Biology B.S.

Click here to view the Suggested Plan of Study (p. 5)

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
General Education Foundations		
F1 - Composition & Rhetoric		3-6
ENGL 101 & ENGL 102	Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research	
or ENGL 103	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.

Degree Requirements

Students must complete WVU General Education Foundations requirements, College B.S. requirements, STEM Foundations requirements, major requirements, and electives with a minimum of 120 hours. For complete details on these requirements, visit the B.S. Degrees tab on the Eberly College of Arts and Sciences (http://catalog.wvu.edu/undergraduate/eberlycollegeofartsandsciences/#bachelorofsciencetext) page.

Departmental Requirements for the B.S. in Biology

Students intending to graduate with a B.S. in Biology must earn a minimum of 38 hours of coursework in biology or approved courses in the biological sciences, with a minimum of 120 hours total required for graduation. Students may not earn both a B.A. and a B.S. in Biology.

- **Capstone Requirement**: The university requires the successful completion of a Biology capstone course (BIOL 320 or BIOL 321). The three semester, BIOL 486, may be counted as the Biology Capstone Experience in place of BIOL 320 or BIOL 321 . Two hours of BIOL 486 will be counted as part of the core requirements (replacingBIOL 320 or BIOL 321) and up to 6 hours may count as upper-level electives.
- **Writing and Communication Skills Requirement**: The Biology Bachelor of Science is a **SpeakWrite Certified Program™**. SpeakWrite Certified programs incorporate and develop students' written, verbal, visual, and mediated communication skills across the curriculum.
- **Calculation of Major GPA:** A minimum GPA of a 2.0 is required in all courses applied to major requirements, with a minimum grade of a C- in BIOL 115, BIOL 115L, BIOL 117, and BIOL 117L. If a course is repeated, all attempts will be included in the calculation of the GPA, unless the course is eligible for a D/F repeat.
- **Electives and Lab Requirement:** Students must complete 20 hours of upper-division biology elective credits, with a least one course in each biology sub-discipline (1- Cell and Molecular, 2- Organismal, 3- Evolution and Ecology, 4- Integrative). Courses listed in more than one group may only be used to satisfy one group requirement. At least two of the selected classes must have a laboratory (lab courses are indicated with an asterisk in the curriculum table below). A maximum of three of the non-biology courses (AEM 341, AEM 401, AGBI 410, BIOC 339, BIOC 531, GEOL 331, PSYC 426, WMAN 446) may be used to fulfill the twenty-hour elective requirement. Special topics courses (BIOL 493) can be used to satisfy electives and may satisfy group-electives if appropriate. Additional elective courses may include any 300- or 400-level BIOL courses (except: BIOL 318, BIOL 320, BIOL 321, BIOL 327, BIOL 387, BIOL 487, BIOL 490, BIOL 491, BIOL 494 and above).

- **Research Option:** With permission of the department, students may enroll in BIOL 386 or BIOL 486. Six hours of BIOL 386 and BIOL 486 may be used towards the 20 hours of Biology upper division electives. One semester of BIOL 386 or BIOL 486 may be used to satisfy one of the lab requirements.

Curriculum Requirements

Code	Title	Hours
University Requirements		49
ECAS B.S. Requirements		3
Biology Major Requirements		68
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
BIOL 191	First-Year Seminar	1
General Electives		30
Total Hours		49

ECAS Bachelor of Science Requirements

Code	Title	Hours
ECAS B.S. Requirements		**3**
Global Studies and Diversity Requirement		
MATHEMATICS REQUIREMENT:		
MATH 150	Applied Calculus	
or MATH 153 & MATH 154	Calculus 1a with Precalculus and Calculus 1b with Precalculus	
or MATH 155	Calculus 1	
SCIENCE REQUIREMENT fulfilled by major requirements [*]		
Total Hours		3

Biology Major Requirements

Code	Title	Hours
STEM FOUNDATIONS		**19**
CHEM 115 & 115L & CHEM 116 & CHEM 116L	Fundamentals of Chemistry 1 and Fundamentals of Chemistry 1 Laboratory and Fundamentals of Chemistry 2 and Fundamentals of Chemistry 2 Laboratory	
STAT 211 & STAT 215	Elementary Statistical Inference and Introduction to Probability and Statistics	
PHYS 101 & 101L & PHYS 102 & PHYS 102L	Introductory Physics 1 and Introductory Physics 1 Laboratory and Introductory Physics 2 and Introductory Physics 2 Laboratory	
or PHYS 111 & 111L & PHYS 112 & PHYS 112L	General Physics 1 and General Physics 1 Laboratory and General Physics 2 and General Physics 2 Laboratory	
CORE COURSES		**26**
BIOL 115 & 115L	Principles of Biology and Principles of Biology Laboratory	
BIOL 117 & 117L	Introductory Physiology and Introductory Physiology Laboratory	

