BACHELOR OF ARTS WITH A MAJOR IN BIOLOGY (STEM)

Biological sciences explore the science of life, from biomolecules to ecosystems. Courses and ongoing research programs are focused in three general areas: cell and molecular biology, ecology, and evolution and systematics. In research laboratories, students and faculty members work together on projects that range from dinosaur evolution through an investigation of how misfolded proteins interfere with insulin production. Many departmental faculty members have working relationships with scientists in surrounding education and federal institutions, and the program has a collaboration of more than 100 years standing with the Smithsonian Institution National Museum of Natural History.

This is a STEM designated program.

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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BISC 111</td>
<td>Introductory Biology: Cells and Molecules</td>
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<tr>
<td>BISC 112</td>
<td>Introductory Biology: The Biology of Organisms</td>
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<tr>
<td>BISC 2202</td>
<td>Cell Biology</td>
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<tr>
<td>BISC 2207</td>
<td>Genetics</td>
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<tr>
<td>BISC 2450</td>
<td>Organic Evolution</td>
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<tr>
<td>BISC 2454</td>
<td>General Ecology</td>
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</tr>
<tr>
<td>or BISC 2452</td>
<td>Animal Behavior</td>
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<tr>
<td>or BISC 3460</td>
<td>Conservation Biology</td>
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</tr>
<tr>
<td>CHEM 1111</td>
<td>General Chemistry I</td>
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<tr>
<td>&amp; CHEM 1112</td>
<td>General Chemistry II</td>
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<tr>
<td>CHEM 2151</td>
<td>Organic Chemistry I</td>
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<tr>
<td>&amp; CHEM 2152</td>
<td>Organic Chemistry II</td>
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<tr>
<td>CHEM 2153</td>
<td>Organic Chemistry Laboratory I</td>
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<tr>
<td>&amp; CHEM 2154</td>
<td>Organic Chemistry Laboratory II</td>
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<tr>
<td>CHEM 3165</td>
<td>Biochemistry I</td>
<td></td>
</tr>
<tr>
<td>or BISC 3261</td>
<td>Introductory Medical Biochemistry</td>
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Laboratory and elective course requirements

At least three courses must be a laboratory or have a laboratory component. These laboratory courses must numbered at the 2000 level or above. Students who complete 1 credit of BISC 4171 or BISC 4171W may count this experience as one of their required laboratory courses. A maximum of 6 credits of BISC 4171 or BISC 4171W may count towards degree requirements.

At least one 3-credit additional course from each of the four elective categories below:

