BACHELOR OF SCIENCE WITH A MAJOR IN MATHEMATICS (STEM)

GW's Department of Mathematics is committed to high-quality teaching and research, providing a curriculum that is designed to give students a solid background in the theory and practice of modern mathematics through three academic tracks: pure, applied, and computational. As a mathematics major, students have a wealth of intellectual challenges and opportunities in Washington, DC, the city with the highest concentration of mathematicians in non-academic positions. Students not only have internship options, they also have diverse potential career options as analysts, consultants, actuaries, stockbrokers, physicians, attorneys, and educators.

This is a STEM designated program.

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

ADMISSIONS

For information about the admission process, including deadlines, visit the Office of Undergraduate Admissions website (https://undergraduate.admissions.gwu.edu/). Applications can be submitted via the Common Application (https://go.gwu.edu/commonapp/).

Supporting documents not submitted online should be mailed to:

Office of Undergraduate Admissions
The George Washington University
800 21st St NW Suite 100
Washington, DC 20052

For questions visit undergraduate.admissions.gwu.edu/contact-us (http://undergraduate.admissions.gwu.edu/contact-us/).

REQUIREMENTS

The following requirements must be fulfilled:

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

Program-specific curriculum:

Code	Title	Credits
Required		
MATH 1231	Single-Variable Calculus I (or the equivalent)	
MATH 1232	Single-Variable Calculus II	
MATH 2185	Comprehensive Introduction to Linear Algebra	
MATH 2233	Multivariable Calculus	

Code	Title	Credits
MATH 2971	Introduction to Mathematical Reasoning	
or MATH 2971W	Introduction to Mathematical Reasoning	

One course (3 credits) selected from the following:

Code	Title	Credits
CSCI 1011	Introduction to Programming with Java	
CSCI 1012	Introduction to Programming with Python	
CSCI 1041	Introduction to FORTRAN Programming	
CSCI 1111	Introduction to Software Development	
CSCI 1121	Introduction to C Programming	
CSCI 1131	Introduction to Programming with C	

For students in the pure mathematics concentration, an alternative course may substitute for the CSCI course with the approval of the department.

Concentration requirement

All students must complete requirements for one of the following three concentrations:

Code	Title	Credits
Pure mathematics concentration		
Required		
MATH 4121	Introduction to Abstract Algebra I	
MATH 4239	Real Analysis I	
or MATH 4239W	Real Analysis I	

Two courses (6 credits) from the following:

Code	Title	Credits
MATH 3125	Linear Algebra II	
MATH 3257	Introduction to Complex Variables	
MATH 3806	Introduction to Topology	
MATH 4122	Introduction to Abstract Algebra II	
MATH 4240	Real Analysis II	

Five additional mathematics (MATH) courses (15 credits) numbered in the 3000 and 4000 ranges. For students who complete the major requirements for a bachelor of science in astronomy and astrophysics, biology, biophysics, chemistry, data science, economics, physics, statistics, finance, information systems, or any major in SEAS, this requirement is reduced to three additional MATH courses (9 credits) numbered in the 3000 and 4000 ranges.

Code	Title	Credits
Applied mathematics concentration		
Required		
MATH 3342	Ordinary Differential Equations	
MATH 3343	Partial Differential Equations	
MATH 3553	Introduction to Numerical Analysis	
MATH 3359	Introduction to Mathematical Modeling	
MATH 4239	Real Analysis I	
or MATH 4239W	Real Analysis I	

Four additional mathematics (MATH) courses (12 credits) numbered in the 3000 and 4000 ranges. For students who complete the major requirements for a bachelor of science in astronomy and astrophysics, biology, biophysics, chemistry, data science, economics, physics, statistics, finance, information systems, or any major in SEAS, this requirement is reduced to two additional MATH courses (6 credits) numbered in the 3000 and 4000 ranges.

Code	Title	Credits
Interdisciplinary mathematics concentration		
Required		
MATH 3342	Ordinary Differential Equations	
MATH 3553	Introduction to Numerical Analysis	
MATH 3359	Introduction to Mathematical Modeling	

Six additional mathematics (MATH) courses (18 credits) numbered in the 3000 and 4000 ranges. For students who complete the major requirements for a bachelor of science in astronomy and astrophysics, biology, biophysics, chemistry, data science, economics, physics, statistics, finance, information systems, or any major in SEAS, this requirement is reduced to four additional MATH courses (12 credits) numbered in the 3000 and 4000 ranges.

Minor or second major requirement—Students in the interdisciplinary concentration must complete an approved minor or second major in a field in which mathematics is applied. The pre-approved fields are astronomy and astrophysics, biology, bioinformatics, biophysics, chemistry, data science, economics, physics, statistics, finance, information systems, or any major in SEAS.

GENERAL EDUCATION

In addition to the University General Education Requirement (https://bulletin.gwu.edu/university-regulations/general-education/), undergraduate students in Columbian College must complete a further, College-specific general education curriculum—Perspective, Analysis, Communication (G-PAC) (https://bulletin.gwu.edu/arts-sciences/gpac/) as well as the course CCAS 1001 First-Year Experience. Together with the University General Education Requirement, G-PAC engages students in active intellectual inquiry across the liberal arts. Students achieve a set of learning outcomes that enhance their analytical skills, develop their communication competencies, and invite them to participate as responsible citizens who are attentive to issues of culture, diversity, and privilege.

Coursework (https://bulletin.gwu.edu/university-regulations/general-education/#generaleducationtext) **for the University General Education Requirement is distributed as follows:**

- One course in critical thinking in the humanities.
- Two courses in critical thinking, quantitative reasoning, or scientific reasoning in the social sciences.
- One course that has an approved oral communication component.
- One course in quantitative reasoning (must be in mathematics or statistics).
- One course in scientific reasoning (must be in natural and/or physical laboratory sciences).
- UW 1020 (https://bulletin.gwu.edu/search/?P=UW%201020) University Writing (4 credits).
- After successful completion of UW 1020, 6 credits distributed over at least two writing in the discipline (WID) courses taken in separate semesters. WID courses are designated by a "W" appended to the course number.

Coursework for the CCAS G-PAC requirement is distributed as follows:

- Arts—one approved arts course that involves the study or creation of artwork based on an understanding or interpretation of artistic traditions or knowledge of art in a contemporary context.
- Global or cross-cultural perspective—one approved course that analyzes the ways in which institutions, practices, and problems transcend national and regional boundaries.
- Local or civic engagement—one approved course that develops the values, ethics, disciplines, and commitment to pursue responsible public action.
- Natural or physical science—one additional approved laboratory course that employs the process of scientific inquiry (in addition to the one course in this category required by the University General Education Requirement).
- Humanities—one additional approved humanities course that involves critical thinking skills (in addition to the one course in this category required by the University General Education Requirement).
- CCAS 1001 First-Year Experience

Certain courses are approved to fulfill GPAC requirements in more than one category.

Courses taken in fulfillment of G-PAC requirements may also be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University may count toward the University General Education Requirement and G-PAC, if those transfer courses are equivalent to GW courses that have been approved by the University and the College.

Lists of approved courses in the above categories are included on each undergraduate major's (https://bulletin.gwu.edu/arts-sciences/#majorstext) page in this Bulletin.

SPECIAL HONORS

To graduate with Special Honors, a student must meet the general requirements stated under University Regulations; maintain a grade-point average of at least 3.5 in courses in the major; complete 3 credits of MATH 4995 Reading and Research in addition to the other required courses in the major; and present an oral defense of a senior thesis prepared for MATH 4995 Reading and Research.