

Environmental Engineering and Sustainability Designated Minor

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Concern for the environment now influences a wide range of public, private and engineering decisions. Environmental Engineering is widely recognized as a discipline at the graduate and professional level, and undergraduate training in environmental issues and processes can provide the preparation necessary to pursue this career path, or serve as a useful complement to a career in any of the traditional areas of engineering. Sustainability issues are now considered critical across engineering disciplines. Effective preparation requires broad knowledge and skills in the areas of environmental engineering, sustainability, and environmental policy.

Faculty Advisors

The Environmental Engineering and Sustainability Program is a focus for faculty members from diverse engineering backgrounds. The faculty are actively engaged in teaching and conducting research in this field. Current faculty advisors are:

Biomedical Engineering: Robert Tilton

Chemical Engineering: Neil Donahue

Civil and Environmental Engineering: Jeanne VanBriesen

Electrical and Computer Engineering: Marija Ilic

Engineering and Public Policy: Mark Kieler and Edward Rubin

Mechanical Engineering: Allen Robinson

Materials Science and Engineering: Paul Salvador and Robert Heard

Course Requirements for Environmental Engineering and Sustainability Minor

The requirements include two core courses, three technical electives and two policy electives.

A1. Core Courses in Sustainability (12 units).

Select one set of **two** mini courses from:

19-622 (co-listed as 12-712) Sustainability

19-623 (co-listed as 12-713) Industrial Ecology

OR

19-614 (co-listed as 12-714) Life Cycle Assessment

19-616 (co-listed as 12-715) Case Studies in Sustainability

A2. Core Courses in Environmental Engineering (9 units).

Select **one** NOT in your home major department from:

12-351 Fundamentals of Environmental Engineering

24-424 (co-listed as 19-424) Energy and the Environment

12-651 Air Quality Engineering

24-425 Combustion and Air Pollution Control

12-702 Fundamentals of Water Quality Engineering

06-620 Global Atmospheric Chemistry: Fundamentals and
Data Analysis Methods

B. Technical Electives in Environmental Engineering and Sustainability (27 units):

Select **three** from the following list

- 03-121 Modern Biology
- 09-106 Modern Chemistry II
- 09-510 Introduction to Green Chemistry
- 06-620 Global Atmospheric Chemistry
- 12-351 Fundamentals of Environmental Engineering
- 12-651 Air Quality Engineering
- 12-702 Fundamentals of Water Quality Engineering (new course proposed by CEE for Fall 2008)
- 12-657 Water Resources Engineering
- 12-658 Hydraulic Structures Design
- 24-424 Energy and the Environment
- 24-425 Combustion and Air Pollution Control
- 19-622 Sustainability (6 units; must be combined with additional 3 units; also listed as 12-712)
- 19-623 Industrial Ecology (6 units; must be combined with additional 3 units; also listed as 12-713)
- 19-614 Life Cycle Assessment (6 units; must be combined with additional 3 units; also listed as 12-714)
- 19-616 Case Studies in Sustainability (6 units; must be combined with additional 3 units; also listed as 12-715)
- 19-650 Climate and Energy: Science, Economics, and Public Policy
- 27-322 Processing of Metals (or 27-323 Powder Processing of Materials: but not both)
- 27-323 Powder Processing of Materials (or 27-322 Processing of Metals: but not both)
- 27-421 Processign Design (6 units; must be combined with three additional units)
- 27-367 Selection and Performance of Materials (6 units; must be combined with three additional units)
- 27-594 Electrochemical Processes in Materials
- 42-621 Biotechnology and Environmental Processes (also listed as 06-621)
- 48-315 Environment I: Climate and Energy
- 48-415 Advanced Building
- 48-596 LEED Building and Green Design Concepts
- 48-569 GIS/ CAFM (also listed as 90-784)
- 48-572 Zero Energy Housing

C. Policy Electives (18 units)

Select **two** from the following list of humanities/social science oriented courses:

- 12-608 Implications of Engineering in Global Society
- 19-448 Science, Technology and Ethics
- 19-626 Climate Science and Policy
- 48-567 Sustainable Design and Development
- 48-576 Mapping Urbanism
- 66-210 Science, Technology and the Environment

73-248 Environmental Economics
 73-357 Regulation: Theory and Policy
 73-358 Economics of the Environment and Natural Resources
 73-359 Benefit-Cost Analysis
 76-319 Environmental Rhetoric
 79-111 Cultural Perspectives on the Environment
 79-244 Pittsburgh and the Transformation of Modern Urban America
 79-263 From Soil to Oil: Energy, Ecology, and Globalization
 79-326 The Role of the Environment in the Collapse of Ancient Societies
 79-336 Epidemic Disease and Public Health
 79-343 Environmental Policy and Development in the Tropical World
 79-345 American Environmental History: Critical Issues
 79-346 International Environmental Law and Policy (also listed as 88-352)
 79-365 Climate Change, Energy Policy and Environmental Protection
 79-398 Environmental History and Politics Since Silent Spring (also listed as 88-346)
 79-471 American Built Environment Since 1860
 79-475 Perspectives on the City and the Environment (also 90-762)
 79-211 Disaster! Fires, Plagues, Hurricanes and Floods in American History
 79-212 Disastrous Encounters: Technology and the Environment in Global Historical
 Context
 80-242 Conflict and Dispute Resolution
 80-244 Environmental Management and Ethics
 88-220 Policy Analysis I
 88-221 Policy Analysis II
 88-223 Decision Analysis and Decision Support Systems
 80-340 Environmental Ethics and Decision Processes
 99-522 Corporations and Environmental Responsibility
 90-747 Cost-Benefit Analysis
 90-758 Ethics and Public Policy in a Global Society
 90-765 Cities, Technology and the Environment
 90-789 Sustainable Community Development
 90-798 Environmental Policy and Regulation
 90-851 Environmental Policy
 90-859 Environmental Conflict Resolution

NOTES:

1. The 48-xxx courses may not be acceptable as technical electives by some CIT engineering departments. (At most one of these courses can be used as a Type B course and one as a Type C course.)
2. Course 12-351 Fundamentals of Environmental Engineering can be counted toward completion of the environmental engineering and sustainability course requirements for non-CEE students only.
3. Courses cannot be double-counted for lists A and B.
4. Courses used to fulfill the basic science requirement for CIT cannot be double counted for list B requirements. Courses required within a student's CIT major can be double counted for list B requirements.

5. Students may take up to two list B courses in their home department. One list B course must be from outside their home department. EPP double majors should NOT consider EPP their home department.
6. Other humanities and social science courses with similar or related content may be substituted for Type C courses with permission of the student's departmental advisor and the Director.
7. A group of three environmental policy courses MAY be counted as fulfilling the H&SS depth requirement required of all CIT students.
8. A list of relevant courses for Type B and C in each semester is provided at the Environmental Engineering and Sustainability Minor web site: