Biology Pre-medical, B.S.

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 Pre-Medical

Students intending to graduate with a B.S. in Biology Pre-Medical must earn a minimum of 47 hours of coursework in biology or approved courses in the biological sciences, with a minimum of 120 hours total required for graduation.

- **Capstone Requirement**: The university requires the successful completion of a Biology capstone course (BIOL 320 or BIOL 321 or the research capstone, BIOL 486).
- **Writing and Communication Skills Requirement**: The Biology Pre-Medical 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.
- **Area of Emphasis:** The B.S. in Biology Pre-Medical offers 2 areas of emphasis: Human Health and Global Health. Each student must complete an area of emphasis.
- **Upper-division laboratory requirement:** biology pre-medical majors must complete a minimum of two upper-division BIOL laboratory courses. Those courses are identified with an "L" listed after the course number.
- **Research Option:** With permission of the department, students may enroll in BIOL 386, BIOL 484, or BIOL 485. These courses can lead to the research capstone, BIOL 486. Up to 6 credits of research can be used towards biology electives within each track.

Curriculum Requirements

Code	Title	Hours
University Requirements		37
ECAS B.S. Requirements		3
Biology Major Requirements		80
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, 6, and 7		12
BIOL 191	First-Year Seminar	1
General Electives		24
Total Hours		37

ECAS Bachelor of Science Requirements

Code	Title	Hours
ECAS B.S. Requirements		
Global Studies and Diversity Requirement		
MATHEMATICS REQUIREMENT:		3
MATH 150	Applied Calculus	
or MATH 155	Calculus 1	
BS Science Requirement is met by Major Requirements		
Total Hours		3

Biology Pre-Medical Major Requirements

Code	Title	Hours
STEM FOUNDATIONS *		**16**
CHEM 115	Fundamentals of Chemistry 1	
& 115L	and Fundamentals of Chemistry 1 Laboratory	
& CHEM 116	and Fundamentals of Chemistry 2	
& CHEM 116L	and Fundamentals of Chemistry 2 Laboratory	
PHYS 101	Introductory Physics 1	
& 101L	and Introductory Physics 1 Laboratory	
& PHYS 102	and Introductory Physics 2	
& PHYS 102L	and Introductory Physics 2 Laboratory	
SOCIAL FOUNDATIONS OF HEALTH		**9**
PSYC 101	Introduction to Psychology	
PHIL 331	Health Care Ethics	
SOC 101	Introduction to Sociology	
or PUBH 201	Global Perspectives of Public Health	
or PUBH 202	Social Determinants of Health	
CORE COURSES		**29**
BIOL 115	Principles of Biology	
& 115L	and Principles of Biology Laboratory	
BIOL 117	Introductory Physiology	
& 117L	and Introductory Physiology Laboratory	
BIOL 219	Cellular and Molecular Biology	
& 219L	and Cellular & Molecular Biology Laboratory	
BIOL 221	Ecology and Evolution	
BIOL 223	Quantitative Biology	
BIOL 327	Professional Development	

BIOL 387	Experimental Design & Communication 1	
BIOL 487	Experimental Design & Communication 2	
CHEM 233 & 233L	Organic Chemistry 1 and Organic Chemistry 1 Laboratory	
CHEM 234 & 234L	Organic Chemistry 2 and Organic Chemistry 2 Laboratory	
AREA OF EMPHASIS		**15**
Select one of the areas of emphasis below.		
Global Health (15 Hours)		
Human Health (16 Hours)		
UPPER-DIVISION BIOLOGY ELECTIVES **		**8**
Select 8 credits of biology courses at the 300 or 400 level		
CAPSTONE EXPERIENCE		**3**
Select one of the following options:		
BIOL 320	The Total Science Experience: Genomics	
BIOL 321	Total Science Experience Lab	
BIOL 486	Honors Investigation and Thesis	
Total Hours		80

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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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Up to 6 credits of research (BIOL 386 or BIOL 484 and BIOL 485) can be used towards the Upper-Division Biology Electives.

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Excluding BIOL 318, BIOL 320, BIOL 321, BIOL 327, BIOL 387, BIOL 486, BIOL 487, BIOL 490, BIOL 494 and above.

