

EARTH SYSTEMS AND GEOINFORMATION SCIENCES, PHD

Banner Code: SC-PHD-ESGS

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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 Graduate Admissions Policies (<http://catalog.gmu.edu/admissions/graduate-policies/>).

To apply for this program, please complete the George Mason University Admissions Application (<https://www2.gmu.edu/admissions-aid/apply-now/>).

Eligibility

This program is intended for graduates who hold a MS or MA degree 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 in applicable fields are also encouraged to apply. Knowledge of mathematics through calculus is preferred. Interested applicants should contact the GGS academic coordinator or the graduate coordinator for more specific advice.

Application Requirements

To apply, prospective students should complete the George Mason University Admissions Application (<https://www2.gmu.edu/admissions-aid/apply-now/>). Official transcripts from each college and graduate institution attended, a current résumé, three letters of recommendation, and an expanded goals statement will be required.

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/>).

Reduction of Credits

For students entering the doctoral program with a master's degree in a related field from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent, the number of required credits may be reduced up to 30 credits, subject to approval of the program faculty and the associate dean for student affairs. See AP.6.5.2 Reduction of Credits (<http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-5-2>) for more information.

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:		
GGG 560	Quantitative Methods	
GGG 754	Earth Science Data and Advanced Data Analysis	
GGG 791	Advanced Spatial Statistics	
Geoinformatics Core:		
GGG 650	Introduction to GIS Algorithms and Programming	
GGG 664	Spatial Data Structures	
GGG 675	Location Science	
GGG 692	Web-based Geographic Information Systems	
GGG 787	Scientific Data Mining for Geoinformatics	
Geosciences and Physical Geography Core:		
GGG 656	The Hydrosphere	

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

Research Synthesis and Colloquium

Code	Title	Credits
Research Synthesis		
Select one from the following:		3
GGG 684	Selected Topics in Geospatial Intelligence	
GGG 689	Seminar in Geographic Thought and Methodology	
Colloquium		2
GGG 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:		
GGG 998	Dissertation Proposal	12-24
GGG 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.