BIOLOGY, BA

Banner Code: SC-BA-BIOL

Academic Advising

1200 Exploratory Hall
Fairfax Campus

Website: biology.gmu.edu/academics/degree-programs/

The Bachelor of Arts in Biology provides a sound liberal arts education with substantial experience in quantitative and analytical thought, along with preparation for related professions. The program provides the strong background necessary for not only for graduate study in the life sciences, but also enables students to develop careers in a wide variety of disciplines, including teaching, environmental management, microbiology, molecular biology, biotechnology, genetics, wildlife management, fisheries biology, and marine science. Furthermore, our curriculum prepares students for careers in the health sciences including medicine, dentistry, veterinary science, and related allied health disciplines.

Admissions & Policies

Admissions

University-wide admissions policies can be found in the Undergraduate Admissions Policies (http://catalog.gmu.edu/admissions/undergraduate-policies/) section of this catalog.

To apply for this program, please complete the George Mason University Admissions Application (https://www2.gmu.edu/admissions-aid/apply-now/).

For students interested in taking the Biological Health concentration, it is advised that they have already obtained a bachelor's degree; this concentration is primarily intended for students who are interested in changing their careers to one with a biology foundation. The BA's other concentration, or the Biology, BS (https://catalog.gmu.edu/colleges-schools/science/biology/biology-bs/) are great options for students early in their undergraduate studies.

Policies

Students must fulfill all Requirements for Bachelor's Degrees (http://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-2), including the Mason Core (http://catalog.gmu.edu/mason-core/). Students in this bachelor's program must also complete the additional College Requirements for the BA Degree (see Requirements).

The writing intensive requirement is fulfilled by BIOL 308 Foundations of Ecology and Evolution. Transfer students who have transferred in BIOL 308 Foundations of Ecology and Evolution but did not meet the writing intensive requirement may take MLAB 300 Science Writing to meet the writing intensive requirement.

Post-baccalaureate students entering this program are advised to explore the Application for a Second Bachelor's Degree (http://catalog.gmu.edu/admissions/undergraduate-policies/#text) and the AP. 5.3.3 (https://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-3) sections of this catalog.

Important information and departmental policies are listed with the Department of Biology (http://catalog.gmu.edu/colleges-schools/science/biology/).

For policies governing all undergraduate programs, see AP.5 Undergraduate Policies (http://catalog.gmu.edu/policies/academic/undergraduate-policies/).

Important Program Requirements

Students must complete the degree requirements with:

- A minimum GPA of 2.00 in the BIOL courses listed in the degree program
- A minimum GPA of 2.00 in the supporting courses listed in the degree program

Additionally:

- Students may apply no more than 4 credits of BIOL 102 Introductory Biology I-Survey of Biodiversity and Ecology (Mason Core) (http://catalog.gmu.edu/mason-core/) or BIOL 103 Introductory Biology II-Survey of Cell and Molecular Biology (Mason Core) (http://catalog.gmu.edu/mason-core/) and BIOL 105 Introductory Biology II Laboratory (Mason Core) (http://catalog.gmu.edu/mason-core/) toward elective credit (or equivalent transfer credit at the 100 to 200-level) if taken before the successful completion of BIOL 213 Cell Structure and Function.
- Biology majors must earn a minimum grade of 'C' in all of the biology core courses. A grade of 'C' or better must be earned in BIOL 213 Cell Structure and Function in order to advance to other core requirements.
- Students may repeat BIOL 213 Cell Structure and Function once, but a second time only with permission of the Department of Biology (http://catalog.gmu.edu/colleges-schools/science/biology/).
- Students may **not** count BIOL 124 Human Anatomy and Physiology and/or BIOL 125 Human Anatomy and Physiology toward any biology major requirement.
- Students who take BIOL 300 BioDiversity may **not** count BIOL 303 Animal Biology and/or BIOL 304 Plant Biology toward any biology major requirement.
- BIOL 308 Foundations of Ecology and Evolution meets the writing intensive requirement for this major. Transfer students who have transferred in BIOL 308 Foundations of Ecology and Evolution but did not meet the writing intensive requirement may take MLAB 300 Science Writing to meet the writing intensive requirement.
- BIOL 493 Honors Research in Biology, BIOL 495 Directed Studies in Biology, and BIOL 497 Special Problems in Biology do not satisfy the requirements of the BA degree which state that students must complete at least one upper division course that includes a laboratory. The courses do, however, count as non-laboratory electives. The total limit for BIOL 493 Honors Research in Biology, BIOL 495 Directed Studies in Biology and BIOL 497 Special Problems in Biology combined is 3 credits toward 32 credits for the BA.

