Energy Land Management, B.S.

Degree Offered
- Bachelor of Science

Nature of the Program
This major focuses on energy land management and how it relates to energy development with an emphasis on the management, coordination, and development of surface and mineral interests. This program provides a strong foundation in the key aspects of energy land management and produces trained professionals that are critically needed in the energy and regulatory sectors. Upon completion of this program, students will understand how energy lands are managed and associated energy resources can be developed and used for maximum social, economic, and environmentally responsible benefit. Students will develop a detailed knowledge related to the identification and leasing of mineral estates; be proficient in drilling site development, transportation planning, pipeline development, and route planning; will have a thorough knowledge of post-processing planning and infrastructure development; and comprehend the ethical, regulatory, and environmental framework in which they must operate.

Admissions
- First-Time Freshman are admitted directly into the Energy Land Management major.
- Students transferring from another major within WVU are directly admitted into the Energy Land Management major if they are in good academic standing (2.00 GPA).
- Students transferring from another institution are directly admitted into the Energy Land Management major if they are in good academic standing (2.00 GPA).

ADMISSION REQUIREMENTS 2022-2023
The Admission Requirements above will be the same for the 2022-2023 Academic Year.

Major Code: 0732

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
- F1 - Composition & Rhetoric
  - ENGL 101
  - ENGL 102
  - ENGL 103
- F2A/F2B - Science & Technology
- F3 - Math & Quantitative Reasoning
- F4 - Society & Connections
- F5 - Human Inquiry & the Past
- F6 - The Arts & Creativity
- F7 - Global Studies & Diversity
- F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)

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
- University Requirements 34
- Energy Land Management Program Requirements 56
Energy Land Management Major Requirements

Total Hours 30

University Requirements

General Education Foundations (GEF) 1, 2, 3, 4, 5, 6, 7, and 8 (31-37 Credits)

Outstanding GEF Requirements 1, 4, 5, 6, 7, and 8 21

ANRD 191 First-Year Seminar 1

General Electives 12

Total Hours 34

Energy Land Management Program Requirements

Energy Land Track 14

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>GEOL 101 &amp; GEOL 102</td>
<td>Planet Earth and Planet Earth Laboratory (GEF 2B)</td>
</tr>
<tr>
<td>GEOL 103 &amp; GEOL 104</td>
<td>Earth Through Time and Earth Through Time Laboratory (GEF 8)</td>
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<tr>
<td>STAT 201 or STAT 211</td>
<td>Applied Statistical Modeling (GEF 8)</td>
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<tr>
<td>or MATH 124</td>
<td>Elementary Statistical Inference</td>
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Geology 3

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>GEOL 472</td>
<td>Energy Geology</td>
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Policy 3

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>FOR 421</td>
<td>Renewable Resources Policy and Governance</td>
</tr>
<tr>
<td>FOR 438</td>
<td>Human Dimensions Natural Resource Management</td>
</tr>
<tr>
<td>ARE 450</td>
<td>Agriculture, Environmental and Resource Policy</td>
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Computer 3

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CS 101 or FOR 240</td>
<td>Intro to Computer Applications or Introduction to Computing in Natural Resources</td>
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Natural Resource Management 18

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tbody>
<tr>
<td>AGRN 455</td>
<td>Reclamation of Disturbed Soils</td>
</tr>
<tr>
<td>ARE 220</td>
<td>Introductory Environmental and Resource Economics</td>
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<tr>
<td>ARE 360</td>
<td>Current Issues In Agriculture</td>
</tr>
<tr>
<td>ARE 382</td>
<td>Agricultural and Natural Resources Law</td>
</tr>
<tr>
<td>ARE 410</td>
<td>Environmental and Resource Economics</td>
</tr>
<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>FMAN 212</td>
<td>Forest Ecology</td>
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<tr>
<td>FOR 140</td>
<td>West Virginia's Natural Resources</td>
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<tr>
<td>FOR 326</td>
<td>Remote Sensing of Environment</td>
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<tr>
<td>RESM 480</td>
<td>Environmental Regulation</td>
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<tr>
<td>WDS 422</td>
<td>Harvesting Forest Products</td>
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<tr>
<td>WDS 444</td>
<td>Bio-based Energy Systems</td>
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<tr>
<td>WMAN 150</td>
<td>Principles of Conservation Ecology</td>
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<tr>
<td>WMAN 200</td>
<td>Restoration Ecology</td>
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<tr>
<td>ARE 201</td>
<td>Principles of Resource and Energy</td>
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<td>WMAN 160</td>
<td>Ecology of Invading Species</td>
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<td>ENVP 155</td>
<td>Elements of Environmental Protection</td>
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<tr>
<td>ENLM 415</td>
<td>Midstream Energy Planning and Development</td>
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Business Perspective 15