BIOL 219 & 219L	The Living Cell and The Living Cell Laboratory	
BIOL 221	Ecology and Evolution	
BIOL 327	Professional Development	
BIOL 387	Experimental Design & Communication 1	
BIOL 487	Experimental Design & Communication 2	
CHEM 233 & 233L & CHEM 234 & CHEM 234L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory and Organic Chemistry 2 and Organic Chemistry 2 Laboratory	
BIOLOGY ELECTIVES **		**20**
Select at least one from each of the following four groups,		
and please select two lab courses:		
1- Cell and Molecular Biology		
BIOL 310	Advanced Cellular/Molecular Biology	
BIOL 310L	Advanced Cellular/Molecular Biology Laboratory	
BIOL 312	Introduction to Virology	
BIOL 313	Molecular Basis of Cellular Growth	
BIOL 316	Developmental Biology	
BIOL 316L	Developmental Biology Laboratory	
BIOL 324	Molecular Genetics	
BIOL 324L	Molecular Genetics Laboratory	
BIOL 335	Cell Physiology	
BIOL 348	Neuroscience 1	
BIOL 350 & 350L	Plant Physiology and Plant Physiology Laboratory (*)	
BIOL 409	Biochemical Basis of Therapeutics	
BIOL 410	Cell and Molecular Biology Methods	
BIOL 411L	Introduction to Recombinant DNA Laboratory	
BIOL 413	Molecular Endocrinology	
BIOL 415	Epigenetics	
BIOL 418	Medical Genetics	
BIOL 420	Genomics	
BIOL 421	Experimental Biochemistry (*)	
BIOL 423	Biochemistry of Nucleic Acids and Proteins	
BIOL 423L	Biochemistry of Nucleic Acids and Proteins Laboratory	
BIOL 424	Protein Structure and Function	
BIOL 425	Developmental Genetics	
BIOL 426	Molecular Biology of Cancer	
BIOL 453	Molecular Basis of Disease	
BIOL 454	Immunology	
BIOL 455	Evolution of Infectious Diseases	
BIOL 456	Microbial Symbiosis	
BIOL 474	Neurogenetics and Behavior	
BIOL 475	Neurobiological Diseases	
2- Organismal Biology		
BIOL 316	Developmental Biology	
BIOL 316L	Developmental Biology Laboratory	
BIOL 324	Molecular Genetics	
BIOL 324L	Molecular Genetics Laboratory	
BIOL 338	Behavioral Ecology	
BIOL 340	Invertebrate Zoology	

BIOL 341 & 341L	Ichthyology and Ichthyology Laboratory (*)
BIOL 344	Advanced Human Physiology
BIOL 344L	Advanced Human Physiology Laboratory (*)
BIOL 345	Human Anatomy
BIOL 345L	Human Anatomy Laboratory
BIOL 349	Neuroscience 2
BIOL 350 & 350L	Plant Physiology and Plant Physiology Laboratory (*)
BIOL 353L	Flora of West Virginia Laboratory
BIOL 363	Plant Geography
BIOL 413	Molecular Endocrinology
BIOL 418	Medical Genetics
BIOL 425	Developmental Genetics
BIOL 436	General Animal Physiology
BIOL 438	Animal Behavior
BIOL 439	Neuroethology
BIOL 440	Comparative Anatomy (*)
BIOL 450 & 450L	Plant Systematics and Plant Systematics Laboratory (*)
BIOL 456	Microbial Symbiosis
BIOL 474	Neurogenetics and Behavior
BIOL 475	Neurobiological Diseases
BIOL 478	Sensory Neural Systems and Behavior
BIOL 479	Principles of Systems Neuroscience
AEM 341	General Microbiology (*)
PSYC 426	Physiological Psychology
3- Evolution and Ecology	
BIOL 301	History of Biology
BIOL 338	Behavioral Ecology
BIOL 339	Animal Communication
BIOL 361 & 361L	Plant Ecology and Plant Ecology Laboratory (*)
BIOL 363	Plant Geography
BIOL 365	Conservation Biology
BIOL 365L	Conservation Biology Laboratory
BIOL 420	Genomics
BIOL 448	Plant-Microbial Interactions
BIOL 455	Evolution of Infectious Diseases
BIOL 456	Microbial Symbiosis
BIOL 457	Ecology of Parasites
BIOL 461	Principles of Evolution
BIOL 462	Ecosystem Models
BIOL 463	Global Ecology
BIOL 464 & 464L	Population and Quantitative Genetics and Population Genetics Laboratory (*)
BIOL 464L	Population Genetics Laboratory
BIOL 477	Central Nervous System Evolution and Development
AEM 401	Environmental Microbiology (*)
GEOL 331	Paleontology (*)
WMAN 446	Freshwater Ecology
WMAN 446L	Freshwater Ecology Laboratory
4- Integrative Biology	

