathleen Benison - Ph.D. (The University of Kansas)
  Regular Graduate Faculty, Sedimentary Geology - Planetary Geology
- Dengliang Gao - Ph.D. (Duke University)
  Regular Graduate Faculty, Exploration Geophysics, Petroleum and Structural Geology
- Amy Hessl - Ph.D. (University of Arizona)
  Regular Graduate Faculty, Biogeography, Forest Ecosystems, Climate Variability
- Brent McCusker - Ph.D. (Michigan State University)
  Regular Graduate Faculty, Land Use Change, Africa, Policy Making
- Shikha Sharma - Ph.D. (University of Lucknow)
  Regular Graduate Faculty, Isotope Geochemistry
- Jaime Toro - Ph.D. (Stanford University)
  Regular Graduate Faculty, Structure and Tectonics
- Dorothy Vesper - Ph.D. (Pennsylvania State University)
  Regular Graduate Faculty, Aqueous Geochemistry, Hydrogeology

ASSOCIATE PROFESSOR

- Jamison Conley - Ph.D. (Pennsylvania State University)
  Regular Graduate Faculty, Spatial Analysis, Geocomputation, Health Geography
- Karen Culcasi - Ph.D. (Syracuse University)
  Regular Graduate Faculty, Geopolitics, Identity, Middle East
- Cynthia Gorman - Ph.D. (Rutgers University)
  Regular Graduate Faculty, Gender, Migration, Human Rights, Refugee Communities
- James Lamsdell - Ph.D. (The University of Kansas)
  Regular Graduate Faculty, Paleobiology, Arthropods, Macroevolution, Heterochrony, Paleoecology, Phylogenetics
- Joseph Lebold - Ph.D. (West Virginia University)
  Regular Graduate Faculty, Paleoecology, Paleontology, Regional Geology
- Brenden McNeil - Ph.D. (Syracuse University)
  Regular Graduate Faculty, GIS, Environmental modeling, Forest Ecosystem Services
- Maria Alejandra Perez - Ph.D. (University of Michigan)
  Regular Graduate Faculty, Cultural Geography, Science & Technology Studies, Speleology, Latin America and the Caribbean
- Amy Weislogel - Ph.D. (Stanford University)
  Regular Graduate Faculty, Sedimentology

- Bradley Wilson - Ph.D. (Rutgers University)
  Regular Graduate Faculty, Social Movements, Local/Global Food Systems, Food Justice

ASSISTANT PROFESSOR

- Vikas Agrawal - Ph.D. (West Virginia University)
  Associate Graduate Faculty, Chemical Hygiene Officer, Isotopic and Biogeochemical Characterization of Geological Materials, Energy and Environment
- Michael Harman - Ph.D. (West Virginia University)
  3D visualization, modeling complex landforms and processes, GIS
- Aaron Maxwell - Ph.D. (West Virginia University)
  Regular Graduate Faculty, Geospatial Instruction, Remote Sensing, Image Analysis, Spatial Modeling
- Charles Shobe - Ph.D. (University of Colorado - Boulder)
  Regular Graduate Faculty, Geomorphology, Earth Surface Processes, Landscape Evolution, Rivers, Source-to-Sink, Numerical Modeling

PROFESSOR EMERITI

- Robert Behling - Ph.D. (The Ohio State University)
- Timothy Carr - Ph.D. (University of Wisconsin - Madison)
- Joe Donovan - Ph.D. (Pennsylvania State University)
- Greg Elmes - Ph.D. (Pennsylvania State University)
- Trevor Harris - Ph.D. (University of Hull)
- Thomas Kammer - Ph.D. (Indiana University)
- Steven Kite - Ph.D. (University of Wisconsin)
- Kenneth C. Martis - Ph.D. (Michigan University)
- Henry Rauch - Ph.D. (Pennsylvania State University)
- Robert C. Shumaker - Ph.D. (Cornell University)
- Richard Smosna - Ph.D. (University of Illinois)
- Timothy Warner - Ph.D. (Purdue University)
- Thomas Wilson - Ph.D. (West Virginia University)

Admissions for 2026-2027

MS IN GEOGRAPHIC INFORMATION SCIENCE (GIS) AND SPATIAL ANALYSIS

The M.S. in Geographic Information Science and Spatial Analysis is a fully online program that offers training in a variety of spatial analysis, quantitative analysis, remote sensing, computational, and spatial programming techniques to investigate problems with a spatial component. All applicants must meet West Virginia University's general admission requirements (http://catalog.wvu.edu/graduate/graduateeducationatwestvirginiauniversity/#classificationstext) and should have a bachelor’s degree in a geospatial, natural, or applied science with some prior exposure to geographic information systems.