Select one of the following minors:
Agribusiness Management
General Business
Or select five of the following:

- ECON 200 Survey of Economics
- BCOR 320 Legal Environment of Business
- BCOR 330 Information Systems and Technology
- BCOR 340 Principles of Finance
- BCOR 360 Supply Chain Management
- BCOR 370 Managing Individuals and Teams
- BCOR 380 Business Ethics
- ARE 110 Agribusiness Accounting
- ARE 482 Enterprise Operation Law
- ARE 204 Agribusiness Management
- ARE 431 Marketing Agricultural Products
- ARE 461 Agribusiness Finance

Total Hours: 56

Energy Land Management Major Requirements

A minimum grade of C- or higher is required in Energy Land Management Major coursework.

ENLM 150 Introduction to Energy Land Management 3
ENLM 200 Principles of Energy Land Management 3
ENLM 220 Energy Production & Operations 3
ENLM 300 Ethics and Negotiations for Energy Land Managers 3
ENLM 390 Land and Lease Analysis 3
ENLM 400 Energy Land Management Contracts 1 3
ENLM 420 Energy Land Management Contracts 2 3
ENLM 442 GIS Skills for Energy Land Management 3
ENLM 450 Energy Land Management Strategic Planning (Capstone Experience and fulfills Writing and Communication Skills requirement) 3
ENLM 491 Professional Field Experience 3

Total Hours: 30

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>ENGL 101 (GEF 1)</td>
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<td>GEOL 103</td>
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<td>MATH 124 (GEF 3)</td>
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<td>ENLM 150</td>
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<td>GEOL 101</td>
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<td>General Elective</td>
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<tr>
<td>ANRD 191</td>
<td>1</td>
<td>GEF 5</td>
<td>3</td>
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<tr>
<td>GEF 8</td>
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<td>GEF 6</td>
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Total: 14

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<tr>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>GEOL 104 (GEF 8)</td>
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**Second Year**

<table>
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<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>ENLM 102 (GEF 1)</td>
<td>3</td>
<td>Natural Resource</td>
<td>3</td>
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<tr>
<td>ENLM 200</td>
<td>3</td>
<td>Management 1</td>
<td>3</td>
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<tr>
<td>STAT 201 or 211</td>
<td>3</td>
<td>General Elective</td>
<td>3</td>
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<tr>
<td>Business Choice</td>
<td>3</td>
<td>ENLM 390</td>
<td>3</td>
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Total: 16
Major Learning Outcomes

ENERGY LAND MANAGEMENT

This new B.S. degree program and major will provide undergraduate students a knowledge-based framework that will develop skillsets essential to a successful career in Energy Land Management. Upon graduation from this degree program and major, students will be able to:

- Effectively communicate with stakeholders, peers, and other professionals in both written and oral forms.
- Design operational plans that integrate industry and public stakeholder goals as to minimize impacts of energy development on local environments and create a positive community relationship.
- Evaluate the types of interests in energy resource ownership including explaining the differences between mineral and surface estates, as well as the ability to interpret mineral and surface deeds.
- Demonstrate professional knowledge and be able to negotiate the key elements of energy-related leases and operating agreements under accepted standards of practice.
- Develop budgets and financial projections associated with energy development and the economics related to multiple energy production systems.

ENLM 150. Introduction to Energy Land Management. 3 Hours.
Comprehensive review of the field of energy land management and how it relates to the natural gas and petroleum extraction processes with an emphasis on shale gas development. Examples of property transfers, mineral ownership, and leasing and the distinction between surface and mineral rights.

ENLM 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.