Teacher Licensure

Students majoring in biology who wish to pursue a career teaching secondary school may consider applying for the Secondary Education

- Biology (6-12) Undergraduate Certificate (http://catalog.gmu.edu/colleges-schools/education-human-development/school-education/secondary-education-biology-6-12-undergraduate-certificate/) offered by the College of Education and Human Development (http://catalog.gmu.edu/colleges-schools/education-human-development/) as an option in seeking an initial Virginia teaching license.

Other routes to licensure include the Biology, BA or BS/Curriculum and Instruction, Accelerated MEd (http://catalog.gmu.edu/colleges-schools/education-human-development/school-education/curriculum-instruction-med/#acceleratedmasterstext) (Secondary Education Biology Concentration) or select traditional Master's programs. Please contact the undergraduate advisor in the College of Education and Human Development (http://catalog.gmu.edu/colleges-schools/education-human-development/) for more information.

Requirements

Degree Requirements

Total credits: minimum 120

Students should refer to the Admissions & Policies tab for specific policies related to this program.

Biology, BA majors are required to complete the following coursework with the option of also completing a concentration.

Biology Core Courses

Code	Title	Credits
BIOL 213	Cell Structure and Function	4
BIOL 214	Biostatistics for Biology Majors	4
BIOL 300	BioDiversity [2]	4
BIOL 308	Foundations of Ecology and Evolution [1,2]	5
BIOL 311	General Genetics	4
Total Credits		21

1. Fulfills the writing intensive requirement.
Transfer students who have transferred in BIOL 308 but did not meet the writing intensive requirement may take MLAB 300 to meet the writing intensive requirement.
2. Post-baccalaureate students in the Biological Health concentration may be excused from taking BIOL 300 and BIOL 308.

Biology Electives

Code	Title	Credits
Complete 11 credits of additional biology courses (http://catalog.gmu.edu/courses/biol/) [1,2]		11

1. For the Biological Illustration concentration students and students with no declared concentration, at least 7 credits must be upper division, and at least one of these upper division courses must include a laboratory.
2. For the Biological Health concentration, all 11 credits must be in upper division courses, and at least one course must include a laboratory.

Chemistry

Code	Title	Credits
CHEM 211 & CHEM 213	General Chemistry I (Mason Core) (http://catalog.gmu.edu/mason-core/) and General Chemistry Laboratory I (Mason Core) (http://catalog.gmu.edu/mason-core/) (Natural Science course)	4
CHEM 212 & CHEM 214	General Chemistry II (Mason Core) (http://catalog.gmu.edu/mason-core/) and General Chemistry Laboratory II (Mason Core) (http://catalog.gmu.edu/mason-core/) (Natural Science course)	4
Total Credits		8

Math

Code	Title	Credits
Select one from the following:		3-6
MATH 111	Linear Mathematical Modeling (Mason Core) (http://catalog.gmu.edu/mason-core/) (Quantitative Reasoning courses)	
or MATH 113	Analytic Geometry and Calculus I (Mason Core) (http://catalog.gmu.edu/mason-core/)	
MATH 123 & MATH 124	Calculus with Algebra/Trigonometry, Part A and Calculus with Algebra/Trigonometry, Part B (Mason Core) (http://catalog.gmu.edu/mason-core/)	
Total Credits		3-6

Computer Science

Code	Title	Credits
Select one from the following:		3
CDS 130	Computing for Scientists (Mason Core) (http://catalog.gmu.edu/mason-core/) [1]	
Any course(s) that fulfills the Mason Core: Information Technology requirement (http://catalog.gmu.edu/mason-core/#information-technology)		
Total Credits		3

1. Recommended by the Department of Biology

Concentration in Biological Illustration (BIOI)

This optional concentration consists of a selection of courses designed to address the needs and interests of students who wish to study biology and simultaneously have the aptitude to draw, animate, or design art for textbooks, videos, papers, etc. This concentration has significant biology, chemistry, and physics components like all biology majors, and includes art classes that will prepare students for the opportunity to use their love of biology and art in one degree.

