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 consists of two elements: interdisciplinary training in a broad array of environmental protection sciences, and a specialization in either pest management or soil and water conservation. Students work with their advisor to select courses from both the environmental protection electives and the specialization electives that match their individual interests and career goals. 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:
  - AGRN 410 Soil Fertility 3
  - AGRN 415 Soil Survey and Land Use 3
  - AGRN 417 Soil Genesis and Classification 4
  - AGRN 420 Soil Microbiology 3
  - AGRN 425 Environmental Soil Management 3
  - AGRN 430 Soil Physics 3
  - AGRN 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 or http://www.naep.org

Admissions

Students who meet University admission requirements may be accepted directly into Davis College as Environmental, Soil and Water Sciences majors.

Click here to view the Suggested Plan of Study (p. 3)

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.

General Education Foundations

<table>
<thead>
<tr>
<th>F1 - Composition &amp; Rhetoric</th>
<th>3-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 101 &amp; ENGL 102 or ENGL 103</td>
<td>Introduction to Composition and Rhetoric and Composition, Rhetoric, and Research Accelerated Academic Writing</td>
</tr>
<tr>
<td>F2A/F2B - Science &amp; Technology</td>
<td>4-6</td>
</tr>
<tr>
<td>F3 - Math &amp; Quantitative Reasoning</td>
<td>3-4</td>
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<tr>
<td>F4 - Society &amp; Connections</td>
<td>3</td>
</tr>
<tr>
<td>F5 - Human Inquiry &amp; the Past</td>
<td>3</td>
</tr>
<tr>
<td>F6 - The Arts &amp; Creativity</td>
<td>3</td>
</tr>
<tr>
<td>F7 - Global Studies &amp; Diversity</td>
<td>3</td>
</tr>
<tr>
<td>F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)</td>
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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

#### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tr>
<td>GEF 1, 5, 6, and 7</td>
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<tr>
<td>ENGL 305</td>
<td>Technical Writing</td>
<td>3</td>
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<tr>
<td>BIOL 101</td>
<td>General Biology</td>
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<tr>
<td>&amp; BIOL 103</td>
<td>General Biology Laboratory (GEF 8)</td>
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<tr>
<td>BIOL 102</td>
<td>General Biology</td>
<td>4</td>
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<tr>
<td>&amp; BIOL 104</td>
<td>General Biology Laboratory (GEF 8)</td>
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Select one of the following pairs (GEF 2 & 8):

<table>
<thead>
<tr>
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<th>Course Name</th>
<th>Credits</th>
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</thead>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 101 &amp; GEOL 102</td>
<td>Planet Earth &amp; Planet Earth Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>GEOL 110 &amp; GEOL 111</td>
<td>Environmental Geoscience &amp; Environmental Geoscience Laboratory</td>
<td>3</td>
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</tbody>
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Select one of the following (GEF 3):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tr>
<td>MATH 124</td>
<td>Algebra with Applications</td>
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<tr>
<td>MATH 150</td>
<td>Applied Calculus</td>
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<tr>
<td>ANRD 191</td>
<td>First-Year Seminar</td>
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<tr>
<td>AEM 341</td>
<td>General Microbiology</td>
<td>3</td>
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<tr>
<td>AGEE 110</td>
<td>Microcomputer Applications in Agricultural Education</td>
<td>3</td>
</tr>
<tr>
<td>AGEE 220</td>
<td>Group Organization and Leadership (GEF 4)</td>
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<tr>
<td>AGRN 202</td>
<td>Principles of Soil Science</td>
<td>3</td>
</tr>
<tr>
<td>AGRN 203</td>
<td>Principles of Soil Science Laboratory</td>
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<tr>
<td>ARE 204</td>
<td>Agribusiness Management</td>
<td>3</td>
</tr>
<tr>
<td>ENVP 119</td>
<td>Soil in the City</td>
<td>3</td>
</tr>
<tr>
<td>ENVP 155</td>
<td>Elements of Environmental Protection</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 206</td>
<td>Principles of Plant Science</td>
<td>4</td>
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<tr>
<td>STAT 211</td>
<td>Elementary Statistical Inference</td>
<td>3</td>
</tr>
<tr>
<td>WMAN 150</td>
<td>Principles of Conservation Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ENVP/AGRN 425</td>
<td>Environmental Soil Management (Capstone Experience)</td>
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#### Restricted Electives

