

# Biology, B.S.

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## Degree Offered

- Bachelor of Science

## Nature of the Program

The Biology Program covers all aspects of the organism, from molecular and biochemical pathways through anatomy and physiology of organisms to the structure of populations, communities, landscapes and ecosystems. The program provides grounding in mathematics and other natural science disciplines necessary for the understanding of the organism, such as chemistry, organic chemistry and physics. By careful choice of biology and restricted electives, students can tailor their educational experience to prepare for professional school, graduate school or entry into the workforce upon graduation.

The program provides the student with the opportunity to select additional courses from the disciplines of biology, chemistry, physics, math, computer science, business, foreign language, psychology, health sciences, engineering or other disciplines which might be helpful in biologically oriented careers. In addition to traditional coursework, students also have the opportunity to engage in research projects selected from a variety of biological disciplines. (Students who select electives in any science or technical areas may need additional courses to meet prerequisites.) The restricted electives are selected by consulting with the assigned biology advisor. For students who have reached a more advanced level in mathematics upon graduation from high school and meet ACT score requirements, either Pre-Calculus and Calculus 1 or Calculus 1 and 2 may be substituted for College Algebra and Trigonometry. Biology majors must earn a "C" or better in the freshman biology courses to enter upper division BIOL courses. During the last semester of the program, students must take the exit exam in biology. Students are also expected to complete a program of volunteer work to fulfill the college requirement for citizenship/community service.

## Program Objectives

Upon graduation, students will be prepared to:

- Pursue advanced degrees in biology and related fields or professional degrees, including medicine, dentistry, veterinary medicine, pharmacy and other health related fields.
- Directly enter a broad range of career pathways in industry and federal or state governments which require a baccalaureate degree in science.

## General Education Foundations

Please use this link to view a list of courses that meet each GEF requirement. (<http://registrar.wvu.edu/gef/>)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

Code	Title	Hours
<b>General Education Foundations</b>		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102 or ENGL 103	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research Accelerated Academic Writing	
F2A/F2B - Science & Technology		4-6
F3 - Math & Quantitative Reasoning		3-4
F4 - Society & Connections		3
F5 - Human Inquiry & the Past		3
F6 - The Arts & Creativity		3
F7 - Global Studies & Diversity		3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)		9
Total Hours		31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

## Curriculum Requirements

Code	Title	Hours
University Requirements		25
Program Requirements		36
Biology Major Requirements		59
Total Hours		120

## University Requirements

Code	Title	Hours
General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)		
Outstanding GEF Requirements 1, 4, 5, 6, and 7		18
WVUE 191	First Year Seminar	1
General Electives *		6
Total Hours		25

Code	Title	Hours
<b>An overall GPA of 2.0 is required for all coursework contributing to Program and Major requirements.</b>		

## Program Requirements

Code	Title	Hours
WRIT 305	Technical Writing	3
<b>Mathematics Requirements (select two of the following):</b>		<b>6</b>
MATH 126	College Algebra (GEF 3)	
MATH 128	Plane Trigonometry	
MATH 129	Pre-Calculus Mathematics	
MATH 150	Applied Calculus	
MATH 155	Calculus 1	
MATH 156	Calculus 2	
CHEM 115 & 115L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory (GEF 2)	4
CHEM 116 & 116L	Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory (GEF 8)	4
CHEM 233 & 233L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	4
CHEM 234 & 234L	Organic Chemistry 2 and Organic Chemistry 2 Laboratory	4
PHYS 101 & 101L	Introductory Physics 1 and Introductory Physics 1 Laboratory	4
PHYS 102 & 102L	Introductory Physics 2 and Introductory Physics 2 Laboratory	4
STAT 211	Elementary Statistical Inference	3
Total Hours		36

## Biology Major Requirements

Code	Title	Hours
BIOL 111	General Biology (GEF 8)	4
BIOL 112	General Biology (GEF 8)	4
BIOL 225	Biology Methods	3
BIOL 240	Microbiology	4
BIOL 303	Genetics	4
BIOL 416	Cell Biology	4
BIOL 461	Principles of Evolution	3

BIOL 466	Ecology	4
BIOL 494	Seminar	2
<b>Botany Electives</b>		<b>4</b>
BIOL 354	Organismal Botany	
BIOL 452	Plant Taxonomy	
<b>Zoology Electives</b>		<b>4</b>
BIOL 343	Systematic Zoology	
BIOL 347	Parasitology	
BIOL 440	Comparative Anatomy	
<b>Biology Electives (any 200-level or higher BIOL course)</b>		<b>8</b>
<b>Restricted Electives or Approved Minor **</b>		<b>11</b>
<b>Exit Examination</b>		
<b>Community Service</b>		
Total Hours		59

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Students choosing to minor in Chemistry will need to take additional courses to ensure 9 unique Chemistry credits are applied toward the minor.

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Restricted electives are chosen from a list approved by the Biology Department. Minors to replace restricted electives must be approved by the Biology Department Chair. Please see your advisor for details.

## Suggested Plan of Study

### First Year

Fall	Hours	Spring	Hours
BIOL 111 (GEF 8)		4 BIOL 112 (GEF 8)	4
ENGL 101 (GEF 1)		3 ENGL 102 (GEF 1)	3
MATH 126 (GEF 3)		3 MATH 128	3
WVUE 191		1 GEF 5	3
GEF 4		3 GEF 6	3
		14	16

### Second Year

Fall	Hours	Spring	Hours
BIOL 225		3 BIOL 240	4
CHEM 115 & 115L (GEF 2)		4 CHEM 116 & 116L (GEF 8)	4
PHYS 101 & 101L		4 PHYS 102 & 102L	4
STAT 211		3 WRIT 305	3
GEF 7		3	
		17	15

### Third Year

Fall	Hours	Spring	Hours
CHEM 233 & 233L		4 BIOL 303	4
Botany Elective		4 BIOL 461	3
Zoology Elective		4 CHEM 234 & 234L	4
Elective		3 Restricted Elective	4
		15	15

### Fourth Year

Fall	Hours	Spring	Hours
BIOL 416		4 BIOL 466	4
BIOL 494		2 Biology Elective	4

Biology Elective	4 Restricted Elective	3
Restricted Elective	4 Electives	3
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	14	14

Total credit hours: 120

## Major Learning Outcomes

### BIOLOGY

Upon graduation, students of the biology program will be able to:

- Apply scientific method to solving problems.
  - a. Formulate a hypothesis and alternate hypotheses.
  - b. Design experiments to test hypotheses.
  - c. Collect data.
  - d. Analyze data statistically and graphically.
  - e. Interpret and report data.
- Communicate effectively in writing and orally.
- Evaluate sources of information through a scientific lens.
  - a. Perform search of primary scientific literature.
  - b. Interpret scientific papers.
  - c. Summarize research results from primary sources.
  - d. Synthesize information from a variety of sources into a coherent argument.
- Explain and apply basic concepts in cell and molecular biology, evolutionary theory, human biology, genetics and ecology.
- Demonstrate skills in the use of equipment and apply safety practices in the laboratory and field settings.