Code	Title	Credits
Natural Science		
Choose 6-7 credits from the following Mason Core: Natural Science Courses		6-7
ASTR 103	Astronomy (Mason Core) (http://catalog.gmu.edu/mason-core/)	

ASTR 111	The Solar System (Mason Core) (http://catalog.gmu.edu/mason-core/)	
ASTR 113	Stars, Galaxies, and the Universe (Mason Core) (http://catalog.gmu.edu/mason-core/)	
GEOL 101 & GEOL 103	Physical Geology (Mason Core) (http://catalog.gmu.edu/mason-core/) and Physical Geology Lab	
GEOL 102	Historical Geology (Mason Core) (http://catalog.gmu.edu/mason-core/)	
PHYS 160	University Physics I (Mason Core) (http://catalog.gmu.edu/mason-core/)	
PHYS 243	College Physics I (Mason Core) (http://catalog.gmu.edu/mason-core/)	
PHYS 245	College Physics II (Mason Core) (http://catalog.gmu.edu/mason-core/)	
PHYS 260	University Physics II (Mason Core) (http://catalog.gmu.edu/mason-core/)	
Art and Visual Technology		
AVT 180	New Media in the Creative Arts (Mason Core) (http://catalog.gmu.edu/mason-core/)	3
AVT 222	Drawing I (Mason Core) (http://catalog.gmu.edu/mason-core/)	3
AVT 385	EcoArt (Mason Core) (http://catalog.gmu.edu/mason-core/)	3
or AVT 497	Senior Project (Mason Core) (http://catalog.gmu.edu/mason-core/)	
Choose 12 additional art credits from the following courses:		12
AVT 323	Drawing II	
AVT 324	Figure Drawing	
AVT 327	Illustration	
AVT 328	Mixed Media	
AVT 382	2D Experimental Animation	
AVT 383	3D Experimental Animation	
AVT 422	Drawing III	
Total Credits		27-28

Concentration in Biological Health (BIOH)

This concentration is specially designed for students who have a previous four-year degree and wish to change careers to pursue a profession in the health sciences. Students are encouraged to work closely with an advisor on their program of study as it relates to their transfer coursework.

Code	Title	Credits
Additional Chemistry		
CHEM 313 & CHEM 315	Organic Chemistry I and Organic Chemistry Lab I	5
CHEM 314 & CHEM 318	Organic Chemistry II and Organic Chemistry Lab II	4-5
or BIOL 483	General Biochemistry	
Physics		
PHYS 243 & PHYS 244	College Physics I (Mason Core) (http://catalog.gmu.edu/mason-core/) and College Physics I Lab (Mason Core) (http://catalog.gmu.edu/mason-core/)	4
PHYS 245 & PHYS 246	College Physics II (Mason Core) (http://catalog.gmu.edu/mason-core/) and College Physics II Lab (Mason Core) (http://catalog.gmu.edu/mason-core/)	4
Total Credits		17-18

Note for Students Expecting to Enter Graduate or Professional School

Students expecting to enter graduate or professional school are strongly encouraged to complete:

Code	Title	Credits
MATH 113 & MATH 114	Analytic Geometry and Calculus I (Mason Core) (http://catalog.gmu.edu/mason-core/) and Analytic Geometry and Calculus II	8
CHEM 313 & CHEM 315	Organic Chemistry I and Organic Chemistry Lab I	5
CHEM 314 & CHEM 318	Organic Chemistry II and Organic Chemistry Lab II	5
PHYS 243 & PHYS 244	College Physics I (Mason Core) (http://catalog.gmu.edu/mason-core/) and College Physics I Lab (Mason Core) (http://catalog.gmu.edu/mason-core/)	4
PHYS 245 & PHYS 246	College Physics II (Mason Core) (http://catalog.gmu.edu/mason-core/) and College Physics II Lab (Mason Core) (http://catalog.gmu.edu/mason-core/)	4

Mason Core and Elective Requirements

In order to meet a minimum of 120 credits, this degree requires an additional credits (specific credit counts by concentration are shown below), which may be applied toward any remaining Mason Core (http://catalog.gmu.edu/mason-core/) requirements (outlined below), Requirements for Bachelor's Degrees (http://catalog.gmu.edu/policies/academic/undergraduate-policies/#text) (refer to AP.5.3.2), College Requirements for the BA Degree (outlined below), and elective courses. Students are strongly encouraged to consult with their advisors to ensure that they fulfill all requirements.