BIOL 302	Biometry	
BIOL 315	Communicating Natural Science	
BIOL 339	Animal Communication	
BIOL 376L	Research Methods Laboratory	
BIOL 430	Bioinformatics	
BIOL 456	Microbial Symbiosis	
BIOL 464 & 464L	Population and Quantitative Genetics and Population Genetics Laboratory (*)	
BIOL 474	Neurogenetics and Behavior	
BIOL 476 & 476L	Computational Neuroscience and Computational Neuroscience Laboratory	
AGBI 410	Introductory Biochemistry	
BIOC 339	Introduction to Human Biochemistry	
CAPSTONE EXPERIENCE		**3**
Select one of the following options:		
BIOL 320	The Total Science Experience: Genomics	
BIOL 321	Total Science Experience Lab	
or 2 semesters of the following:		
BIOL 486	Honors Investigation and Thesis (9 hours) ***	
AND 1 semester of the following:		
BIOL 386	Undergraduate Research	
Or 3 semesters of the following:		
BIOL 486	Honors Investigation and Thesis	
Total Hours		68

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STEM foundation courses are common to most STEM majors and excluded from the calculation of the percentage of upper-division courses.

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Permission of the department must be obtained to enroll in BIOL 386, 486, 490, and 491. Only four credit hours of 386/486 may be used towards the fourteen hour elective requirement. BIOL 490 and BIOL 491 do not satisfy the required fourteen hours of electives in biology. These can serve as general electives.

Suggested Plan of Study

First Year

Fall	Hours	Spring	Hours
BIOL 191	1	BIOL 117 & 117L (GEF 8; B.S. First Area 2)	4
BIOL 115 & 115L (GEF 2; B.S. First Area 1)	4	CHEM 116 & 116L (GEF 8; B.S. Second Area 2)	4
CHEM 115 & 115L (GEF 8; B.S. Second Area 1)	4	ENGL 101 (GEF 1)	3
MATH 150 or 155	3	General Elective	3
GEF 4	3	General Elective	1
	15		15

Second Year

Fall	Hours	Spring	Hours
BIOL 219 & 219L	4	BIOL 221	3
CHEM 233 & 233L	4	BIOL 327	1
PHYS 101 & 101L (B.S. Third Area 1)	4	CHEM 234 & 234L	4
ENGL 102 (GEF 1)	3	PHYS 102 & 102L (B.S. Third Area 2)	4

		GEF 5	3
		15	15

Third Year

Fall	Hours	Spring	Hours
BIOL 387	1	BIOL Elective Lab 1**	4
BIOL Elective Group I***	3	BIOL Elective Group III	3
BIOL Elective Group II	3	STAT Requirement	3
GEF 6	3	ECAS Global Studies and Diversity Requirement (GEF 7)	3
General Elective	3	General Elective	1
General Elective	3		
	16		14

Fourth Year

Fall	Hours	Spring	Hours
BIOL 487	1	BIOL Elective Group IV***	3
BIOL Elective Lab 2**	4	BIOL Capstone	3
General Elective	3	General Elective	3
General Elective	3	General Elective	3
General Elective	3	General Elective	3
General Elective	1		
	15		15

Total credit hours: 120

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BIOL 321 / BIOL 320 (capstone) may be replaced with three semesters of BIOL 486 (research).

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At least two upper division lab courses must be taken, one of which can be 386 or 486.

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At least one 300-level or above course must be taken in each biology sub-discipline (1-4).

B.S. Biology: Pre-Medical track

The following information is included for advising purposes only and is not an approved curriculum. Completing the stipulations suggested below will not result in an additional designation on any official record.