Biology electives

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>BISC 2208</td>
<td>Genetics Laboratory</td>
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<td>BISC 2213</td>
<td>Biology of Cancer</td>
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<tr>
<td>BISC 2220</td>
<td>Developmental Neurobiology</td>
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<tr>
<td>BISC 2320</td>
<td>Neural Circuits and Behavior</td>
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<tr>
<td>BISC 3122</td>
<td>Human Physiology</td>
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<td>BISC 3123</td>
<td>Human Physiology Lab</td>
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<tr>
<td>BISC 3165</td>
<td>Biochemistry I</td>
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<tr>
<td>BISC 3167</td>
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<tr>
<td>or BISC 3262</td>
<td>Biochemistry Laboratory</td>
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<tr>
<td>BISC 3208</td>
<td>Molecular Biology Laboratory</td>
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<tr>
<td>BISC 3209</td>
<td>Molecular Biology</td>
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<tr>
<td>BISC 3210</td>
<td>Nanobiotechnology</td>
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<tr>
<td>BISC 3211</td>
<td>Nanobiotechnology Laboratory</td>
<td>1</td>
</tr>
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<td>Code</td>
<td>Title</td>
<td>Credits</td>
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<tr>
<td>BISC 3212</td>
<td>Immunology</td>
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<tr>
<td>BISC 3214</td>
<td>Developmental Biology</td>
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<td>BISC 3215</td>
<td>Genome Editing Laboratory</td>
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<tr>
<td>BISC 3263</td>
<td>Special Topics in Biochemistry</td>
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<td>BISC 3320</td>
<td>Human Neurobiology</td>
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<tr>
<td>BISC 4132</td>
<td>Advanced Cellular-Molecular Biology</td>
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<td>BISC 4212</td>
<td>Virology and Antiviral Immunity</td>
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<tr>
<td>BISC 6205</td>
<td>Current Topics in Cell and Molecular Biology</td>
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<tr>
<td>BISC 6218</td>
<td>Innate Immunity</td>
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<tr>
<td>BISC 6219</td>
<td>Host-Microbe Interactions</td>
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<tr>
<td>PUBH 3202</td>
<td>Introduction to Genomics</td>
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<tr>
<td>BISC 2000</td>
<td>Biodiversity Studies in a Changing Planet</td>
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<tr>
<td>BISC 2305</td>
<td>Plant Biology</td>
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<tr>
<td>BISC 2331</td>
<td>Insect Biology</td>
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<td>BISC 2335</td>
<td>Insect Biology Lab 1</td>
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<td>BISC 2332</td>
<td>Comparative Vertebrate Anatomy 1</td>
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<tr>
<td>BISC 2333</td>
<td>Evolution and Extinction of Dinosaurs</td>
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<td>BISC 2334W</td>
<td>Integrative Biology of Fishes</td>
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<td>BISC 2336</td>
<td>Introductory Microbiology</td>
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<td>BISC 2393</td>
<td>Parasitology 1</td>
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<td>BISC 2401</td>
<td>Biodiversity in A Changing World</td>
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<tr>
<td>BISC 6215</td>
<td>Vertebrate Phylogeny 1</td>
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<td>BISC 6249</td>
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<tr>
<td>BISC 2208</td>
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<tr>
<td>BISC 2224</td>
<td>Biology of Horticulture</td>
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<tr>
<td>BISC 2451</td>
<td>History of Life</td>
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<tr>
<td>BISC 2452</td>
<td>Animal Behavior</td>
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<td>BISC 2453</td>
<td>Animal Behavior Laboratory 1</td>
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<tr>
<td>BISC 2455</td>
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<td>BISC 3453</td>
<td>Plant Comparative Structure and Function Lab 1,2</td>
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<td>BISC 3454</td>
<td>Marine Ecology</td>
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<td>BISC 3455</td>
<td>Marine Ecology Laboratory 2</td>
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<td>BISC 3458</td>
<td>Plant Comparative Structure and Function</td>
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<td>BISC 3458</td>
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<td>BISC 3459</td>
<td>Field Biology 1,2</td>
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<td>BISC 3460</td>
<td>Conservation Biology 3</td>
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<td>or BISC 3460W</td>
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<td>BISC 3461</td>
<td>Plant-Animal Interactions</td>
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<td>BISC 3462</td>
<td>Plant-Animal Interactions Laboratory 1,2</td>
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<tr>
<td>BISC 3464</td>
<td>Ecology and Evolution of Societies</td>
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<tr>
<td>BISC 6210</td>
<td>Methods of Study of Evolution</td>
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<tr>
<td>BISC 6211</td>
<td>Biogeography and Speciation</td>
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<td>BISC 6243</td>
<td>Seminar: Ecology</td>
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<tr>
<td>BISC 2585</td>
<td>Biometery</td>
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<tr>
<td>MATH 1231</td>
<td>Single-Variable Calculus I</td>
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<td>or MATH 1220 &amp; MATH 1221</td>
<td>Calculus with Precalculus I and Calculus with Precalculus II</td>
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<td>MATH 1232</td>
<td>Single-Variable Calculus II</td>
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<tr>
<td>PUBH 3201</td>
<td>Introduction to Bioinformatics</td>
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<tr>
<td>or BISC 2584</td>
<td>Introduction to Bioinformatics</td>
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<tr>
<td>STAT 1127</td>
<td>Statistics for the Biological Sciences</td>
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1 Laboratory course.
2 Field component.
3 If not taken as a required course option.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BISC 2216</td>
<td>Scanning Electron Microscopy Laboratory</td>
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<tr>
<td>BISC 2224</td>
<td>Biology of Horticulture</td>
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<tr>
<td>BISC 2332</td>
<td>Comparative Vertebrate Anatomy</td>
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<td>BISC 2335</td>
<td>Insect Biology Lab</td>
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<tr>
<td>BISC 2337</td>
<td>Introductory Microbiology Laboratory</td>
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<tr>
<td>BISC 2339</td>
<td>Parasitology</td>
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<td>BISC 2453</td>
<td>Animal Behavior Laboratory</td>
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<td>BISC 2456</td>
<td>General Ecology Laboratory</td>
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<td>BISC 3123</td>
<td>Human Physiology Lab</td>
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<td>BISC 3208</td>
<td>Molecular Biology Laboratory</td>
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<td>BISC 3211</td>
<td>Nanobiotechnology Laboratory</td>
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<tr>
<td>BISC 3215</td>
<td>Genome Editing Laboratory</td>
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<tr>
<td>BISC 3453</td>
<td>Plant Comparative Structure and Function Lab</td>
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<tr>
<td>BISC 3455</td>
<td>Marine Ecology Laboratory</td>
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<tr>
<td>BISC 3459</td>
<td>Field Biology</td>
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<td>Plant-Animal Interactions Laboratory</td>
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<tr>
<td>BISC 4171</td>
<td>Undergraduate Research</td>
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<td>or BISC 4171W</td>
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<tr>
<td>BISC 4234</td>
<td>Microbial Genomics Laboratory</td>
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**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

In addition to the general requirements stated under University Regulations, in order to be considered for graduation with Special Honors, students must maintain a cumulative 3.5 grade-point average in biological sciences courses and at least a 3.0 cumulative overall grade-point average. Students who meet these criteria and wish to pursue special honors must complete an approved research project under faculty direction.