

CONSERVATION BIOLOGY

Degree: B.S., Biology

Department of Biological Sciences (<https://cas.umw.edu/biology/>)

Biology encompasses the study of all living things and their interaction with the environment. The Department faculty is dedicated to providing students with a strong undergraduate education in the fundamental principles of biology, while offering opportunities and encouraging students to pursue specialized interests in ecology and conservation.

The Conservation Biology major is designed for students interested in public or private-sector careers in fields such as endangered species protection and recovery, habitat conservation, conservation biology education, and fisheries and wildlife management. Additionally, it prepares students for graduate study in conservation biology in cases where graduate degrees are required for particular careers. Students who complete all requirements earn the degree of Bachelor of Science (B.S.) in Biology with a major in Conservation Biology.

The core curriculum is designed to ensure thorough command of the scientific method and access to inquiry-based learning experiences, while providing a balanced background in genetics, organismal biology, and ecology. Elective courses cover a wide variety of specialized topics to meet students' particular interests in biology. An array of laboratory and field experiences further develop working knowledge of the scientific method, teach specific experimental techniques, and promote ongoing development of quantitative and analytical skills.

All of the equipment and facilities in the department are available for undergraduate student use. Collections of microscope slides, vertebrate and invertebrate specimens and a herbarium are available to enhance learning. Advanced laboratory instrumentation such as spectrophotometers, thermal cyclers, ultracentrifuges, and two electron microscopes allow students to engage in sophisticated research. The department also has appropriate field equipment for collecting biological data from the terrestrial, aquatic, and estuarine habitats surrounding campus.

Every student is expected to engage in undergraduate research through either research-intensive laboratory courses or undergraduate research with a UMW faculty member. Research intensive (RI) classes allow students to work in teams to design research plans, collect and analyze data and present their findings at a University symposium, while undergraduate research may be a more independent project, mentored by a faculty member. On many occasions this independent work results in presentations at state, regional, and national scientific meetings. Research students who meet minimum requirements (3.0 overall GPA and a 3.25 average in biology) may pursue Honors in Biology by writing and defending a thesis on their research project. Students can also gain focused research experience via participation in the UMW Summer Science Institute. Financial support for student research is available. Additionally, biology faculty offer research opportunities through the university's undergraduate research (URES 197 (<https://umw-preview.courseleaf.com/search/?P=URES%20197>)) program.

Students may also take advantage of Biology service learning opportunities (BIOL 000 (<https://umw-preview.courseleaf.com/search/?P=BIOL%20000>)) Community Service Learning, or internship opportunities (BIOL 499 (<https://umw-preview.courseleaf.com/search/?P=BIOL%20499>)) to gain valuable career related experience which can count for the University's Beyond the Classroom OR After Mary Washington general

education requirement. A maximum of 2 elective credits of BIOL 499 may be counted towards the Biology major.

Student Learning Outcomes

Students will demonstrate knowledge of Core Concepts for Biological Literacy. Students will demonstrate knowledge of:

1. Core Concept of the concepts and processes of evolution.
2. Core Concept of the nature of structure and function.
3. Core Concept of information flow, exchange, and storage.
4. Core Concept of the pathways and transformations of energy and matter.
5. Core Concept of the nature of biological entities as systems.

Students will demonstrate abilities of Core Competencies for the Practice of Biology. Students will be able to:

6. Core Competency for the practice of Biology of how to apply the processes of science.
7. Core Competency for the practice of Biology of how to use quantitative reasoning.
8. Core Competency of the practice of Biology of how to use modeling and simulation.

Students will demonstrate abilities of Core Competencies for Societal Issues in Biology. Students will be able to:

9. Core Competency for societal issues in Biology of the ability to tap into the interdisciplinary nature of science.
10. Core Competency for societal issues in Biology of the ability to communicate and collaborate with other disciplines.
11. Core Competency for societal issues in Biology of the ability to understand the relationship between science and society.

Major Requirements

Students must earn a C- or better in most BIOL required courses that serve as prerequisites for other BIOL courses. Students must also earn a C- or better in the core courses (BIOL 210 Introduction to Ecology and Evolution, BIOL 260 Biostatistics and Research Design, BIOL 341 General Genetics, BIOL 428 Conservation Biology or equivalent) **to graduate with a degree in Conservation Biology. See also the Department of Chemistry's minimum grade requirements for** CHEM 111 General Chemistry I, CHEM 112 General Chemistry II. *A maximum of 16 CONS course credits can count to the major.*

A minimum of 41 credits from the following:

Code	Title	Credits
BIOL 132	Organism Function and Diversity	4
or BIOL 126	Phage Hunters II	
BIOL 210	Introduction to Ecology and Evolution	3
BIOL 260	Biostatistics and Research Design	4
BIOL 341	General Genetics	4
Select one of the following:		4
BIOL 428	Conservation Biology	
CONS 402	Applied Conservation	
CONS 404	Biodiversity Monitoring	
CONS 491	Conservation Management Planning	
Select one of the following:		4
EESC 205	GIS Applications in Environmental Science and Geology with Lab	

GISC 200	Introduction to GIS
GISC 250	Introduction to Geographic Information Systems and Cartography
Select one public policy, economic, and cultural perspectives course: 3	
ANTH 365	Environment and Development Narratives: The Modern Myths of Nature and Progress
CONS 410	Human Dimensions of Conservation
ECON 331A	Environmental and Resource Economics
EESC 230	Global Environmental Problems
EESC 330	Environmental Regulations
GEOG 245	Environment and Society
HIST 322	US Environmental History
PHIL 330	Environmental Ethics
SOCG 354	Environmental Sociology
SOCG 456	Environmental Justice