- **Independent Research:** Students with aspirations to attend top-rank medical schools should include at least three hours of independent research (BIOL 386 or BIOL 486) in their program of study if they are to be competitive. The three semester, BIOL 486, may be counted as the Biology Capstone in place of BIOL 320 or BIOL 321. Six hours of BIOL 386 and BIOL 486 may be used to satisfy upper division electives. One semester of BIOL 386 or will satisfy one lab course.

- **MCAT and Medical School admission requirements**: Students who will take the MCAT in 2015 or later should take PSYC 101, SOC 101, ANTH 105, and one further course in Psychology and Sociology in order to be prepared for the new social sciences section of the MCAT - consult with your adviser for more detailed information. The course of study outlined below is recommended for students interested in attending medical school. However, admission requirements will vary from one medical school to another, so a review of specific requirements for each school of interest is recommended.

Note: The list of electives and recommendations outlined below are recommended for students interested in attending medical school. However, admission requirements will vary from one medical school to another, so a review of specific requirements for each school of interest is recommended. B.S. Biology students should select their biology electives from the list below. "General Requirements" and "Biochemistry Requirements" are strongly recommended for a competitive medical school application. Students interested in Graduate School and Research are strongly encouraged to take MATH 156. Please consult your adviser.

Code	Title	Hours
General Requirements		**10**
BIOL 310	Advanced Cellular/Molecular Biology	
BIOL 436	General Animal Physiology	
BIOL 440	Comparative Anatomy	
Biochemistry Requirement		**3**

Select one of the following:		
AGBI 410	Introductory Biochemistry	
BIOC 339	Introduction to Human Biochemistry	
Ecology and Evolution Requirement		**3**
Select one of the following:		
BIOL 338	Behavioral Ecology	
BIOL 461	Principles of Evolution	
BIOL 464	Population and Quantitative Genetics	
Laboratory Requirement		**4**
Select one of the following:		
AEM 341	General Microbiology	
AEM 401	Environmental Microbiology	
Electives		**3**
Select remaining hours from the following:		
BIOL 302	Biometry	
BIOL 312	Introduction to Virology	
BIOL 313	Molecular Basis of Cellular Growth	
BIOL 316	Developmental Biology	
BIOL 324	Molecular Genetics	
BIOL 324L	Molecular Genetics Laboratory	
BIOL 335	Cell Physiology	
BIOL 348	Neuroscience 1	
BIOL 386	Undergraduate Research	
BIOL 410	Cell and Molecular Biology Methods	
BIOL 411L	Introduction to Recombinant DNA Laboratory	
BIOL 413	Molecular Endocrinology	
BIOL 415	Epigenetics	
BIOL 425	Developmental Genetics	
BIOL 426	Molecular Biology of Cancer	
BIOL 438	Animal Behavior	
BIOL 453	Molecular Basis of Disease	
BIOL 454	Immunology	
BIOL 455	Evolution of Infectious Diseases	
BIOL 456	Microbial Symbiosis	
PSYC 426	Physiological Psychology	
Total Hours		23

Areas of Emphasis Offered:

- Cellular and Molecular Biology (p. 7)
- Ecology and Environmental Biology (p. 10)

Bachelor of Arts or Sciences in Biology: Cellular and Molecular Biology Area of Emphasis

A biology degree with an emphasis in cellular and molecular biology provides the student with all the preparation necessary for the health professions, pharmacy and pharmacology, and graduate school in cellular or molecular biology, virology, genetics, immunology and a variety of related fields. Biology majors pursuing the area of emphasis in Cellular and Molecular Biology take two introductory courses to learn about the processes within cells and the mechanisms for communication between cells. They then take a further concentration of courses in Biology that are related to cellular and molecular biology.

Cellular and Molecular Biology Area of Emphasis Requirements:

Students wishing to complete a Cellular and Molecular Biology Area of Emphasis must take the following selection of courses as part of their required Biology electives, either for the B.A. or the B.S.

