Environmental, Soil and Water Sciences, B.S.

Degree Offered

- Bachelor of Science

Nature of the Program

This major prepares students for careers in areas which safeguard the quality of the environment. The curriculum is built on interdisciplinary training in a broad array of environmental, soil, and water sciences. Recent graduates in this option are employed by municipal, state, and federal governmental agencies; consulting firms, especially those specializing in land reclamation, water quality, or pest management; and companies associated with natural resource industries.

In addition to the required curriculum students can enhance their career qualifications by also completing some or all of the following options:

- A minor in a relevant field (Geology, Resource Economics, Wildlife Conservation, etc.)
- USDA Soil Scientist Certification: thirty hours in biological, physical or earth science, including at least fifteen hours in soils courses such as:

Code	Title	Hours
ESWS 410	Soil Fertility	3
ESWS 415 & 415L	Soil Survey and Land Use and Soil Survey and Land Use Laboratory	3
ESWS 417 & 417L	Soil Genesis and Classification and Soil Genesis and Classification Laboratory	4
ESWS 425 & 425L	Environmental Soil Management and Environmental Soil Management Laboratory	3
ESWS 430 & 430L	and Soil Physics Laboratory	3
ESWS 455	Reclamation of Disturbed Soils	3

- USDA Soil Conservationist Certification: thirty hours in natural resources or agricultural disciplines including at least twelve hours from soils, crops, or plant science, with at least three hours in soils and three hours in crop or plant science.
- ENVP 415 Hazardous Waste Training. Equivalent to OSHA 40-hour HAZWOPER course.
- Information on academic requirements for other professional certifications may be obtained at https://www.agronomy.org/certifications (https://www.agronomy.org/certifications/) or http://www.naep.org

Admissions for 2025-2026

- First-Time Freshman are admitted directly into the Environmental Soil and Water major.
- Students transferring from another major within WVU are directly admitted to the Environmental Soil and Water major if they are in good academic standing (2.0 or higher GPA).
- Students transferring from another institution are directly admitted to the Environmental Soil and Water major if they are in good academic standing (2.0 or higher GPA).

Major Code: 1706

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.

Curriculum Requirements

Code	Title	Hours
University Requirements		38
Environmental, Soil and Water Major Requirements		82
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, and 6		15
ANRD 191	First-Year Seminar	1
General Electives		22
Total Hours		38

Environmental, Soil and Water Sciences Major Requirements

Code	Title	Hours
WRIT 305	Technical Writing	3
Select one of the following sequences (GEF 8):		8
BIOL 101 & 101L & BIOL 102 & BIOL 102L	General Biology 1 and General Biology 1 Laboratory and General Biology 2 and General Biology 2 Laboratory	
BIOL 115 & 115L & BIOL 117 & BIOL 117L	Principles of Biology and Principles of Biology Laboratory and Introductory Physiology and Introductory Physiology Laboratory	
Select one of the following pairs (GEF 2 & 8):		8
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	
CHEM 111 & 111L & CHEM 112 & CHEM 112L	Survey of General, Organic, and Biological Chemistry 1 and Survey of Chemistry 1 Laboratory and Survey of General Organic Biological Chemistry 2 and Survey of Chemistry 2 Laboratory	
GEOL 101 & 101L	Planet Earth and Planet Earth Laboratory	4
Select one of the following (GEF 3):		3
MATH 124	Algebra with Applications	
MATH 150	Applied Calculus	
AEM 341 & 341L	General Microbiology and General Microbiology Laboratory	4
ESWS 202	Principles of Soil Science	3
ESWS 202L	Principles of Soil Science Laboratory	1

ESWS 155	Elements of Environmental Protection	3
Plant Science Elective:		3
AGRN 451 & 451L	Principles of Weed Science and Principles of Weed Science Laboratory	
FNRS 212 & 212L	Forest Ecology and Forest Ecology Laboratory	
HORT 260L	Woody Plant Materials Laboratory	
PLSC 206 & 206L	Principles of Plant Science and Principles of Plant Science Laboratory	
STAT 211	Elementary Statistical Inference	3
WMAN 150	Principles of Conservation Ecology (GEF 7)	3
ESWS 425 & 425L	Environmental Soil Management and Environmental Soil Management Laboratory (Capstone Experience)	3
or ESWS 460 & 460L	Environmental Impact Assessment and Environmental Impact Assessment Laboratory	
Restricted Electives		**21**
AEM 401 & 401L	Environmental Microbiology and Environmental Microbiology Laboratory	
AGEE 110	Microcomputer Applications in Agricultural Education	
or FNRS 240	Introduction to Computing in Natural Resources	
AGEE 220	Group Organization and Leadership (GEF 4)	
ESWS 455	Reclamation of Disturbed Soils	
AEM 420	Soil Microbiology	
AGBI 410	Introductory Biochemistry	
ESWS 125L	Soil Judging Laboratory	
ESWS 415 & 415L	Soil Survey and Land Use and Soil Survey and Land Use Laboratory	
ESWS 430 & 430L	Soil Physics and Soil Physics Laboratory	
ARE 204	Agribusiness Management	
BIOL 361 & 361L	Plant Ecology and Plant Ecology Laboratory	
CE 347 & 347L	Introduction to Environmental Engineering and Introduction to Environmental Engineering Laboratory	
CE 351 & 351L	Introductory Soil Mechanics and Introductory Soil Mechanics Laboratory	
CHEM 231 & 231L	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course Laboratory	
ESWS 355	Environmental Sampling and Analysis	
ESWS 460 & 460L	Environmental Impact Assessment and Environmental Impact Assessment Laboratory	
FNRS 444 & ESWS 325	Watershed Management and Principles of Water Resources	
GEOL 321	Geomorphology	
GEOL 365	Environmental Geology	
GEOL 462	Introductory Hydrogeology	
GEOL 463	Physical Hydrogeology	
GEOL 488	Environmental Geochemistry	
PHYS 101 & 101L	Introductory Physics 1 and Introductory Physics 1 Laboratory	
PHYS 102 & 102L	Introductory Physics 2 and Introductory Physics 2 Laboratory	
PLSC 491	Professional Field Experience	
POLS 338	Environmental Policy	

