The Institute for Sustainability and Energy at Northwestern (ISEN) advances global energy and sustainability solutions through transformational research, interdisciplinary education, and public engagement. ISEN supports on-campus research at the undergraduate, graduate, and faculty levels spanning multiple fields, including physical and social sciences, engineering, law, policy, ethics, business, economics, and journalism. It also sponsors a variety of outreach programs, both on and off campus, in collaboration with student groups, academic and governmental partners, and private industry.

ISEN also offers curriculum at the undergraduate and graduate levels, including an undergraduate certificate in sustainability and energy. It provides a means for Northwestern students to pursue interdisciplinary instruction in the increasingly important areas of sustainability and energy during their undergraduate coursework, while signaling broad topic proficiency to potential future employers. See more at isen.northwestern.edu/isen-certificate.

In partnership with Northwestern's Study Abroad Office, Office of International Program Development, and Northwestern Engineering Office for Global Initiatives, ISEN offers for-credit and non-credit summer programs in China, Germany, and Israel, with a focus on renewable energy policy, green technology development, sustainable manufacturing, and water resource management. See more at isen.northwestern.edu/study-abroad.

Certificate Requirements (7 units)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ISEN 210-0</td>
<td>Introduction to Sustainability: Challenges and Solutions</td>
</tr>
<tr>
<td>ISEN 220-0</td>
<td>Introduction to Energy Systems for the 21st Century</td>
</tr>
<tr>
<td>ISEN 230-0</td>
<td>Climate Change and Sustainability: Ethical Dimensions</td>
</tr>
</tbody>
</table>

- 4 electives
  - Chosen from pre-approved curricula—including study abroad options—in the natural and social sciences, engineering, and other disciplines. An eligible electives list (along with registration forms and FAQs) is at isen.northwestern.edu/isen-certificate.
  - Can draw no more than 2 elective courses from a single department/program.
  - At least 3 must be 300 level or higher.
  - 3.0 GPA requirement.
  - Up to 3 of the 7 total courses may be double-counted toward all other academic plans (major, minor, other certificates; including distribution requirements, unrestricted electives, etc).

ISEN 210-0 Introduction to Sustainability: Challenges and Solutions (1 Unit) Introduction to using lifecycle systems perspectives in forming evaluations and basic quantitative understandings of the challenges and potential solutions that exist for sustainable societies; framing these in the context of resource use, energy consumption and development, and environmental constraints. Social Behavioral Sciences Distro Area

ISEN 220-0 Introduction to Energy Systems for the 21st Century (1 Unit) Overview of energy issues in the context of global sustainability: energy demands for industrial, transportation, housing, and commercial uses, strategies for demand reduction, traditional versus renewable energy systems. Natural Sciences Distro Area

ISEN 230-0 Climate Change and Sustainability: Ethical Dimensions (1 Unit) Interdisciplinary analysis of economic and ethical issues concerning climate change; scientific evidence for anthropogenic global warming; economics and ethics of resource use, conservation practices, and sustainability. ISEN 230-0 taught with PHIL 270-0; students may not earn credit for both courses. Ethics Values Distro Area

ISEN 350-SA Energy Technology & Policy in China (1 Unit) Examines the energy landscape in China, including an overview of various energy technologies, national policies, practical applications, and future innovations, through lectures and field trips in the US and China. Restricted to students in Northwestern's China program.

ISEN 390-0 Special Topics in Energy & Sustainability (1 Unit) Focused exploration of specific topical themes, trends, and challenges in applied energy and sustainability. Content varies each year; previously offered topics include geographic information systems and the impact of energy systems on the geographic distribution, wellbeing, and social organization of societies. May be repeated for credit with change in topic.

ISEN 390-SA Special Topics in Energy & Sustainability (1 Unit) Focused exploration of specific topical themes, trends, and challenges in applied energy and sustainability. Content varies each year; previously offered topics include geographic information systems and the impact of energy systems on the geographic distribution, wellbeing, and social organization of societies. May be repeated for credit with change in topic.