Students must take a minimum of 15 credits from the following: 15

Select at least two of the following diversity courses:

BIOL 231	Plant Biology
BIOL 313	Natural History: Observing Plants from Individuals to Ecosystem
BIOL 321	Invertebrate Zoology
BIOL 323	Entomology
BIOL 372	Parasitology
BIOL 425	Vertebrate Zoology
BIOL 426	Biology of Fishes
BIOL 427	Ornithology
BIOL 444	Bioinformatics
BIOL 471	Topics in Biology ¹

Select at least one upper-level ecology course:

BIOL 311	Plant Ecology
BIOL 322	Animal Ecology
BIOL 401	Animal Behavior
BIOL 423	Ecology and Evolution in the Galapagos Islands
BIOL 424	Tropical Ecology
BIOL 471	Topics in Biology ¹
CONS 405	Landscape and Macrosystems Ecology
CONS 406	Small Population Management

Select at least one Research Intensive (RI) course or Course Sequence:

BIOL 427	Ornithology (Select at least one Research Intensive (RI) course or sequence)
BIOL 445	Research Practices in Aquatic Ecology
BIOL 462	Research Practices in Plant Ecology
BIOL 472	Research-Intensive Topics in Biology ¹
BIOL 481 & BIOL 491	Research Design & Proposal Development in Biology and Special Problems in Biology ¹
CONS 490	Integrated Conservation Strategies
CONS 496	Research in Conservation

Select additional electives to meet the 41 credit requirement:

BIOL 499	Internship
BIOL 416	Vertebrate Endocrinology
CONS 400	Conservation Seminar

EESC 357	Sustainable Aquaculture
EESC 418	Applied Ecotoxicology
GEOG 241	Biogeography
GEOG 327	Climate Change

Total Credits 41¹ As approved by the department.

General Education Requirements

The general education requirements for Bachelor of Arts/Bachelor of Science degrees (<https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-arts-bachelor-science-degrees/>) apply to all students who are seeking to earn an undergraduate B.A., B.S. or B.S.Ed. degree.

Students seeking a Bachelor of Liberal Studies degree have a separate set of BLS general education requirements (<https://catalog.umw.edu/undergraduate/general-education/requirements-bachelor-liberal-studies-degrees/>).

Electives

Elective courses are those that are not needed to fulfill a general education requirement or major program requirement but are chosen by the student to complete the 120 credits required for graduation with a B.A./B.S./B.S.Ed. degree or the BLS degree. These courses may be taken graded or pass/fail (or S/U in the case of physical education and 100-level dance). No student in a regular B.A./B.S./B.S.Ed. program may count more than 60 credits in a single discipline toward the 120 credits required for graduation.

Total Credits Required for the Degree: 120 credits

Plan of Study

This suggested plan of study should serve as a guide to assist students when planning their course selections. It is not a substitute for a student's Degree Evaluation or the Program Requirements listed for this major in the catalog. Academic planning is the student's responsibility, and course selections should be finalized only after speaking with an advisor. Students should familiarize themselves with the catalog in effect at the time they matriculated at the University of Mary Washington. Students should also familiarize themselves with general education requirements (<https://catalog.umw.edu/undergraduate/general-education/>) which can be fulfilled through general electives as well as major/minor course requirements. Course requirements and sequencing may vary with AP, IB, CLEP, Cambridge or previous coursework, transfer courses, or other conditions. To be considered full-time, an undergraduate student must be enrolled in 12 or more credits for the semester.

Course	Title	Credits
Freshman		
Fall		
BIOL 121 or BIOL 125	Biological Concepts or Phage Hunters I	4
CHEM 111	General Chemistry I	4
FSEM 100	First-Year Seminar	3
General Education Courses		6
Credits		17
Spring		
BIOL 132 or BIOL 126	Organism Function and Diversity or Phage Hunters II	4

CHEM 112	General Chemistry II	4
General Education Courses		6
Credits		14
Sophomore		
Fall		
BIOL 210 or BIOL 260	Introduction to Ecology and Evolution ¹ or Biostatistics and Research Design	3
GISC Elective		4
General Education Courses		6
Credits		13
Spring		
BIOL 260 or BIOL 210	Biostatistics and Research Design ¹ or Introduction to Ecology and Evolution	4
BIOL 341		4
General Education Courses		8
Credits		16
Junior		
Fall		
BIOL 428	Conservation Biology ²	4
Upper Level Ecology Elective		4
General Education Courses or Electives		8
Credits		16
Spring		
Diversity Elective ²		4
Policy Elective		4
General Electives		8
Credits		16
Senior		
Fall		
Research Intensive Course or Diversity Elective ³		4
General Electives		11
Credits		15
Spring		
Research Intensive Course or Diversity Elective ³		4
General Electives		9
Credits		13
Total Credits		120

April N. Wynn

Assistant Professors

Lauren A. Cirino
 Ginny R. Morriss
 Laura M. Sipe

Senior Lecturer

Michael C. Stebar

¹ BIOL 260 is a Digital Intensive course and counts as Writing Intensive in the major.

² BIOL 428 counts as Speaking Intensive in the major.

³ A research intensive course will count as Writing Intensive in the major.

Biological Sciences Faculty

Dianne M. Baker, Chair

Faculty

Professors

Dianne M. Baker
 Andrew S. Dolby
 Alan B. Griffith
 Lynn O. Lewis
 Deborah A. O'Dell

Associate Professors

Swati Agrawal
 Theresa M. Grana
 Bradley A. Lamphere
 Abbie M. Tomba
 R. Parrish Waters