ENLM 200. Principles of Energy Land Management. 3 Hours.
The science of energy land management with an emphasis on petroleum, natural gas, coal, solar, wind, hydropower, and biomass energy production. Complexities of energy systems and how surface and mineral management techniques compare and/or contrast to those found in traditional energy systems.

ENLM 220. Energy Production & Operations. 3 Hours.
Overview of energy development with a focus on oil and gas wellhead operations. Review of drilling technologies, gas extraction processes, fracturing, waste water treatment, gas transportation and other factors involved in the extraction and marketing of natural gas and oil. Class will also develop understanding of wellhead functions, surface equipment, separation and dehydration, compression, oil and gas measurement and gauging.
ENLM 250. Managing Non-Technical Risks. 3 Hours.
Identification, management, and communication of social risks in energy management. Exploration of media relations, crisis communication, advocacy, community education, and government relations as they relate to the energy industry. Risk management and communication skills development through case studies, presentations, and experiential exercises.

ENLM 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ENLM 300. Ethics and Negotiations for Energy Land Managers. 3 Hours.
PR: ENLM 250 with a minimum grade of C-. Basic negotiation components including negotiating positions, techniques, and styles, and how they are used in energy land management. Emphasis placed on the legal and ethical aspects of negotiation and include a complete review of the AAPL code of Ethics and Standards of Practice.

ENLM 390. Land and Lease Analysis. 3 Hours.
PR: ENLM 200 with a minimum grade of C-. Course will cover the theory and practice of real property title and genealogical research. Students will be required to complete and construct a mineral title packet; demonstrate analysis and drafting of oil & gas leases; and develop a solid foundation in heirship research. Students will also develop skills managing complex land records using software systems.

ENLM 393. Special Topics. 1-6 Hours.
Investigation of topics not covered in regularly scheduled courses.

ENLM 400. Energy Land Management Contracts 1. 3 Hours.
PR: ENLM 300 with a minimum grade of C-. Introduction to mineral and environmental law with specific emphasis on titles, deeds, and leasing instruments commonly used in an exploration effort. Examination of land ownership, estates, land measurement, and leasing including a broad overview of the role of the energy land manager during the exploration and development of energy resources.

ENLM 415. Midstream Energy Planning and Development. 3 Hours.
PR: ENLM 220 with a minimum grade of C-. The science of midstream energy with a focus on site and transportation infrastructure development and best management practices for minimizing potential surface and water impacts. Complexities of energy systems with an emphasis on agreements, regulatory framework and techniques for reducing environmental impacts of development in both traditional and renewable energy systems.

ENLM 420. Energy Land Management Contracts 2. 3 Hours.
PR: ENLM 400 with a minimum grade of C-. Continuation of oil and gas contracts with emphasis on lease examination, execution, payment, and development. Complexities of lease management and permitting including an overview of federal, state, and local regulations and how they pertain to oil and gas development.

ENLM 441. Applied Geographic Information Systems and Energy Land Management. 1 Hour.
PR or CONC: RESM 440. Use of Geographic Information Systems (GIS) foundations to solve problems related directly to Energy Land Management. Incorporation of GIS skills in a holistic manner to develop spatial solutions to a real-world challenge in the planning, acquisition, and development of a petroleum/natural gas resource play.

ENLM 442. GIS Skills for Energy Land Management. 3 Hours.
PR: ENLM 200 with a minimum grade of C-. This class will provide students with background in the use of fundamental GIS skills to solve problems directly related to Energy Land Management. GIS skills will be used to develop spatial solutions to a real-world challenge in the planning, acquisition, and development of a petroleum/natural gas resource play.

ENLM 450. Energy Land Management Strategic Planning. 3 Hours.
PR: ENLM 420 with a grade of C or higher. Preparation for the challenges faced when developing energy properties from initial definition to production, including answering targeted questions, writing concise reports, and relaying findings and opinion. Strategic planning includes initial geologic concept, prospect economics, lease acquisition, drilling initial discovery well, reservoir analysis, drilling of development wells, gas marketing, and prospect divestment.

ENLM 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

ENLM 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated for a maximum of 18 Hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ENLM 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ENLM 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENLM 496. 1-3 Hours.
PR: Consent.

ENLM 497. Research. 1-6 Hours.