Curriculum Requirements

Code	Title	Hours
BIOL 310	Advanced Cellular/Molecular Biology	3
BIOL 324	Molecular Genetics	3
Select two of the following:		6
BIOL 312	Introduction to Virology	
BIOL 313	Molecular Basis of Cellular Growth	
BIOL 316	Developmental Biology	
BIOL 335	Cell Physiology	
BIOL 348	Neuroscience 1	
BIOL 409	Biochemical Basis of Therapeutics	
BIOL 410	Cell and Molecular Biology Methods	
BIOL 411L	Introduction to Recombinant DNA Laboratory	
BIOL 413	Molecular Endocrinology	
BIOL 415	Epigenetics	
BIOL 418	Medical Genetics	
BIOL 420	Genomics	
BIOL 423	Biochemistry of Nucleic Acids and Proteins	
BIOL 424	Protein Structure and Function	
BIOL 425	Developmental Genetics	
BIOL 426	Molecular Biology of Cancer	
BIOL 430	Bioinformatics	
BIOL 436	General Animal Physiology	
BIOL 453	Molecular Basis of Disease	
BIOL 454	Immunology	
BIOL 455	Evolution of Infectious Diseases	
BIOL 456	Microbial Symbiosis	
BIOL 464 & 464L	Population and Quantitative Genetics and Population Genetics Laboratory	
FIS 432	Forensic Biology	
Total Hours		12

Suggested Plan of Study for the B.A. in Biology with an Area of Emphasis in Cellular and Molecular Biology

First Year

Fall	Hours	Spring	Hours
BIOL 191	1	ENGL 101	3
BIOL 115 & 115L	4	BIOL 117 & 117L	4
CHEM 115 & 115L	4	CHEM 116 & 116L	4
MATH 150	3	Language 102	3
Language 101	3	General Elective	1
	15		15

Second Year

Fall	Hours	Spring	Hours
BIOL 219 & 219L	4	BIOL 221	3
CHEM 233 & 233L	4	BIOL 327	1
ENGL 102	3	CHEM 234 & 234L	4

Language 203	3	Language 204	3
General Elective	1	General Elective	1
		GEF 4	3
	15		15

Third Year

Fall	Hours	Spring	Hours
GEF 5	3	GEF 6	3
BIOL 310	3	Biology Capstone	2
BIOL 387	1	PHYS 102 & 102L	4
PHYS 101 & 101L	4	BIOL 324	3
STAT 211	3	General Elective	3
General Elective	1		
	15		15

Fourth Year

Fall	Hours	Spring	Hours
BIOL 478	3	CMB AoE Elective 2	3
GEF 7	3	Biology Elective	3
CMB AoE Elective 1 (with lab)	4	General Elective	3
General Elective	3	General Elective	3
General Elective	2	General Elective	3
	15		15

Total credit hours: 120

Suggested Plan of Study for the B.S. in Biology with an Area of Emphasis in Cellular and Molecular Biology

First Year

Fall	Hours	Spring	Hours
BIOL 191	1	ENGL 101	3
GEF 4	3	BIOL 117 & 117L	4
BIOL 115 & 115L	4	CHEM 116 & 116L	4
CHEM 115 & 115L	4	General Elective	3
MATH 155	4		
	16		14

Second Year

Fall	Hours	Spring	Hours
ENGL 102	3	BIOL 221	3
BIOL 219 & 219L	4	BIOL 327	1
CHEM 233 & 233L	4	CHEM 234 & 234L	4
PHYS 101 & 101L	4	PHYS 102 & 102L	4
		STAT 211	3
	15		15

Third Year

Fall	Hours	Spring	Hours
BIOL 310 (Group I elective)	3	BIOL 324 (Group II)	3
BIOL 387	1	General Elective	3

GEF 5		3 General Elective	3
GEF 6		3 Biology Elective, Lab 1	4
GEF 7		3 Biology Capstone	2
Biology Elective, Group III, AoE Elective 1		3	
		16	15

Fourth Year

Fall	Hours	Spring	Hours
BIOL 487		1 Biology Elective, Group IV, AoE Elective 2	3
Biology Elective, Lab 2		4 General Elective	3
General Elective		3 General Elective	3
General Elective		2 General Elective	3
General Elective		3 General Elective	3
General Elective		1	
		14	15

Total credit hours: 120

Bachelor of Arts or Science in Biology: Ecology and Environmental Biology Area of Emphasis

Ecology and Environmental Biology Area of Emphasis:

Curriculum Requirements

Code	Title	Hours
Core Courses		**6**
BIOL 302	Biometry	
BIOL 461	Principles of Evolution	
Ecology Electives		**6**
Select 2 of the following:		
BIOL 338	Behavioral Ecology	
BIOL 361 & 361L	Plant Ecology and Plant Ecology Laboratory	
BIOL 363	Plant Geography	
BIOL 365 & 365L	Conservation Biology and Conservation Biology Laboratory	
BIOL 456	Microbial Symbiosis	
BIOL 457	Ecology of Parasites	
BIOL 463	Global Ecology	
WMAN 446 & 446L	Freshwater Ecology and Freshwater Ecology Laboratory	
Total Hours		12