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<tr>
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<tr>
<td>AEM/ENVP 401</td>
<td>Environmental Microbiology</td>
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<td>AGRN 455</td>
<td>Reclamation of Disturbed Soils</td>
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<tr>
<td>AEM 420</td>
<td>Soil Microbiology</td>
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<tr>
<td>AGBI 410</td>
<td>Introductory Biochemistry</td>
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</tr>
<tr>
<td>AGRN 125</td>
<td>Soil Judging</td>
<td></td>
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<tr>
<td>AGRN 415</td>
<td>Soil Survey and Land Use</td>
<td></td>
</tr>
<tr>
<td>AGRN 430</td>
<td>Soil Physics</td>
<td></td>
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<tr>
<td>BIOL 361</td>
<td>Plant Ecology</td>
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<tr>
<td>CE 347</td>
<td>Introduction to Environmental Engineering</td>
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<tr>
<td>CE 351</td>
<td>Introductory Soil Mechanics</td>
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<tr>
<td>CHEM 231 &amp; 231L</td>
<td>Organic Chemistry: Brief Course &amp; Organic Chemistry: Brief Course - Laboratory</td>
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<td>Course Code</td>
<td>Course Title</td>
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<tr>
<td>ENVP 355</td>
<td>Environmental Sampling and Analysis</td>
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<tr>
<td>ENVP 460</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>FHYD 444</td>
<td>Watershed Management</td>
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<tr>
<td>GEOL 321</td>
<td>Geomorphology</td>
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<td>GEOL 365</td>
<td>Environmental Geology</td>
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<td>GEOL 462</td>
<td>Introductory Hydrogeology</td>
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<tr>
<td>GEOL 463</td>
<td>Physical Hydrogeology</td>
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<td>GEOL 488</td>
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<td>PLSC 491</td>
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<td>POLS 338</td>
<td>Environmental Policy</td>
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<tr>
<td>RESM 440</td>
<td>Foundations of Applied Geographic Information Systems</td>
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<td>RESM 441</td>
<td>Introduction Geographic Information Systems Natural Science</td>
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<td>RESM 480</td>
<td>Environmental Regulation</td>
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<td>WMAN 446</td>
<td>Freshwater Ecology</td>
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<td>WMAN 449</td>
<td>Stream Ecosystem Assessment</td>
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<td>Free Electives (used to reach 120 minimum required for degree) 10</td>
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<td></td>
<td>Select one Area of Emphasis                      17</td>
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<td>Total Hours                                      120</td>
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**SUGGESTED PLAN OF STUDY**

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ANRD 191</td>
<td>3</td>
<td>1 ANEE 110</td>
<td>3</td>
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<tr>
<td>ENGL 101 (GEF 1)</td>
<td>3</td>
<td>3 ENVP 155</td>
<td>3</td>
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<tr>
<td>BIOL 101</td>
<td>3</td>
<td>4 ENVP 119</td>
<td>3</td>
</tr>
<tr>
<td>&amp; BIOL 103 (GEF 8)</td>
<td>4</td>
<td>3 BIOL 102</td>
<td>4</td>
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<tr>
<td>&amp; BIOL 104 (GEF 8)</td>
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<td>WMAN 150</td>
<td>3</td>
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<tr>
<td>Select one of the following:</td>
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<td></td>
<td></td>
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<tr>
<td>GEOL 101 &amp; GEOL 102</td>
<td>4</td>
<td></td>
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</tr>
<tr>
<td>GEOL 110 &amp; GEOL 111</td>
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| Hours | 15 |

**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Select one of the following (GEF 2):</td>
<td>4</td>
<td>4 PLSC 206</td>
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<tr>
<td>CHEM 111 &amp; 111L</td>
<td>4</td>
<td>3 CHEM 112</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 115 &amp; 115L</td>
<td>4</td>
<td>&amp; 116L</td>
<td>4</td>
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<tr>
<td>ENGL 102 (GEF 1)</td>
<td>3</td>
<td>3 GEF 6</td>
<td>3</td>
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<tr>
<td>STAT 211</td>
<td>3</td>
<td>3 GEF 5</td>
<td>3</td>
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<td>GEF 5</td>
<td>3</td>
<td>3 AGRN 202</td>
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<tr>
<td>Restricted Elective</td>
<td>3</td>
<td>3 AGRN 203</td>
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| Hours | 16 |

| Hours | 15 |
### Third Year

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>AEM 341</td>
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<tr>
<td>ARE 204</td>
<td>3</td>
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<tr>
<td>ENGL 305</td>
<td>3</td>
</tr>
<tr>
<td>GEF 7</td>
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<tr>
<td>Area of Emphasis Required Course</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>4 Area of Emphasis Required Course</td>
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<tr>
<td>3 Restricted Electives</td>
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<tr>
<td>3 Free Electives</td>
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<td><strong>Total</strong></td>
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### Fourth Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>AGEE 220 (GEF 4)</td>
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<tr>
<td>ENVP 425 or AGRN 425</td>
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<tr>
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<tr>
<td>Free Electives</td>
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<td><strong>Total</strong></td>
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<table>
<thead>
<tr>
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<th>Hours</th>
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</thead>
<tbody>
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<td>3 Area of Emphasis Required Courses</td>
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<td>3 Restricted Electives</td>
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Total credit hours: 120

