EARTH SYSTEMS AND GEOINFORMATION SCIENCES, PHD

Banner Code: SC-PHD-ESGS

Graduate Advising

2400 Exploratory Hall
Fairfax Campus

Phone: 703-993-3615
Email: ggs@gmu.edu
Website: science.gmu.edu/academics/departments-units/geography-geoinformation-science

The Earth Systems and Geoinformation Sciences (ESGS) doctoral program is based upon the integration of the scientific disciplines in geosystems, geography, geosciences, and geoinformatics. Students receive broad-based training in systematic geosciences and geography, as well as technical courses in computation and geoinformation sciences. The ESGS doctoral program represents a gateway to an academic career for some students; for others, it facilitates career advancement in the public sector or private industry. Graduates are equipped to participate in interdisciplinary research, which is the norm in today's research arena.

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Graduate Admissions Policies (https://catalog.gmu.edu/admissions/graduate-policies/) section of this catalog. International students and students having earned international degrees should also refer to Admission of International Students (https://catalog.gmu.edu/admissions/international-students/) for additional requirements.

Eligibility

This program is intended for graduates who hold a MS or MA degree from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent in atmospheric science, climatology, meteorology, Earth science, geology, environmental science, remote sensing, hydrology, oceanography, geography, or a related field.

Highly-qualified students with a BS or BA from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent in applicable fields are also encouraged to apply.

Knowledge of mathematics through calculus is preferred.

Interested applicants should contact the GGS graduate coordinator for more specific advice if needed.

Application Requirements

To apply, prospective students should submit the George Mason University Admissions Application (https://www2.gmu.edu/admissions-aid/apply-now/) and its supplemental documentation, three letters of recommendation, and a goals statement.

GRE scores are not required for admission into this program, but are strongly encouraged if a student is seeking internal funding support.

Policies

For policies governing all graduate programs, see AP.6 Graduate Policies (http://catalog.gmu.edu/policies/academic/graduate-policies/).

Transferring Previous Graduate Credit into this Program

Previously earned and relevant graduate credits may be eligible for transfer into this program; details can be found in the Credit by Exam or Transfer (https://catalog.gmu.edu/policies/academic/graduate-policies/) section of this catalog.

Secondary Program Options

Students enrolled in this doctoral program have the option of adding a secondary graduate certificate or master's program (http://catalog.gmu.edu/colleges-schools/science/geography-geoinformation-science/#programstext). Depending upon the secondary program chosen, many courses may be applicable to both programs. Before adding a secondary program, students are advised to carefully review AP.6.8 Requirements for Graduate Certificate (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-8)s or AP.6.9 Requirements for Master's Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-9) and AP.6.10 Requirements for Doctoral Degrees (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-10). Faculty advisors should be contacted for further guidance and for secondary program suggestions.

Requirements

Degree Requirements

Total credits: 72

Students should refer to the Admissions & Policies tab for specific policies related to this program.

Core Courses

Students are required to choose from the following courses in the core areas below. Of the cores, students must complete at least one course in five of the cores and two courses in at least three of those five cores.

Code	Title	Credits
The core areas from which to choose these credits are:		24
Quantitative Core:		
GGS 560	Quantitative Methods	
GGS 754	Earth Science Data and Advanced Data Analysis	
GGS 791	Advanced Spatial Statistics	
Geoinformatics Core:		
GGS 650	Introduction to GIS Algorithms and Programming	
GGS 664	Spatial Data Structures	
GGS 675	Location Science	
GGS 692	Web-based Geographic Information Systems	

GGS 787	Scientific Data Mining for Geoinformatics	
Geosciences and Physical Geography Core:		
GGS 656	The Hydrosphere	
GGS 657	The Lithosphere	
GGS 670	Introduction to Atmosphere and Weather	
PHYS 575	Atmospheric Physics	
Human Geography Core:		
GGS 504	Population Geography	
GGS 505	Transportation Geography	
GGS 507	Geographic Approaches for Sustainable Development	
GGS 516	Geography of Latin America	
GGS 517	Geography of China	
GGS 518	Geography of North Africa and the Middle East	
GGS 526	Geography of Eastern Europe and Russia	
GGS 533	Issues in Regional Geography	
GGS 540	Health Geography	
GGS 615	Economic Geography	
GGS 704	Spatial Demography	
Geographic Information Science Core:		
GGS 553	Geographic Information Systems	
GGS 563	Advanced Geographic Information Systems	
Remote Sensing Core:		
GGS 579	Remote Sensing	
GGS 622	Drone Remote Sensing	
GGS 626	Physical Fundamentals of Remote Sensing	
GGS 629	Remote Sensing of the Environment and Earth System	
GGS 680	Earth Image Processing	
GGS 760	Advanced Topics in Remote Sensing	
GGS 777	Remote Sensing Natural Hazards	
Total Credits		24

Research Synthesis and Colloquium

Code	Title	Credits
Research Synthesis		**3**
GGS 689	Seminar in Geographic Thought and Methodology	
Colloquium		**2**
GGS 900	Geography and Geoinformation Science Colloquium (complete twice)	
Total Credits		5

Electives

Code	Title	Credits
In consultation with the advisor, students select credits necessary to reach 72 total credits [1]		19-31

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At least half of the elective credits taken at Mason must be from GGS courses.

Dissertation Research

Students take 12-24 credits, with at least 6 credits in GGS 999 Dissertation. After reaching candidacy, students must stay continuously enrolled GGS 999 Dissertation until defending their dissertation.

Code	Title	Credits
Select 12-24 credits from the following:		12-24
GGS 998	Dissertation Proposal	
GGS 999	Dissertation	
Total Credits		12-24

Dissertation Committee

All students will be assigned a temporary academic advisor when they first enroll in the program. No later than the end of the second year, each student should identify a dissertation advisor and form a doctoral committee. The committee will be chaired by a GGS tenure or tenure-track professor and be composed of at least four members. GGS tenure or tenure-track faculty should be at least 50% and have larger committee membership than any other Mason department/academic unit or external organization. At least one member should be a tenure or tenure-track faculty member from another Mason department or program outside of GGS. All members of the committee must be Mason Graduate Faculty and approved by the department's chair.

Candidacy Examination

After completing all required courses, each student must take a candidacy exam administered by the dissertation committee. The exam will have written and oral components. Its purpose is to determine whether the student has acquired adequate general knowledge in the selected subject area, as well as much more detailed knowledge of the specific research topic planned for the dissertation.

Dissertation Proposal and Advancement to Candidacy

After students have completed all required courses and passed the candidacy exam, they should prepare an acceptable dissertation proposal. After the dissertation proposal is approved and the appropriate paperwork is completed, the student will be advanced to candidacy.

Doctoral Dissertation

The degree will be awarded upon completion of the required coursework and successful defense of a PhD dissertation that makes an original and significant contribution to the field.