

# 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 (<http://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

**Admission** Fall - January 15 (late applications may be considered  
**deadlines:** on a case-by-case basis)

**Standardized** GRE general test required; GRE subject test  
**test scores:** recommended (institutional code 5246).

The Test of English as a Foreign Language (TOEFL), the academic International English Language Testing System (IELTS), or the PTE Academic is required of all applicants except those who hold a bachelor's, master's, or doctoral degree from a college or university in the United States or from an institution located in a country in which English is the official language, provided English was the language of instruction.

Minimum scores for the program are:

- Academic IELTS: an overall band score of 7.0 with no individual score below 6.0; or

- TOEFL: 600 on paper-based or 100 on Internet-based; or

- PTE Academic: 68;

**Prerequisite** A bachelor's degree in mathematics or comparable requirements/coursework.

**Recommendations** Three (3) recommendations  
**required:**

**Prior academic records:**

Transcripts are required from all colleges and universities attended, whether or not credit was earned, the program was completed, or the credit appears as transfer credit on another transcript. Unofficial transcripts from all colleges and universities attended must be uploaded to your online application. Official transcripts are required only of applicants who are offered admission. If transcripts are in a language other than English, English language translations must be provided. The English translation alone should be uploaded into your application.

**Statement of purpose:** In an essay of 250 – 500 words, state your purpose in undertaking graduate study in your chosen field. Include your academic objectives, research interests, and career plans. Also discuss your related qualifications, including collegiate, professional, and community activities, and any other substantial accomplishments not already mentioned on the application. If you are applying for an assistantship or fellowship, you should also describe any teaching experience you have had.

**International applicants only:** Please review International Applicant Information (<https://columbian.gwu.edu/international-graduate-applicants> (<https://columbian.gwu.edu/international-graduate-applicants/>)) carefully for details on required documents, earlier deadlines for applicants requiring an I-20 or DS-2019 from GW, and English language 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:**

askccas@gwu.edu  
202-994-6210 (phone)

Hours: 9:00 am to 5:00 pm, Monday through Friday

## REQUIREMENTS

The following requirements must be fulfilled:

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

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

## Pre-candidacy

Pre-candidacy requirements include satisfactory completion of 48 credits of coursework and achievement of a passing grade in the general examination.

### Coursework

After completing 36 credits of coursework, students may petition the graduate committee for approval to take MATH 6995, but students may take no more than 12 credits in any combination of MATH 6995 and MATH 8999 in a single academic year.

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. Students wishing to take such courses must petition and obtain the approval of the graduate committee.

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	

### General examination

The general examination consists of two preliminary examinations. One examination is in two to four subjects selected from algebra, analysis, topology, and applied math, and the other is a specialty examination in a research area approved by the department.

## Post-candidacy requirements

Post-candidacy requirements include the successful completion of an additional 24 credits of graduate coursework, including at least 6 credits of MATH 8999; the completion of the dissertation; and the successful defense of the dissertation in a final oral examination.

No more than 15 credits in any combination of MATH 6995 and MATH 8999 may be among the student's final 18 credits of required coursework.

Once a student successfully completes 24 post-candidacy credits, they must register for 1 credit of CCAS 0940 each subsequent fall and spring semester until they have successfully defended their dissertation, thereby completing the degree program.