- Without concentration: 71-74 credits
- BIOI concentration: 43-47 credits
- BIOH concentration: 53-57 credits

Mason Core

Some Mason Core (http://catalog.gmu.edu/mason-core/) requirements may already be fulfilled by the major requirements listed above. Students are strongly encouraged to consult their advisors to ensure they fulfill all remaining Mason Core (http://catalog.gmu.edu/mason-core/) requirements.

Code	Title	Credits
Foundation Requirements		
Written Communication (ENGH 101) (http://catalog.gmu.edu/mason-core/#written)		3

Oral Communication (http://catalog.gmu.edu/mason-core/#oral)	3
Quantitative Reasoning (http://catalog.gmu.edu/mason-core/#quantitative)	3
Information Technology and Computing (http://catalog.gmu.edu/mason-core/#information-technology)	3
Exploration Requirements	
Arts (http://catalog.gmu.edu/mason-core/#arts)	3
Global Understanding (http://catalog.gmu.edu/mason-core/#global)	3
Literature (http://catalog.gmu.edu/mason-core/#literature)	3
Natural Science (http://catalog.gmu.edu/mason-core/#natural-science)	7
Social and Behavioral Sciences (http://catalog.gmu.edu/mason-core/#social-behavioral-science)	3
Western Civilization/World History (http://catalog.gmu.edu/mason-core/#western-civilization-world-history)	3
Integration Requirements	
Written Communications (ENGH 302) (http://catalog.gmu.edu/mason-core/#written)	3
Writing-Intensive (http://catalog.gmu.edu/mason-core/#wi) [1]	3
Synthesis/Capstone (http://catalog.gmu.edu/mason-core/#synthesis-capstone) [2]	3
Total Credits	40

1 Most programs include the writing-intensive course designated for the major as part of the major requirements; this course is therefore not counted towards the total required for Mason Core.

2 Minimum 3 credits required.

College Requirements for the BA Degree

In addition to the program requirements and the Mason Core (http://catalog.gmu.edu/mason-core/) requirements, students pursuing a BA degree must complete the coursework below. Except where expressly prohibited, a course used to fulfill this college-level requirement may also be used simultaneously to satisfy other requirements such as Mason Core (http://catalog.gmu.edu/mason-core/) requirements, other college-level requirements, or requirements for the major. In some cases, the requirements listed below may be superseded by requirements of the degree program and the Mason Core (http://catalog.gmu.edu/mason-core/).

Foundational Breadth

Choose two courses from approved Mason Core: Arts (http://catalog.gmu.edu/mason-core/#arts), Mason Core: Literature (http://catalog.gmu.edu/mason-core/#literature), Mason Core: Global Understanding (http://catalog.gmu.edu/mason-core/#global-understanding), and Mason Core: Social and Behavioral Sciences (http://catalog.gmu.edu/mason-core/#social-behavioral-science) courses in addition to those required by the Mason Core (http://catalog.gmu.edu/mason-core/). The two courses used to fulfill the college-level requirements must each be from different Mason Core categories. Additionally, they must be from different disciplines than the courses used to fulfill the University Mason Core requirements.

Natural Science

Choose one credit in addition to the Mason Core: Natural Science (http://catalog.gmu.edu/mason-core/#natural-science) requirement for a total of 8 credits[1]. This combined college-level and university requirement must be fulfilled by completing two of any approved Mason Core: Natural Science (http://catalog.gmu.edu/mason-core/#natural-science) courses that include a laboratory experience[2].

Code	Title	Credits
Select an additional Mason Core Natural Science course		1

1 For Geography, BA majors, this extra credit is not required.

2 BIOL 124 Human Anatomy and Physiology and BIOL 125 Human Anatomy and Physiology may not be used to fulfill this requirement.

Foreign Language

Code	Title	Credits
Intermediate-level proficiency in one foreign language is required and may be fulfilled via one of the options below: [1]		
1. Completing a course in a foreign language numbered 202 (or its equivalent), or higher level courses taught in the language.		
2. Achieving a satisfactory score on an approved proficiency test.		
3. Completing a three course sequence in American Sign Language:		
EDSE 115	American Sign Language (ASL) I	
EDSE 116	American Sign Language (ASL) II	
EDSE 219	American Sign Language (ASL) III	

1 Students who are already proficient in a second language may be eligible for a waiver of this requirement. Additional information on waivers can be found with the college's Office of Academic and Student Affairs (http://cosundergrad.gmu.edu/).

