COMPUTATIONAL SOCIAL SCIENCE, PHD

Banner Code: SC-PHD-CSS

Academic Programs Administrator

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The core objective of the program is to train graduate students to be professional computational social scientists in academia, government, or business. The program offers a unique and innovative interdisciplinary academic environment for systematically exploring, discovering, and developing skills to successfully follow careers in one of the areas of computational social science.

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Graduate Admissions Policies (http://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

Applicants should have an undergraduate degree from an institution of higher education accredited by a Mason-recognized U.S. institutional accrediting agency or international equivalent with a GPA of at least 3.25. The undergraduate degree should be in one of the social sciences, computer science, engineering, or a relevant discipline, and undergraduate courses in these and related areas. Bachelor's degrees in the physical or biological sciences are also eligible, but applicants may be advised to take additional courses in social science or computer science as prerequisites to admission.

Minimal requirements also include one undergraduate course in calculus and knowledge of a computer programming language, preferably object-based.

Application Requirements

To apply for this program, prospective students should submit the George Mason University Admissions Application (https://www2.gmu.edu/admissions-aid/apply-now/) and its required supplemental documentation, and:

- A goals statement not to exceed 2,000 words,
- The names of two Mason faculty members who may be suitable advisors,
- Two letters of recommendation received directly from faculty members or individuals with direct knowledge of the student's academic or professional capabilities, and
- An official report of GRE-GEN scores.

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.

Academic Advising

During the first year, each student will form a graduate studies committee, called the first-year committee, consisting of the student's advisor plus two or three appropriately qualified individuals. The committee assists the student in designing a specific plan of study and evaluating the student's progress by the end of the first year. During the second year, the student forms a doctoral committee, with membership approved by the CSS program director. The committee will advise the student on preparing for the doctoral candidacy exams and preparing, developing, and defending the doctoral dissertation.

Requirements

Degree Requirements

Total credits: 72

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

Core Courses

Code	Title	Credits
CSS 600	Introduction to Computational Social Science	3
CSS 605	Object-Oriented Modeling in Social Science	3
CSS 610	Agent-based Modeling and Simulation	3
CSS 620	Origins of Social Complexity	3
Total Credits		12

Extended Core Courses

Code	Title	Credits
Select 6 credits from the following:		6
CSS 625	Complexity Theory in the Social Sciences	
CSS 635	Cognitive Foundations of Computational Social Science	
CSS 645	Spatial Agent-Based Models of Human-Environment Interactions	
CSS 665	Complex Adaptive Systems in Public Policy	
CSS 692	Social Network Analysis	
Total Credits		6

Discipline-based Courses

Code	Title	Credits
Select 15 credits of discipline-based social science courses in a specific area such as anthropology, economics, geography, history, linguistics, political science, or sociology, as approved by the student's advisor, to provide domain-specific knowledge.		15
Total Credits		15

Electives

Code	Title	Credits
Select 15 credits of electives or independent research, as approved by the student's advisor, to provide further substantive or methodological specialization as needed.		15
Total Credits		15

Students with a strong background in computing, for example, a prior MS in computer science, but weaker social science training will be required to use all or most of these electives in a substantive social science. Conversely, students with a strong background in social science, for example, a BS in economics, will be required to use most or all of these electives in computing courses.

Candidacy Examination

The candidacy exam is taken after students have completed all core requirements and a majority of additional coursework (18 plus 15 credits), which typically corresponds to the fifth semester in the program. The purpose of the candidacy exam is to assess the student's substantive and methodological knowledge in CSS as a whole and in the chosen focus area, the ability to integrate materials from different courses, and the potential for a successful dissertation. The exam consists of written and oral parts.

Dissertation Proposal

Upon passing the candidacy examination, each student shall prepare and, within a year, defend a dissertation proposal, written in the form of an extramural research grant proposal. The student shall develop the dissertation proposal in consultation with the dissertation committee. With successful defense of the proposal, a student becomes a PhD candidate.

Dissertation Research

Dissertation research credits are required in order to demonstrate doctoral-level originality and research excellence:

Code	Title	Credits
Select 24 credits from the following:		24
CSS 998	Doctoral Dissertation Proposal	
CSS 999	Doctoral Dissertation	
Total Credits		24

Example Dissertation Areas

Areas for dissertation research include, but are not limited to, the following:

- Agent-based computational economics: trade, finance, decision making under risk
- Computational political economy: voting, institutions, norms, inequality
- Computational linguistics: generative grammars, parsing, classifiers, inference
- Social network analysis: connectivity, structure, evolution of the Internet, social media, cyber warfare
- Computational anthropology: emergence of hierarchy, settlement patterns
- Computational political science: systems of government, conflict and war, cooperation
- Computational sociology: segregation, collective action, leadership, trust
- Complexity theory: power laws, potential theory, criticality, bifurcation
- Computational methodology: multiagent systems, evolutionary computation
- Agent-based computational geography: land use change, humanitarian assistance, urban modeling

Doctoral Dissertation Defense

The PhD dissertation is the detailed written report of an original and significant research contribution to computational social science. It is defended before the dissertation committee in a forum open to fellow students and interested faculty and staff. The dissertation committee recommends that the graduate faculty of George Mason University accept the student candidate for the PhD degree upon a successful defense and completion of any final revisions.