BACHELOR OF SCIENCE WITH A MAJOR IN DATA SCIENCE (STEM)

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/).

This is a STEM designated program.

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://advising.columbian.gwu.edu/general-education-curriculum-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 University Writing
- After successful completion of UW 1020, 6 credits distributed over at least two different Writing in the Disciplines (WID) courses taken in separate semesters (summer counts as one semester). 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 can also be counted toward majors or minors. Transfer courses taken prior to, but not after, admission to George Washington University can 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.

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, Undergraduate Programs (https://bulletin.gwu.edu/arts-sciences/#degreeregulationstext).

Curriculum requirements for the major:

Code	Title	Credits
Prerequisite courses		
15 credits		
CSCI 1012	Introduction to Programming with Python	
MATH 1231	Single-Variable Calculus I	
or MATH 1221	Calculus with Precalculus II	
MATH 1232	Single-Variable Calculus II	
MATH 2184	Linear Algebra I	
STAT 1051	Introduction to Business and Economic Statistics	
or STAT 1053	Introduction to Statistics in Social Science	
or STAT 1111	Business and Economic Statistics I	
or STAT 1127	Statistics for the Biological Sciences	
Core courses		
18 credits		
DATS 1001	Data Science for All	
DATS 2101	Ethical Life in a Digital World	
DATS 2102	Data Visualization for Data Science	
DATS 2103	Data Mining for Data Science	
DATS 2104	Data Warehousing for Data Science	
DATS 4001	Data Science Capstone	
Domain concentration		
Students complete a minimum of 9 credits in a 3-course domain. Focus area options are astronomy and astrophysics; biology–biodiversity and global change; biology–biotechnology; data journalism; economics; geospatial data science; mathematical modeling; physics; and science, technology, and society.		
Students can petition to substitute a second major or a minor in another discipline for the domain.		
Astronomy and astrophysics domain		
Prerequisites		
PHYS 1011	General Physics I	
or PHYS 1021	University Physics I	
PHYS 1012	General Physics II	
or PHYS 1022	University Physics II	
Required		
ASTR 2121	Introduction to Modern Astrophysics	
ASTR 3141	Data Analysis in Astrophysics	
One course selected from the following:		
ASTR 2131	Astrophysics Seminar	
ASTR 3161	Space Astrophysics	
Biology–biodiversity and global change domain		
Prerequisites		
BISC 1111	Introductory Biology: Cells and Molecules	
BISC 1112	Introductory Biology: The Biology of Organisms	
Required		
BISC 2450	Organic Evolution	
Two courses selected from the following:		
BISC 2010	Global Change Biology	
BISC 2332	Comparative Vertebrate Anatomy	
BISC 2333	Evolution and Extinction of Dinosaurs	
BISC 2454	General Ecology	
BISC 3454	Marine Ecology	
BISC 3458	Plant Comparative Structure and Function	
BISC 3460	Conservation Biology	
Biology–biotechnology domain		
Prerequisites		
BISC 1111	Introductory Biology: Cells and Molecules	
BISC 1112	Introductory Biology: The Biology of Organisms	
Required		
BISC 2207	Genetics	
Two courses selected from the following:		
BISC 2202	Cell Biology	
BISC 2213	Biology of Cancer	
BISC 3209	Molecular Biology	
PUBH 3201	Introduction to Bioinformatics	

Economics domain	
Required	
ECON 2104	Intermediate Macroeconomic Theory: A Mathematical Approach
or ECON 2102	Intermediate Macroeconomic Theory
ECON 2123	Introduction to Econometrics
One course selected from the following:	
ECON 3105	Economic Forecasting
ECON 3142	Labor Economics
ECON 4198W	Proseminar in Economics
Data journalism domain	
Prerequisite	
SMPA 2110W	Introduction to News Writing and Reporting
Required	
SMPA 2111W	Advanced News Reporting
SMPA 3230	Reporting in the Digital Age
One course selected from the following:	
SMPA 3233	Photojournalism
SMPA 3234	Editing and Design for Print and Web
SMPA 3235W	Broadcast News Writing
SMPA 3240W	Washington Reporting
SMPA 3241W	Campaign Reporting
SMPA 3242	Investigative Reporting
SMPA 3246	Specialized Reporting
Geospatial data science domain	
Required	
GEOG 2104	Introduction to Cartography and GIS
GEOG 3105	Techniques of Spatial Analysis
One course selected from the following:	
GEOG 3106	Intermediate Geographic Information Systems
GEOG 3107	Introduction to Remote Sensing
GEOG 3196	Special Topics in Techniques

Mathematics domain	
Prerequisite	
MATH 2233	Multivariable Calculus
Required	
Three courses selected from the following:	
MATH 3553	Introduction to Numerical Analysis
MATH 3359	Introduction to Mathematical Modeling
MATH 3410	Mathematics of Finance
MATH 3411	Stochastic Calculus Methods in Finance
MATH 3632	Introduction to Graph Theory
MATH 3740	Computational Complexity
MATH 4981	Seminar: Topics in Mathematics
STAT 4157	Introduction to Mathematical Statistics I
STAT 4181	Applied Time Series Analysis
Physics domain	
Prerequisites	
MATH 2233	Multivariable Calculus
MATH 3342	Ordinary Differential Equations
PHYS 1021	University Physics I
or PHYS 1025	University Physics I with Biological Applications
PHYS 1022	University Physics II
or PHYS 1026	University Physics II with Biological Applications
Required:	
PHYS 2023	Modern Physics
PHYS 3161	Mechanics
PHYS 3181	Computational Physics
Science, technology, and society domain	
Required	
Three courses selected from the following:	
AMST 2610	Science, Technology, and Politics in Modern America
or HIST 2610	Science, Technology, and Politics in Modern America

AMST 2620	Human Mind and Artificial Intelligence
AMST 2680W	Hashtag America
ANTH 2502	Anthropology of Science and Technology: Twenty-First Century Brave New Worlds
ANTH 3531	Methods in Sociocultural Anthropology
ANTH 3691	Special Topics in Linguistic Anthropology
SMPA 3476	Media, Technology, and Culture
SMPA 3477	Information Technology and Politics