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 (http://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 (http://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 (http://bulletin.gwu.edu/arts-sciences/#majorstext) page in this Bulletin.

REQUIREMENTS

The following requirements must be fulfilled:

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

Curriculum requirements for the major:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Prerequisite courses</strong></td>
<td></td>
</tr>
<tr>
<td>15 credits</td>
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<td></td>
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<tr>
<td>CSCI 1012</td>
<td>Introduction to Programming with Python</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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<tr>
<td>MATH 1231</td>
<td>Single-Variable Calculus I</td>
<td></td>
</tr>
<tr>
<td>or MATH 1221</td>
<td>Calculus with Precalculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 1232</td>
<td>Single-Variable Calculus II</td>
<td></td>
</tr>
<tr>
<td>MATH 2184</td>
<td>Linear Algebra I</td>
<td></td>
</tr>
<tr>
<td>STAT 1051</td>
<td>Introduction to Business and Economic Statistics</td>
<td></td>
</tr>
<tr>
<td>or STAT 1053</td>
<td>Introduction to Statistics in Social Science</td>
<td></td>
</tr>
<tr>
<td>or STAT 1111</td>
<td>Business and Economic Statistics I</td>
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</tr>
<tr>
<td>or STAT 1127</td>
<td>Statistics for the Biological Sciences</td>
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</tbody>
</table>

**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:

**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
<table>
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<tr>
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<tbody>
<tr>
<td>ECON 2123</td>
<td>Introduction to Econometrics</td>
</tr>
<tr>
<td>ECON 3105</td>
<td>Economic Forecasting</td>
</tr>
<tr>
<td>ECON 3142</td>
<td>Labor Economics</td>
</tr>
<tr>
<td>ECON 4198W</td>
<td>Proseminar in Economics</td>
</tr>
</tbody>
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**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

One course selected from the following:
- 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
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>ANTH 3691</td>
<td>Special Topics in Linguistic Anthropology</td>
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<tr>
<td>SMPA 3476</td>
<td>Media, Technology, and Culture</td>
</tr>
<tr>
<td>SMPA 3477</td>
<td>Information Technology and Politics</td>
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