### Environmental Assessment and Reclamation Area of Emphasis

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>ENVP 255</td>
<td>3</td>
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<tr>
<td>ENVP 355</td>
<td>3</td>
</tr>
<tr>
<td>ENVP 455</td>
<td>3</td>
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<tr>
<td>ENVP 460</td>
<td>3</td>
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<tr>
<td><strong>Total Hours</strong></td>
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### Soil and Water Sciences Area of Emphasis

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRN 125</td>
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</tr>
<tr>
<td>AGRN 410</td>
<td>3</td>
</tr>
<tr>
<td>AGRN 415</td>
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<td>AGRN 417</td>
<td>4</td>
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<tr>
<td>AGRN 420</td>
<td>3</td>
</tr>
<tr>
<td>AGRN 430</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

### 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.

**ENVP 119. Soil in the City. 3 Hours.**

Study of soil as a natural resource in urban environments; influence of soils on urban development; study of environmental problems related to soils in urban land uses.

**ENVP 155. Elements of Environmental Protection. 3 Hours.**

An introduction to land and water resources and their management and protection. An evaluation of the relationships between human activities and natural environments and the interaction between natural resource utilization and development.
ENVP 191. First-Year Seminar. 1-3 Hours.
Engages students in active learning strategies that enable effective transition to college life at WVU. Students will explore school, college and university programs, policies and services relevant to academic success. Provides active learning activities that enable effective transition to the academic environment. Students examine school, college and university programs, policies and services.

ENVP 255. Elements of Environmental Management. 3 Hours.
PR: ENVP 155. An introduction to the various regulations promulgated by the United States Environmental Protection Agency. The main goal of this course is to provide the student with a foundation of knowledge that will allow them to read and interpret environmental regulations as well as all types of regulations and codes.

ENVP 325. Principles of Water Resources. 3 Hours.
PR: MATH 124 or higher. This course provides students an opportunity to increase their knowledge pertaining to the role(s) that water plays in human and environmental systems by examining the geographic distribution/redistribution, quantity, and quality of water resources. Students are introduced to water management evaluation policies, law and economics used to explore the decision-making challenges surrounding water resources.

ENVP 355. Environmental Sampling and Analysis. 3 Hours.
PR: BIOL 101 and BIOL 102 and BIOL 103 and BIOL 104 and CHEM 115 and CHEM 116. Introduction to environmental sampling methods and analysis. Lecture and hands-on experience will include sampling plan development, sample point selection, sampling equipment use, containers and preservatives, sample analysis, chain-of-custody and protective equipment.

ENVP 401. Environmental Microbiology. 4 Hours.
PR: AEM 341 or consent. Microbiology as applied to soil, water, wastewater, sewage, air, and the general environment. Occurrence, distribution, ecology, and detection of microorganisms in these environments. (Also listed as AEM 401.).

ENVP 412. Pest Management. 3 Hours.
PR: ENTO 404 or consent. An in-depth look at current problems and solution in controlling insect pests in an environmentally compatible manner. Management techniques include cultural, mechanical, physical, biological, regulatory, and chemical practices. (Also listed as ENTO 412.).

ENVP 415. Hazardous Waste Training. 3 Hours.
Introduction to hazardous waste training. Lectures and hands-on experience with health and safety plan development, selecting personal protective equipment, air monitoring, incident command, site characterization, decontamination and toxicology. Includes two full-scale disaster exercises.

ENVP 420. Soil Microbiology. 3 Hours.
PR: AEM 341. Microbiology and biochemistry of the soil environment. Occurrence, distribution, ecology, and detection of microorganisms in soil. (Also listed as AEM 420 and AGRN 420.).

ENVP 425. Environmental Soil Management. 3 Hours.
PR: AGRN 202 and AGRN 203. This course provides a foundation for utilizing creative solutions and technical knowledge in preserving and enhancing soil and water quality. Soil conservation, precision agriculture and nutrient management for protection of soil and water quality are covered. (Also listed as AGRN 425).

ENVP 451. Principles of Weed Science. 3 Hours.
PR: PLSC 206 and AGRN 202 and AGRN 203 or consent. Fundamental principles of weed science including identification, ecology and control in crops. (Also listed as AGRN 451.).

ENVP 455. Reclamation of Disturbed Soils. 3 Hours.
PR: Junior standing or above. Principles of soil science, geology, hydrology, and engineering will be applied to surface mine planning, overburden handling during mining, soil replacement and amendments, revegetation practices, acid mine drainage control and treatment, hazardous wastes, and land management of disturbed areas. (Field trip required.) (Also listed as AGRN 455.).

ENVP 460. Environmental Impact Assessment. 3 Hours.
PR: BIOL 101 and BIOL 102 and BIOL 103 and BIOL 104 and CHEM 115 and CHEM 116. Application of physical, biological and social science principles to assess environmental impacts. Review and prepare environmental assessments, permits, site assessments and ecological risk assessments for environmental decision-making.