RESM 440 & 440L	Foundations of Applied Geographic Information Systems and Foundations of Applied Geographic Information Systems Laboratory	
RESM 480	Environmental Regulation	
WMAN 446 & 446L	Freshwater Ecology and Freshwater Ecology Laboratory	
Area of Emphasis		**12-14**
Environmental Assessment and Reclamation (12 Hours)		
Environmental Microbiology (14 Hours)		
Soil and Water Sciences (14 Hours)		
Total Hours		82

SUGGESTED PLAN OF STUDY

First Year

Fall	Hours	Spring	Hours
ANRD 191	1	ESWS 155	3
ENGL 101 (GEF 1)	3	BIOL 102 & 102L (GEF 8)	4
BIOL 101 & 101L (GEF 8)	4	WMAN 150 (GEF 7)	3
Select one of the following (GEF 3):	3	General Electives	6
MATH 124			
MATH 126			
MATH 150			
GEOL 101 & 101L	4		
	15		16

Second Year

Fall	Hours	Spring	Hours
Select one of the following (GEF 2):	4	Plant Science Elective	3
CHEM 111 & 111L		Select one of the following (GEF 8):	4
CHEM 115 & 115L		CHEM 112 & 112L	
ENGL 102 (GEF 1)	3	CHEM 116 & 116L	
STAT 211	3	GEF 6	3
GEF 5	3	ESWS 202	3
Restricted Elective	3	ESWS 202L	1
		General Elective	1
	16		15

Third Year

Fall	Hours	Spring	Hours
AEM 341 & 341L	4	Area of Emphasis Required Course	3
WRIT 305	3	Restricted Electives	7
Area of Emphasis Required Course	3	General Electives	4
Restricted Elective	3		
General Elective	3		
	16		14

Fourth Year

Fall	Hours	Spring	Hours
ESWS 425 & 425L	3	Area of Emphasis Required Course	3

GEF 4	3 Restricted Electives	8
Area of Emphasis Required Course	3 General Electives	2
General Electives	6	
	15	13

Total credit hours: 120

Areas of Emphasis

- Environmental Assessment and Reclamation
- Environmental Microbiology
- Soil and Water Sciences

ENVIRONMENTAL ASSESSMENT AND RECLAMATION AREA OF EMPHASIS

Code	Title	Hours
ESWS 255	Elements of Environmental Management	3
ESWS 355	Environmental Sampling and Analysis	3
ESWS 415 & 415L	Soil Survey and Land Use and Soil Survey and Land Use Laboratory	3
ESWS 455	Reclamation of Disturbed Soils	3
Total Hours		12

ENVIRONMENTAL MICROBIOLOGY AREA OF EMPHASIS

Code	Title	Hours
AEM 470	Microbes and Global Change	3
AEM 401 & 401L	Environmental Microbiology and Environmental Microbiology Laboratory	4
PPTH 401 & 401L	General Plant Pathology and General Plant Pathology Laboratory	4
PPTH 403	Mycology	3
Total Hours		14

SOIL AND WATER SCIENCES AREA OF EMPHASIS

Code	Title	Hours
AEM 470	Microbes and Global Change	3
ESWS 125L	Soil Judging Laboratory	1
ESWS 410	Soil Fertility	3
ESWS 415 & 415L	Soil Survey and Land Use and Soil Survey and Land Use Laboratory	3
ESWS 417 & 417L	Soil Genesis and Classification and Soil Genesis and Classification Laboratory	4
Total Hours		14

Major Learning Outcomes

ENVIRONMENTAL, SOIL AND WATER SCIENCES

The learning outcomes of the environmental protection major center on developing individuals who are effective stewards of soil and water resources. A thorough science-based curriculum will allow students - after completion of the major - to assess, evaluate, manage, and safeguard soil and water resources and develop plans to use and/or mitigate impacts on these resources. The major emphasizes long term sustainability, conservation, and stewardship balanced with the need to develop soil and water resources for current and future human use.

Soil & Water Sciences Area of Emphasis

- Describe the important roles of soil and water in the environment in agricultural and non-agricultural systems.
- Design and implement sustainable soil and water management practices.
- Evaluate existing soil, water and landscape resources to develop recommendations for sustainable land use practices.