Energy Minor

Energy Minor Requirements

The Energy minor is designed to allow students majoring in a diverse set of disciplines to develop additional expertise in energy and to position them to become leaders in the energy field, either directly as entering professionals in industry, government laboratories, and other organizations, or as students in the best graduate programs.

It consists of 26-29 credits of energy-related courses in four areas: (a) pre-requisite courses, (b) fundamentals, (c) science and policy context, and (d) technical energy electives. There are two options for completing the fundamentals. Option I is recommended for students completing a major that does not require a thermodynamics course. Option II is recommended for students completing a major that requires a thermodynamics course. Students are encouraged to select electives to fit their particular interests and career goals.

Elective courses that can count toward the minor are those focused on science and policy issues related to energy and relevant technical skills and knowledge areas. The joint KSAS and WSE Directors of Undergraduate Studies (DUS) maintain a list of approved courses for the minor each semester, and these courses are denoted with the POS tags ENGY-TECH and ENGY-SCIPOL in the Schedule of Classes.

Approval for other appropriate courses can be sought by emailing one of the DUS's. All courses must be taken for a letter grade, and students must earn a grade of C- or better to apply the course to the minor. Courses must be taken at Johns Hopkins. Exam credits and waivers cannot be used to satisfy the requirements.

Sample Programs of Study

Students majoring in a natural science discipline who do Option I of the fundamentals may follow a curriculum similar to the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS.173.111</td>
<td>General Physics Laboratory I</td>
<td>3</td>
</tr>
<tr>
<td>or AS.173.115</td>
<td>Classical Mechanics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td><strong>Fundamentals: Option I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN.520.370</td>
<td>Introduction to Renewable Energy Engineering</td>
<td>3</td>
</tr>
<tr>
<td>AS.171.102</td>
<td>General Physics: Physical Science Major II</td>
<td>4</td>
</tr>
<tr>
<td>or AS.171.104</td>
<td>General Physics/Biology Majors</td>
<td></td>
</tr>
<tr>
<td>or AS.171.106</td>
<td>Electricity and Magnetism I</td>
<td></td>
</tr>
<tr>
<td>or AS.171.108</td>
<td>General Physics for Physical Science Majors (AL)</td>
<td></td>
</tr>
<tr>
<td>AS.173.112</td>
<td>General Physics Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>or EN.560.112</td>
<td>Electromagnetism &amp; Sensors Lab</td>
<td></td>
</tr>
<tr>
<td><strong>Fundamentals: Option II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN.520.370</td>
<td>Introduction to Renewable Energy Engineering</td>
<td>3</td>
</tr>
<tr>
<td>AS.030.301</td>
<td>Physical Chemistry I</td>
<td>2-4</td>
</tr>
<tr>
<td>or AS.171.312</td>
<td>Statistical Physics/Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>or AS.250.372</td>
<td>Biophysical Chemistry</td>
<td></td>
</tr>
<tr>
<td>or EN.510.312</td>
<td>Thermodynamics/Materials</td>
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</tr>
<tr>
<td>or EN.530.231</td>
<td>Mechanical Engineering Thermodynamics</td>
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</tr>
<tr>
<td>or EN.540.203</td>
<td>Engineering Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>or EN.580.241</td>
<td>Statistical Physics</td>
<td></td>
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</table>

Science and Policy Context Electives

Complete a minimum of 6 credits of approved electives with the ENGY-SCIPOL POS-Tag

Technical Energy Electives

Complete a minimum of 6 credits of approved electives with the ENGY-TECH POS-Tag

Total Credits

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>27-29</td>
</tr>
</tbody>
</table>

* Students complete either (1) Fundamentals: Option I or (2) Fundamentals: Option II.

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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AS.110.106</td>
<td>Calculus I (Biology and Social Sciences)</td>
<td>4</td>
</tr>
<tr>
<td>or AS.110.108</td>
<td>Calculus I (Physical Sciences &amp; Engineering)</td>
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<tr>
<td>AS.171.101</td>
<td>General Physics: Physical Science Major I</td>
<td>4</td>
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<tr>
<td>or AS.171.103</td>
<td>General Physics for Biological Science Majors</td>
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<tr>
<td>or AS.171.105</td>
<td>Classical Mechanics I</td>
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</tr>
<tr>
<td>or AS.171.107</td>
<td>General Physics for Physical Sciences Majors (AL)</td>
<td></td>
</tr>
</tbody>
</table>

Professor Susanna Thon at susanna.thon@jhu.edu

The Energy minor is jointly administered by the Department of Earth and Planetary Sciences in the Krieger School of Arts and Sciences and the Department of Electrical and Computer Engineering in the Whiting School of Engineering and is affiliated with the Ralph O’Connor Sustainable Energy Institute (ROSEI, https://energyinstitute.jhu.edu/) which provides additional support and co-curricular opportunities to students in the program. If you have questions regarding the minor, please direct them to Professor Susanna Thon at susanna.thon@jhu.edu.

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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tr>
<td>Fall</td>
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<tr>
<td>AS.110.108</td>
<td>Calculus I (Physical Sciences &amp; Engineering)</td>
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<tr>
<td>AS.171.101</td>
<td>General Physics: Physical Science Major I</td>
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<td>AS.173.111</td>
<td>General Physics Laboratory I</td>
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<td>EN.520.370</td>
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<td>Spring</td>
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<td>EN.510.312</td>
<td>Thermodynamics/Materials</td>
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<td>Fall</td>
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<td>Policy elective (ENGY-SCIPOL)</td>
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<td>Technical elective (ENGY-TECH)</td>
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<td>Policy elective (ENGY-SCIPOL)</td>
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<td>Spring</td>
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<td>Technical elective (ENGY-TECH)</td>
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