

REQUIREMENTS FOR THE ISEN CERTIFICATE

*Last edited Sept. 2020; applies to all students declaring the ISEN Certificate in AY2020-21 or later, until updated
The previous (pre-Sept 2020 edit) list of pre-approved electives is accessible [here](#).*

The ISEN undergraduate certificate provides a means for Northwestern students to pursue instruction that contextualizes the relevance and importance of climate, sustainability, and energy across a broad spectrum of disciplines. Certificate students will develop a sustainability literacy that allows them to make informed and effective decisions towards building a more equitable, sustainable future, no matter what they pursue professionally post-graduation.

ISEN CERTIFICATE REQUIREMENTS

- **ISEN 200-level core sequence (3.0 credits)**
ISEN 210 – *Introduction to Sustainability*
ISEN 220 – *Introduction to Energy Systems for the 21st Century*
ISEN 230 - *Climate Change and Sustainability: Ethical Dimensions*
(Note: these courses are non-sequential and can be taken in whatever order best fits the student's schedule)
- **Electives (4.0 additional credits)**
 - At least three (3) at the 300+ level; none at the 100-level
 - At most two (2) from any department or program (for classes that are cross-listed, the department the shows on your transcript will be the one we use to evaluate this rule)
 - Only one (1) approved study abroad course can be counted
 - Relevant "Special Topics" courses may be counted more than once, with a change in topic
- **GPA requirements**
 - 3.0 average or better within the ISEN 200-level sequence
 - 3.0 average or better across all seven requisite courses
 - All classes submitted towards completion of the Certificate must receive a merit (letter) grade
- **Double-Counting Rules**
 - Certificates requires academic course work of at least four (4) units that are not applied to a major or minor - means you can double-count up to three (3) courses *cumulatively* (across all other majors/minor, not per additional major/minor)
 - Double-counted classes can be from the ISEN core sequence, the electives, or a mixture thereof

PRE-APPROVED ELECTIVES

Approved Electives are noted below. Because new courses are being introduced/retired all the time, and/or course numbers change from time-to-time, it's possible that you may not see a course below that you believe should be included, or may see a course that is not offered in a given year (particularly Special Topics courses). Please contact isened@northwestern.edu to inquire under such a circumstance.

Courses should have a primary/majority focus on topic(s) pertinent to climate, sustainability and/or energy.

Natural Sciences

Biological Sciences

BIOL_SCI 335 – *Critical Topics in Ecology and Conservation*
BIOL_SCI 337/PBC 435 – *Biostatistics (formerly Quantitative Methods for Ecology and Conservation)*
BIOL_SCI 347 – *Conservation Biology*

Chemistry

CHEM 306/406 – *Environmental Chemistry*
CHEM 393 – *Green Chemistry*
CHEM 435/445 – *Advanced Inorganic / Advanced Physical Chemistry: Chemistry of Alternative Energy*

Earth and Planetary Sciences

EARTH 314/CIV_ENV 314 – *Organic Geochemistry*
EARTH 341 – *Quaternary Climate Change: From the Ice Age to the Age of Oil*
EARTH 342/ISEN 410 – *Contemporary Energy & Climate Change*
EARTH 343 – *Earth System Modeling*
EARTH 390 – *Special Topics (when relevant, e.g., GIS Applications for Earth and Environmental Sciences)*
EARTH 450 - *Advanced Topics (when relevant, e.g. Communicating Science Beyond Academia, in Paleoclimate*

Environmental Sciences

ENVR_SCI 201 – *Earth: A Habitable Planet*
ENVR_SCI 202 – *The Health of the Biosphere*
ENVR_SCI 203 – *Humans and the Environment*
ENVR_SCI 390 – *Special Topics (when relevant, e.g., GIS Applications for Earth and Environmental Sciences, Global Change Ecology, etc.)*

Physics

PHYSICS 333-2 - *Advanced Electricity and Magnetism*
PHYSICS 359 - *Electronics Laboratory*

Engineering

Chemical and Biological Engineering

CHEM_ENG 345 – *Process Optimization for Energy and Sustainability*
CHEM_ENG 364 – *Chemical Processing and the Environment*
CHEM_ENG 365 – *Sustainability, Technology and Society*
CHEM_ENG 367 – *Quantitative Methods in LCA*

Civil and Environmental Engineering

CIV_ENV 201 – *Engineering Possibilities: Decision Science in the Age of Smart Technologies*