The GRE is not required for admission.

List of Admission Requirements:

- See the steps to apply for admission and access the application here (https://graduateadmissions.wvu.edu/how-to-apply/).
- Transcripts from all institutions attended.
- Two letters of recommendation written by persons acquainted with the applicant's professional work, experience, or academic background.
- Resume or curriculum vitae.
- A statement of purpose/personal statement (at least 500 words) that describes the applicant's reasons for pursuing graduate study, reasons for specifically pursuing the MS in GIS and Spatial Analysis at WVU, and career goals.

Application Deadlines:

- The MS admits students for all semesters.
- The deadline for Fall semester admission is June 15th.
- The deadline for the Summer term is March 15th.

- The deadline for Spring semester admissions is November 15th.
- All application materials, including completed recommendation letters, must be submitted by the deadline in order to ensure full consideration.
- In exceptional circumstances, we will review applicants received after the January 15th and October 1st deadlines on space-available basis.

Certain application requirements may be waived based on a preliminary review of an application by the program.

Major Code: 14E9

Degree Requirements

- **Credit Hours:** Students must complete 31 hours of coursework, including a minimum of 3 credits in Resource Management.
- **Grade Point Average:** Students must earn a minimum cumulative GPA of 3.0 and a minimum GPA of 3.0 in courses applied to the degree.
- **Graduation Requirement:** In addition to completing the required coursework, students must complete a graduation project. This may include a written report or deliverables/products, such as data, software, maps, web maps, code, and/or web apps. An oral defense of the work is not required.
- **Note**: Certificate students who have completed RESM 585: GIS and Spatial Analysis Project, must complete a new project and register for Geography 797: Research.

Code	Title	Hours
CORE COURSES:		**16**
GEOG 550	Geographic Information Science	
GEOG 797	Research	
Select two of the following:		
GEOG 651	Geographic Information Science: Technical Issues	
GEOG 655	Remote Sensing Principles	
RESM 540	Geospatial Modeling	
ELECTIVES:		**15**
GEOG 462	Digital Cartography	
GEOG 651	Geographic Information Science: Technical Issues	
GEOG 654	Environmental Geographic Information Systems Modeling	
GEOG 655	Remote Sensing Principles	
GEOG 657	Open-Source Spatial Analytics	
RESM 540	Geospatial Modeling	
RESM 545	GIS for Watershed Analysis	
RESM 575	Spatial Analysis for Resource Management	
Total Hours		31

Degree Progress

All graduate students enrolled in at least one credit hour during the academic year must be provided with a written evaluation from their program following the end of each spring term. This requirement may be waived for students in good standing who are expected to graduate in spring or summer. Specific processes and timelines for each program's evaluation can be found in the graduate handbook. Annual evaluation may result in probation for students either not making adequate degree progress or failing to uphold professional standards.

MASTER'S BENCHMARKS

- By the end of the first semester, full time students should have completed at least 9 hours of coursework towards degree completion.
- By the end of the second semester, students should have completed at least 18 hours of coursework towards degree completion.
- Part time students should expect slower degree progress.
- By the end of the third semester, full time students should have completed at least 24 hours of coursework towards degree completion, formed a project advisory committee, have submitted a project proposal and gained approval from their committee to undertake the project in the last term of attendance.
- Part time students should, prior to completion of the 24 hours of course work, formed a project advisory committee, submitted a project proposal, and gained approval from his or her committee to undertake the project in the last term of attendance.
- The graduation project must be completed before the end of the last semester of attendance.

Major Learning Goals

GIS AND SPATIAL ANALYSIS

The educational goals and objectives:

1. Design, execute, and defend a professional project that effectively addresses a need, problem, or research question with a spatial component.
2. Collect, create, use, and manage data to address a spatial problem.
3. Apply a variety of spatial analysis, quantitative analysis, remote sensing, computational, and spatial programming techniques to investigate a problem that has a spatial component.
4. Critique and compare a variety of spatial analysis and quantitative analysis techniques to solve a problem.
5. Make recommendations as to the best data and methods for investigating a question with a spatial component.
6. Construct multi-part and complex analyses to address a question or problem.
7. Produce written reports that effectively communicate the methods and results of an analysis.
8. Design and create maps and graphics that effectively communicate findings and data.