Suggested Plan of Study for the B.A. in Biology with an Area of Emphasis in Ecology/ Environmental Biology

First Year

Fall	Hours	Spring	Hours
BIOL 191		1 ENGL 101 (GEF 1)	3
Foreign Language 101		3 Foreign Language 102	3
BIOL 115 & 115L (GEF 2)		4 BIOL 117 & 117L (GEF 8)	4
MATH 150 (GEF 3)		3 CHEM 116 & 116L (GEF 8)	4

CHEM 115 & 115L (GEF 8)	4	General Elective	1
	15		15

Second Year

Fall	Hours	Spring	Hours
ENGL 102 (GEF 1)	3	Foreign Language 204	3
Foreign Language 203	3	BIOL 221	3
BIOL 219 & 219L	4	BIOL 327	1
CHEM 233 & 233L	4	CHEM 234 & 234L	4
General Elective	1	STAT 211	3
		General Elective	1
	15		15

Third Year

Fall	Hours	Spring	Hours
BIOL 387	1	GEF 6 (ECAS Fine Arts Requirement)	3
GEF 4	3	Biology Capstone	2
GEF 5	3	BIOL 461	3
BIOL 302	3	PHYS 102 & 102L	4
PHYS 101 & 101L	4	General Elective	3
General Elective	1		
	15		15

Fourth Year

Fall	Hours	Spring	Hours
BIOL 487	1	BIOL Elective with Laboratory	4
ECAS Global Studies and Diversity Requirement (GEF 7)	3	Ecology AoE Elective 2	3
Ecology AoE Elective 1	3	General Elective	3
General Elective	3	General Elective	3
General Elective	3	General Elective	2
General Elective	2		
	15		15

Total credit hours: 120

Suggested Plan of Study for the B.S. in Biology with an Area of Emphasis in Ecology/ Environmental Biology

First Year

Fall	Hours	Spring	Hours
BIOL 191	1	ENGL 101 (GEF 1)	3
GEF 4	3	BIOL 117 & 117L (GEF 8; B.S. First Area 2)	4
BIOL 115 & 115L (GEF 2; B.S. First Area 1)	4	CHEM 116 & 116L (GEF 8; B.S. Second Area 2)	4
CHEM 115 & 115L (GEF 8; B.S. Second Area 1)	4	STAT 211	3
MATH 155 (GEF 3)	4		
	16		14

Second Year

Fall	Hours	Spring	Hours
ENGL 102 (GEF 1)	3	BIOL 221	3

BIOL 219 & 219L	4	BIOL 327	1
CHEM 233 & 233L	4	CHEM 234 & 234L	4
PHYS 101 & 101L (B.S. Third Area 1)	4	PHYS 102 & 102L (B.S. Third Area 2)	4
		General Elective	3
	15		15

Third Year

Fall	Hours	Spring	Hours
BIOL 387	1	BIOL 461 (Group III elective)	3
GEF 5	3	Biology Capstone	2
GEF 6	3	General Elective	4
ECAS Global Studies and Diversity Requirement (GEF 7)	3	General Elective	3
BIOL 302 (Group IV elective)	3	General Elective	3
General Elective	2		
	15		15

Fourth Year

Fall	Hours	Spring	Hours
BIOL 487	1	Ecology AoE Elective Course 2	3
Ecology AoE Elective Course 1	3	BIOL Elective with Lab (Group II)*	4
Biology Elective with lab (Group I)*	4	General Elective	3
General Elective	3	General Elective	3
General Elective	2	General Elective	2
General Elective	2		
	15		15

Total credit hours: 120

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Maybe fulfilled by a course selected in Area of Emphasis.

Major Learning Outcomes

BIOLOGY

Upon successful completion of the B.A. or B.S. degree, **Biology** majors will demonstrate competency in these areas:

1. Students will demonstrate competency in five content areas (listed below) at three biological levels - cellular/molecular, organismal/physiological, ecological and populations)

- Information flow
- Transformations of energy and matter
- Structure-function relationships
- Evolution
- Systems and interactions

2. Students will be able to apply science process skills, including: reading the primary literature, developing a testable hypothesis, designing and experiment, collecting and analyzing data statistically.

3. Students will be able to communicate effectively with both fellow scientists and non-scientists in both written and oral forms.

4. Students will be able to synthesize knowledge and skills from across the curriculum and apply them to societal issues and problems.