<p>CIV_ENV 202 – <i>Biological and Ecological Principles</i> CIV_ENV 203 – <i>Earth in the Anthropocene</i> CIV_ENV 260 – <i>Environmental Systems and Processes</i> CIV_ENV 295 – <i>Climate Change and Adaptation</i> CIV_ENV 303/ENVR_POL 390 – <i>Environmental Law and Policy</i> CIV_ENV 304 – <i>Civil & Environmental Engineering Systems Analysis</i> CIV_ENV 314/EARTH 314 – <i>Organic Geochemistry</i> CIV_ENV 346 – <i>Ecohydrology</i> CIV_ENV 361-1 – <i>Environmental Microbiology</i> CIV_ENV 361-2 – <i>Public and Environmental Health</i> CIV_ENV 364 – <i>Sustainable Water Systems</i> CIV_ENV 368 – <i>Sustainability: The City</i> CIV_ENV 387 – <i>Design of Sustainable Urban Developments</i> CIV_ENV 395 – <i>Special Topics (when relevant, e.g., Energy Law and Policy, Water in Israel and the Middle East, Energy Geostructures and Geosystems, etc)</i></p> <p><u>Materials Science</u> MAT_SCI 381 – <i>Energy Materials</i> MAT_SCI 382 – <i>Electrochemical Energy Materials and Devices</i></p> <p><u>Mechanical Engineering</u> MAT_SCI 380/ISEN 390 - <i>Thermal Energy Systems Design</i> MECH_ENG 395 – <i>Special Topics (when relevant, e.g., Combustion/Energy Systems; Fundamentals of Nuclear Reactor Physics; Energy and Society, Bioinspired Surface Engineering)</i></p> <p><u>Project Management</u> PROJ_MGMT 441 - <i>Sustainability in Construction</i> PROJ_MGMT 443 - <i>Sustainability Strategies in Organizations</i> PROJ_MGMT 445 - <i>Sustainability Policy and Regulatory Context</i> PROJ_MGMT 446 – <i>System Thinking for Sustainable Design</i> PROJ_MGMT 448 – <i>Metrics of Sustainability</i> PROJ_MGMT 449 – <i>Economics of Sustainability</i></p> <p><u>Other Engineering courses</u> ENTREP 474/ISEN 430 – <i>NUvention: Energy</i></p> <p>Social Sciences/Humanities</p> <p><u>Economics</u> ECON 371 – <i>Economics of Energy</i> ECON 372 – <i>Environmental Economics</i> ECON 373 – <i>Natural Resource Economics</i></p> <p><u>Environmental Policy and Culture</u> ENVR_POL 212/SOCIOLOG 212 – <i>Environment and Society</i> ENVR_POL 336/SOCIOLOG 336 – <i>The Climate Crisis, Policies and Society</i> ENVR_POL 340 – <i>Global Environments and World History</i> ENVR_POL 390 – <i>Special Topics in EPC (when relevant, e.g., US and/or International Environmental Politics, Political Ecology, Media, Earth and Making a Difference, Climate Change, Law and Policy, etc)</i> ENVR_POL 394 – <i>Professional Linkage Seminar (always relevant, e.g., International Environmental Organizations)</i> ENVR_POL 395 – <i>Special Topics Seminar (when relevant, e.g., Climate Change and Public Health)</i></p> <p><u>English</u> ENGLISH 300 - <i>Seminar in Reading and Interpretation: Global Ecologies</i></p>	<p>ENGLISH 339 - <i>Special Topics in Shakespeare (when relevant, e.g. Green Worlds? Shakespeare’s Environmental Questions (Pre-1830))</i> ENGLISH 378 - <i>Studies in American Literature (when relevant, e.g. Environmental Justice in Black and Indigenous Women’s Literature)</i></p> <p><u>History</u> HIST 251 – <i>The Politics of Disaster: A Global Environmental History</i> HIST 300 - <i>New Lectures in History (when relevant, e.g. American Environmental History)</i> HIST 309 – <i>American Environmental History</i> HIST 376 – <i>Global Environments and World History</i> HIST 392 – <i>Topics in History (when relevant, e.g. History of the Environment: Science, Technology and Culture, Environment and Energy in the Middle East, Energy in American History, etc)</i></p> <p><u>Political Science</u> POLI_SCI 329 – <i>US Environmental Politics</i> POLI_SCI 349/ENVR_POL 390 – <i>International Environmental Politics</i> POLI_SCI 390 – <i>Special Topics (when relevant, e.g. Civic Participation and the Environment, Environmental Politics of the Middle East, Geopolitics of Energy)</i></p> <p><u>Sociology</u> SOCIOLOG 212/ENVR_POL 212 – <i>Environment and Society</i> SOCIOLOG 336/ENVR_POL 336 – <i>The Climate Crisis, Policies and Society</i></p> <p><u>Other Social Sciences/Humanities courses</u> ANTHRO 390 – <i>Special Topics (when relevant, e.g. Political Ecology, Arch of Sustainability and Collapse)</i> COMM_ST COMM_ST 383 – <i>Media, Communications, Environment</i> COMP_LIT 302 - <i>Reading Across Disciplines (when relevant, e.g. Environmental Cultures in East Asia)</i> GEOG 240 – <i>Economic Geography</i> HUM 370 - <i>Special Topics (when relevant, e.g. Fire and Blood: Resources, Energy, and Society)</i> JOUR 390-0 – <i>Topics (when relevant, e.g. Native American Environmental Issues and the Media)</i> MENA 390 – <i>Advanced Topics (when relevant, e.g. Resources, Energy, and Power in the Middle East and North Africa)</i> PHIL 270 - <i>Climate Change and Sustainability: Ethical Dimensions (*Note – this is a cross-list of ISEN 230, and therefore is NOT eligible for elective credit*)</i> RELIGION 369/ENVR_POL 390 – <i>Media, Earth & Making a Difference</i></p> <p>Other</p> <p><u>ISEN (non-core) courses</u> ISEN 390 – <i>Special Topics in Energy and Sustainability (always relevant)</i> ISEN 410/EARTH 342 – <i>Contemporary Energy & Climate Change</i> ISEN 430/ENTREP 474 – <i>NUvention: Energy</i> ISEN 495 - <i>Special Topics in Energy and Sustainability (always relevant)</i> * Please note that there are several additional ISEN 400-level courses designed specifically for MS Energy & Sustainability (MSES) students that are not typically open to undergrad enrollment, and so are not listed here. Should you receive</p>
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<p><i>enrollment permission, all ISEN 400-level classes would be approved for ISEN Certificate elective credit</i></p> <p><u>Study Abroad Options</u> Wanxiang Summer Program: <i>Energy Technology and Policy in China</i> (ISEN 350-SA) <i>Others must be pre-approved</i></p>	
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