Energy Land Management

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.

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: Introduction to Composition and Rhetoric, Composition, Rhetoric, and Research, Accelerated Academic Writing

F2A/F2B - Science & Technology
- GEOL 101, GEOL 102: Planet Earth and Planet Earth Laboratory (GEF 2B)
- GEOL 103, GEOL 104: Earth Through Time and Earth Through Time Laboratory (GEF 8)
- STAT 201: Applied Statistical Modeling (GEF 8)
- STAT 211: Elementary Statistical Inference
- ARE 187: Energy Resource Economics (GEF 8)

F3 - Math & Quantitative Reasoning
- MATH 124: Algebra with Applications (GEF 3)

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

GEF 1, 4, 5, 6, & 7

Energy Land Track

ANRD 191: First-Year Seminar
GEOL 101: Planet Earth
& GEOL 102: and Planet Earth Laboratory (GEF 2B)
GEOL 103: Earth Through Time
& GEOL 104: and Earth Through Time Laboratory (GEF 8)
STAT 201: Applied Statistical Modeling (GEF 8)
or STAT 211: Elementary Statistical Inference
ARE 187: Energy Resource Economics (GEF 8)
MATH 124: Algebra with Applications (GEF 3)

Geology
- GEO 373: Introduction to Petroleum Geology

Petroleum Engineering
- 3

- 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PNGE 200</td>
<td>Introduction to Petroleum Engineering</td>
</tr>
<tr>
<td>RESM 440</td>
<td>Foundations of Applied Geographic Information Systems</td>
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**GIS and Remote Sensing**

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<th>Course Code</th>
<th>Course Title</th>
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**Policy**

Choose 1 of the following:

- FOR 421 Renewable Resources Policy and Governance
- FOR 438 Human Dimensions Natural Resource Management
- ARE 450 Agriculture, Environmental and Resource Policy

**Computer**

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

Select 6 from the following

- AGRN 455 Reclamation of Disturbed Soils
- ARE 220 Introductory Environmental and Resource Economics
- ARE 360 Current Issues In Agriculture
- ARE 382 Agricultural and Natural Resources Law
- ARE 410 Environmental and Resource Economics
- ENVP 460 Environmental Impact Assessment
- FHYD 444 Watershed Management
- FMAN 212 Forest Ecology
- FMAN 222 Forest Mensuration
- FOR 140 West Virginia's Natural Resources
- FOR 310 Elements of Silviculture
- FOR 326 Remote Sensing of Environment
- RESM 480 Environmental Regulation
- WDSC 422 Harvesting Forest Products
- WDSC 444 Bio-based Energy Systems
- WMAN 150 Principles of Conservation Ecology
- WMAN 175 Introduction to Wildlife and Fisheries
- WMAN 200 Restoration Ecology

**Business**

Accounting - Select 1 of the following

- BUSA 202 Survey of Accounting
- ARE 110 Agribusiness Accounting

Law - Select 1 of the following

- BUSA 310 Survey of Business Law
- ARE 482 Enterprise Operation Law

Management - Select 1 of the following

- BUSA 320 Survey of Management
- ENTR 340 Survey of Entrepreneurship
- ARE 204 Agribusiness Management

Marketing - Select 1 of the following:

- BUSA 330 Survey of Marketing
- ENTR 300 Creativity and Idea Generation
- ARE 431 Marketing Agricultural Products
- WDSC 470 Marketing Forest Products

Finance - Select 1 of the following:

- BUSA 340 Survey of Finance
- ENTR 380 Survey of Business Planning
- ARE 461 Agribusiness Finance
### 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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<tr>
<td>ENGL 101 (GEF 1)</td>
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<td>GEOL 103 &amp; GEOL 104 (GEF 8)</td>
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<tr>
<td>MATH 124 (GEF 3)</td>
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<td>ENLM 150</td>
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<td>GEOL 101 &amp; GEOL 102 (GEF 2B)</td>
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<td>ANRD 191</td>
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<td>ARE 187 (GEF 8)</td>
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**Second Year**

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<th>Fall</th>
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<td>ENGL 102 (GEF 1)</td>
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<td>Natural Resource Management 1</td>
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<tr>
<td>ENLM 200</td>
<td>3 FOR 240</td>
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<td>STAT 201 or 211 (GEF 8)</td>
<td>0-3 PNGE 200</td>
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<td>GEF 7</td>
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**Third Year**

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<td>Natural Resource Management 2</td>
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<td>3 ENLM 491</td>
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<td>Natural Resource Management 3</td>
<td>3 ENLM 441</td>
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<td>ENLM 300</td>
<td>3 ENLM 400</td>
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<tr>
<td>Business - Marketing</td>
<td>3 GEOL 373</td>
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<tr>
<td>GEF 4</td>
<td>3 Business - Law</td>
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**Fourth Year**

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<td>Natural Resource Management 4</td>
<td>3 Business - Finance</td>
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<td>Natural Resource Management 5</td>
<td>3 ENLM 450</td>
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<tr>
<td>Policy</td>
<td>3 Elective</td>
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**Total Hours**: 121
Major Learning Outcomes

ENERGY LAND MANAGEMENT

Upon graduation from this degree program and major, students will be able to:

• demonstrate the role of professional energy land managers in energy development
• compare and contrast land management activities associated with multiple energy production systems
• demonstrate the impacts of energy development on local communities and be able to develop plans that minimize impacts
• explain the role of media in the energy business, the necessity of appropriate communication in crisis situations, and the concept of non-technical risks associated with energy development
• demonstrate a complete knowledge of ethics and standards of practices in association with energy development and an understanding of common negotiating strategies
• interpret the types of interests in energy resource ownership including the ability to recognize the differences between mineral and surface estates, the ability to interpret mineral and surface deeds, and the ability to understand the key elements of energy-related leases
• recognize the basic process of permitting of energy development at both the State and Federal level, and be able to manage the complexities of energy land development through the use of lease and production management software
• apply their collective experience and knowledge gained through the Energy Land Management Curriculum as a professional energy land manager upon graduation.
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.