Honors

Honors in the Major

Admissions

Minimum requirements for invitation:

- GPA in biology courses must be 3.33 or better
- GPA in supporting requirements (math and other science) must be 3.00 or better
- Grade of 'B' or better in BIOL 213 Cell Structure and Function

Students should apply for admission to the Honors Program during their first or second year at the university. Contact the Department of Biology (http://catalog.gmu.edu/colleges-schools/science/biology/) for information on applying.

Retention Requirements

Students in honors biology must maintain a biology GPA of 3.33 or better and a supporting GPA of 3.00 or better from the time they have accumulated 30 hours and thereafter. Students who fall below this standard will be given a one semester probationary period in which to bring their GPA back up to the minimum standard.

Requirements to Graduate with Biology Honors

Students are required to take 6 to 8 credits in honors courses in BIOL including three semesters of BIOL 494 Honors Seminar in Biology or two semesters of BIOL 494 Honors Seminar in Biology and one

semester of BIOL 493 Honors Research in Biology. BIOL 498 Research Seminar may count toward one of the semester requirements of BIOL 494 Honors Seminar in Biology. The GPA requirements are as follows:

- Minimum 3.33 GPA in honors biology courses
- Minimum 3.33 GPA in biology requirements
- Minimum 3.00 GPA in supporting requirements
- Minimum 3.00 GPA overall

Accelerated Master's

Biology, BA or BS/Curriculum and Instruction, Accelerated MEd (Secondary Education Biology Concentration)

Overview

Highly-qualified undergraduates may be admitted to the bachelor's/accelerated master's program and obtain a BA or BS in Biology (http://catalog.gmu.edu/colleges-schools/science/biology/biology-bs/) (degree without concentration) and an MEd in Curriculum and Instruction (Secondary Education Biology concentration) (https://catalog.gmu.edu/colleges-schools/education-human-development/school-education/curriculum-instruction-med/) in an accelerated time-frame after satisfactory completion of a minimum of 143 credits.

See AP.6.7 Bachelor's/Accelerated Master's Degree (http://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) for policies related to this program.

This accelerated option is offered jointly by the Biology Undergraduate Program (http://catalog.gmu.edu/colleges-schools/science/biology/) and the School of Education (http://catalog.gmu.edu/colleges-schools/education-human-development/school-education/).

Students in an accelerated degree program must fulfill all university requirements for the master's degree. For policies governing all graduate degrees, see AP.6 Graduate Policies (http://catalog.gmu.edu/policies/academic/graduate-policies/#text).

BAM Pathway Admission Requirements

Applicants to all graduate programs at George Mason University must meet the admission standards and application requirements for graduate study as specified in Graduate Admissions Policies (https://catalog.gmu.edu/admissions/graduate-policies/) and Bachelor's/Accelerated Master's Degree (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) policies. For information specific to this accelerated master's program, see Application Requirements and Deadlines (https://cehd.gmu.edu/bachelors-accelerated-masters-program/).

Students will be considered for admission into the BAM Pathway after completion of a minimum of 60 credits, and additional unit-specific criteria.

Students who are accepted into the BAM Pathway will be allowed to register for graduate level courses after successful completion of a minimum of 75 undergraduate credits and course-specific pre-requisites.

Accelerated Master's Admission Requirements

Students already admitted in the BAM Pathway will be admitted to the MEd program, if they have met the following criteria, as verified on the Bachelor's/Accelerated Master's Transition form:

- 3.0 overall GPA
- Completion of specific undergraduate coursework
- Successfully meeting Mason's requirements for undergraduate degree conferral (graduation) and completing the application for graduation.

Accelerated Pathway Requirements

To maintain the integrity and quality of both the undergraduate and graduate degree programs, undergraduate students interested in taking graduate courses must choose from the following which can be taken as Advanced Standing or Reserve Graduate credit (https://catalog.gmu.edu/policies/academic/graduate-policies/#text) (to be determined by the student and their advisor):

Code	Title	Credits
EDRD 619	Literacy in the Content Areas	3
EDUC 547	Scientific Inquiry and the Nature of Science	3
SEED 522	Foundations of Secondary Education	3
SEED 540	Human Development and Learning: Secondary Education	3
SEED 573	Teaching Science in the Secondary School	3
SEED 673	Advanced Methods of Teaching Science in the Secondary School	3
SEED approved elective (http://catalog.gmu.edu/courses/seed/)		

For more detailed information on coursework and timeline requirements, see AP.6.7 Bachelor's/Accelerated Master's Degree (https://catalog.gmu.edu/policies/academic/graduate-policies/#ap-6-7) policies.