DOCTOR OF PHILOSOPHY IN THE FIELD OF MATHEMATICS (STEM)

Faculty expertise in the PhD program in mathematics covers a wide range of research fields, including analysis, ordinary and partial differential equations, dynamical systems, applied math (including numerical analysis), combinatorics, logic, topology and knot theory. With about 30 graduate students and 20 faculty members, there is lively interaction as well as extensive individual attention.

All graduate students have individual advisors throughout their enrollment, starting from the time of admission. New students also receive peer advisors. In addition, research seminars and the department colloquium series help students explore potential research areas. Teaching assistantships are available for full-time students. Assistants gain teaching experience with a moderate workload, leading recitations for one introductory undergraduate course per semester.

The graduate certificate in mathematics (https://bulletin.gwu.edu/arts-sciences/mathematics/certificate-mathematics/) is offered for those who seek to strengthen their mathematical backgrounds at the advanced undergraduate and beginning graduate levels and better position themselves in their careers or prepare for graduate work in quantitative disciplines.

This is a STEM designated program.

Visit the program website (https://math.columbian.gwu.edu/phd-mathematics) for additional information.

ADMISSIONS

Visit the Columbian College of Arts and Sciences website for application requirements (https://columbian.gwu.edu/application-requirements).

Supporting documents not submitted online should be mailed to:

> Columbian College of Arts and Sciences, Office of Graduate Studies
> The George Washington University
> 801 22nd Street NW, Phillips Hall 107
> Washington DC 20052

For additional information about the admissions process visit the Columbian College of Arts and Sciences Frequently Asked Questions (https://columbian.gwu.edu/graduate-admissions-faq) page.

Contact for questions:

askccas@gwu.edu
202-994-6210 (phone)
Hours: 9:00 am to 5:00 pm, Monday through Friday

REQUIREMENTS

This Bulletin covers the degree requirements for students matriculating in the current academic year. Students who matriculated before the current year can find their requirements in the relevant archived Bulletin (https://bulletin.gwu.edu/archives/).

The following requirements must be fulfilled:

The general requirements stated under Columbian College of Arts and Sciences, Graduate Programs (https://bulletin.gwu.edu/arts-sciences/#degreeregulationstext).

The requirements for the Doctor of Philosophy Program (https://bulletin.gwu.edu/arts-sciences/#doctoraltext).

72 credits, including at least 45 credits of coursework, and at least 6 credits of dissertation research.

Pre-candidacy

During the pre-candidacy phase, students must complete a minimum of 45, but no more than 54, credits of coursework. This coursework is to be undertaken in preparation for the specialty examination.

To complete the initial 45 credits of coursework, students can seek permission from the graduate committee to enroll in MATH 6995 Reading and Research; however, enrollment in this course is limited to a maximum of 3 credits per semester.

Upon completion of 45 credits of coursework (by the end of the fifth semester, for full-time students), if students have not passed the specialty examination, they are permitted to register for an additional 3 credits of MATH 6995 during their sixth semester.

Students wishing to take courses outside the department must petition and obtain the approval of the graduate committee. The committee may limit the number of such courses that students take.

Subject to the approval of the graduate committee (requested via petition), students may take up to 12 credits of courses offered by other institutions in the Consortium of Universities of the Washington Metropolitan Area.

Subject to the approval of the graduate committee (requested via petition) and the agreement of the instructor, students may take up to 12 credits from the following upper-level undergraduate courses for graduate credit, provided that additional graduate-level coursework is completed in these classes.

Code	Title	Credits
MATH 3613	Introduction to Combinatorics	
MATH 3632	Introduction to Graph Theory	
MATH 3710	Introduction to Mathematical Logic	
MATH 3720	Axiomatic Set Theory	
MATH 3730	Computability Theory	
MATH 3740	Computational Complexity	
MATH 3848	Differential Geometry	

MATH 4239	Real Analysis I
MATH 4240	Real Analysis II
MATH 4981	Seminar: Topics in Mathematics

Candidacy assessment process

To advance to candidacy, students must successfully complete at least 45 credits of coursework, a qualifying examination, and a specialty examination.

The qualifying examination covers four subject areas—algebra, analysis, applied mathematics, and topology—and is offered twice each year, before the start of the fall and spring semesters. The exam in each subject area is worth 30 points and may be taken no more than twice. To pass the qualifying examination, students must achieve a total of at least 50 points across three subject areas by the start of their fourth semester in the program.

The specialty examination is an oral examination in the student's intended research area. It is conducted by a committee of three faculty members, including the prospective director of the student's dissertation. Students are required to pass the specialty examination by the time they have completed 54 credits of coursework (by the end of the sixth semester, for full-time students).

Post-candidacy

Once they have advanced to candidacy, students must complete the remaining credits required for the Ph.D., including at least 6 credits of MATH 8999 Dissertation Research; their dissertation; and the successful defense of their dissertation in a final oral examination.