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 (GEF 3)	3	PHIL 331 (GEF 5)	3
PSYC 101 (GEF 4)	3	General Elective	1
	15		15

Second Year

Fall	Hours	Spring	Hours
BIOL 219 & 219L	4	BIOL 221	3
ENGL 102 (GEF 1)	3	BIOL 327	1
CHEM 233 & 233L	4	BIOL 223	3
SOC 101, PUBH 201, or PUBH 202	3	CHEM 234 & 234L	4
		PHYS 101	4
		General Elective	1
	14		16

Third Year

Fall	Hours	Spring	Hours
BIOL 387	1	AoE Course 3	3

AoE Course 1*	3	AoE Course 4	3
AoE Course 2	3	GEF 6	3
PHYS 102	4	General Elective	3
General Elective	3	General Elective	3
	14		15

Fourth Year

Fall	Hours	Spring	Hours
AoE Course 5	3	BIOL 487	1
Upper-Division Biology Elective	4	BIOL Capstone	3
GEF 7	3	Upper-Division Biology Elective	4
General Elective	4	General Elective	3
		General Elective	3
		General Elective	3
	14		17

Total credit hours: 120

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At least two upper division lab courses must be taken, one of which can be 386 or 485.

Areas of Emphasis

- Global Health (p. 4)
- Human Health (p. 5)

Global Health Area of Emphasis

This focused training will prepare the graduate for professional programs in public health, infectious disease, conservation biology, and biomedical research.

Code	Title	Hours
BIOL 455	Evolution of Infectious Diseases	3
BIOL 310	Advanced Cellular/Molecular Biology	3
or BIOL 312	Introduction to Virology	
or BIOL 313	Molecular Basis of Cellular Growth	
or BIOL 316	Developmental Biology	
or BIOL 324	Molecular Genetics	
or BIOL 335	Cell Physiology	
or BIOL 348	Neuroscience 1	
or BIOL 409	Biochemical Basis of Therapeutics	
or BIOL 418	Medical Genetics	
or BIOL 425	Developmental Genetics	
or BIOL 426	Molecular Biology of Cancer	
or BIOL 454	Immunology	
or BIOL 475	Neurobiological Diseases	
BIOL 338	Behavioral Ecology	3
or BIOL 340	Invertebrate Zoology	
or BIOL 344 & 344L	Advanced Human Physiology and Advanced Human Physiology Laboratory	
or BIOL 345 & 345L	Human Anatomy and Human Anatomy Laboratory	
or BIOL 436	General Animal Physiology	
or BIOL 438	Animal Behavior	
or BIOL 457	Ecology of Parasites	
or AEM 341 & 341L	General Microbiology and General Microbiology Laboratory	

BIOL 363	Plant Geography	3
or BIOL 365 & 365L	Conservation Biology and Conservation Biology Laboratory	
or BIOL 448	Plant-Microbial Interactions	
or BIOL 462	Ecosystem Models	
or BIOL 463	Global Ecology	
or AEM 401	Environmental Microbiology	
or WMAN 446 & 446L	Freshwater Ecology and Freshwater Ecology Laboratory	
BIOL 420	Genomics	3
or BIOL 430	Bioinformatics	
or BIOL 462	Ecosystem Models	
or BIOL 476	Computational Neuroscience	
Total Hours		15

Human Health Area of Emphasis

This focused training will prepare the graduate for professional programs in medicine, dentistry, physician's assistant programs, and biomedical research.

Code	Title	Hours
AGBI 410	Introductory Biochemistry	3
BIOL 310	Advanced Cellular/Molecular Biology	3
or BIOL 324	Molecular Genetics	
or BIOL 418	Medical Genetics	
or BIOL 425	Developmental Genetics	
BIOL 315	Communicating Natural Science	3
or COMM 309	Health Communication	
BIOL 312	Introduction to Virology	3
or BIOL 454	Immunology	
or BIOL 455	Evolution of Infectious Diseases	
or AEM 341 & 341L	General Microbiology and General Microbiology Laboratory	
BIOL 345 & 345L	Human Anatomy and Human Anatomy Laboratory	4
or BIOL 344 & 344L	Advanced Human Physiology and Advanced Human Physiology Laboratory	
Total Hours		16

Major Learning Outcomes

BIOLOGY PRE-MEDICAL

Upon successful completion of the B.S. degree, students will demonstrate competency in these areas:

1. Biological: Students will demonstrate competency in the content areas (listed below) at three biological levels - cellular/molecular, organismal/ physiological, ecosystem/populations)

- Information Flow
- Tranformations of energy and matter
- Structure-function relationships
- Evolution
- Systems and interactions

2. Professional Skills: Students will demonstrate interpersonal skills including: effective communication with both professional and general audiences in written and oral forms, the ability to work in collaborative teams, global perspectives, social awareness, ethical and moral reasoning, demonstrated ability to synthesize and apply knowledge and skills from across the curriculum to social issues and problems.

3. Scientific Process Skills: Students will be able to apply science process skills, including: scientific literacy, experimental design, collecting and analyzing data quantitatively and statistically, application of critical and analytical thinking to address scientific questions.