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The Environmental Sciences Program is headquartered in this building at the corner of Hinman Ave. and Clark St. on the south edge of Northwestern's Evanston campus.

ENVIRONMENTAL SCIENCES PROGRAM

Weinberg College of Arts and Sciences
Northwestern University
Evanston, Illinois

This brochure is designed as background information for students contemplating a major in Environmental Sciences and as a guide to program requirements for current majors. Those who wish to learn more about the major should contact Prof. John C. Hudson, Environmental Sciences Program, Northwestern University, 1810 Hinman Ave., Evanston, IL 60208-1310 or at j-hudson@northwestern.edu. Phone (847) 491-2855.

Program of Study for the Environmental Sciences major

Between twenty and twenty-two courses are required to complete an Environmental Sciences major, depending on a student's placement in science and mathematics courses on entering the university. The major is structured around four successive levels of course work.

I. Foundation courses in science, mathematics, and social science support an understanding of environmental issues. *(Ten or eleven courses required)*

II. Core courses represent the first step toward focusing on the environment. These are specialized courses drawing from the earth and biological sciences and engineering. *(Three courses are required)*

III. Advanced Studies are upper-level courses in science, social science, and engineering that develop the theory and methods of environmental analysis. *(Six courses are required)*

IV. Environmental Research Seminar is the capstone of the program. It is a two-quarter research seminar taken in the senior year. *(Two courses are required)*

It is advisable to complete the Foundation courses in the first two years and to take the Core courses during the second and third years.

Detailed listing of required and elective course options in the Environmental Sciences major

I. Foundation courses

All of these are required:

- Chemistry 101 (General Chemistry), 102 (General Inorganic Chemistry), and 103 (General Physical Chemistry) *OR* 171 (Accelerated General Inorganic Chemistry) and 172 (Accelerated General Physical Chemistry).
- Mathematics 220 (Differential Calculus of One Variable Functions), 224 (Integral Calculus of One Variable Functions).

plus five of the following

- Mathematics 230 (Differential Calculus of Multivariable Functions).
- Statistics 210 (Introductory Statistics for the Social Sciences)
- Physics 135-1,2 General Physics. Counts as two courses. Physics 130-1,2 (College Physics) may be substituted with consent of the program advisor)
- Biology 210-1 (Genetics and Evolutionary Biology) *OR* Biology 164 (Genetics and Evolution)
- Chemistry 210-1 (Organic Chemistry)
- Economics 201 (Introduction to Macroeconomics), 202 (Introduction to Microeconomics) Counts as two courses.

II. Core courses

Three courses are required:

- Envr Sci 201 (Earth, An Habitable Planet); Envr Sci 202 (The Health of the Biosphere); Envr Sci 203 (Energy and the Environment: The Automobile)

III. Advanced Studies courses

Six courses are required, of which four must be at the 300-level. In most cases students should select four courses from the Science list and two from the Environment and Society list.

• Science courses

- Anthropology 312 (Human Population Biology); 313 (Anthropological Population Genetics); 315 (Medical Anthropology)
- Biological Sciences 341 (Population Genetics); 343 (Phylogenetics); 345 (Topics in Evolutionary Biology); 346 (Field Ecology); 347 (Conservation Biology), 348 (Plant Population Genetics); 349 (Plant Community Ecology)
- Chemistry 204 (Environmental Chemistry), 329 (Analytical Chemistry); 342-1 (Thermodynamics); 393 (Green Chemistry)
- Civil and Environmental Engineering 358 (Airphoto Interpretation); 359 (Hazardous Waste Management); 360 (Environmental Impact Evaluation); 361 (Environmental Microbiology and Public Health); 363 (Environmental Engineering Applications I, Air and Land); 364 (Environmental Engineering Applications II, Water); 366 (Ecosystems and Ecotoxicology); 367 (Aquatic Chemistry)
- Geography 211 (World Biogeography); 235 (Atmosphere and Climate—formerly Env Sci 235); 341 (Principles of Cartography); 343 (Geographic Information Systems)
- Geological Sciences 201 (Surface Processes); 204 (Environmental Geology); 301 (Geochemistry of Global Environment); 317 (Paleobiology); 318 (Stable Isotope Geochemistry); 327 (Radiogenic Isotope Geochemistry)
- Physics 301 (Radiation in the Environment)

• Environment and Society courses*

- Anthropology 306 (Evolution of Life Histories); 383 (Environmental Anthropology)
- Economics 370 (Environmental and Natural Resource Economics)
- Environmental Sciences 390 (Internship in Environmental Sciences—summer only)

Geography 328 (Human Use of the Earth)
Environment and Society courses, contd.

History 215 (Western Hemisphere Environments from 1492 to the Present)
Philosophy 268 (Ethics and the Environment)
Political Science 204 (Politics and Nature); 349 (International Environmental Politics); 371
(Environmental Politics)
Sociology 312 (Social Basis of Environmental Change)

* Additional courses fulfilling the Environment and Society course requirements are offered in various departments each year under special-topics headings or as linkage seminars; consult the Environmental Sciences Program advisor for details.

IV. Environmental Research Seminar
Two courses are required

- Envr Sci 398-1,2 (Environmental Research Seminar) *OR* Civ Eng 398-1, 2 (Community-Based Design)

Courses offered by the Environmental Sciences Program

The 200-level courses carry distribution-requirement credit in Area I, Natural Sciences, and are open to all students in the university. The 300-level courses require permission of instructor. Consult the undergraduate bulletin of the university for descriptions of courses offered in other departments and programs.

Envr Sci 201 Earth, An Habitable Planet Chemical and physical perspective on the evolution of the planet, emergence of life and nature of biogeochemical cycles, the role of human activities that are now part of these cycles.

Envr Sci 202 The Health of the Biosphere Population processes in nature, role of human population growth, interactions between populations, major impacts of human populations on the environment.

Envr Sci 203 Energy and the Environment: The Automobile Integrated study of fundamental chemistry, industrial production, energy use, and public policy using the automobile as an example.

Envr Sci 390 Internship in Environmental Sciences Participation in off-campus research activities of private and public environmental organizations under the supervision of faculty. Offered in summer only.

Envr Sci 398-1,2 Environmental Research Seminar Independent research directed by environmental sciences faculty; research design and scientific communication.

Majors and advising

Entering freshmen planning to pursue an Environmental Sciences major are advised to complete the 100-level chemistry and 200-level calculus requirements during their first year at Northwestern. Completion of these requirements as well as those in foreign language and the

Freshman Seminars will allow the student to make normal progress through the Environmental Sciences major during the remaining three years of the program.

Program Honors

All students are required to complete Envr Sci 398-1,2 or Civ Eng 398-1,2, the senior research seminar, as part of the major. Students who have strong grade-point averages in the major and in their general university course work may be eligible for program honors at graduation. A committee of Environmental Sciences faculty reviews each student's record of academic performance and reads each student paper completed in the senior research seminar. Those with strong academic records and who also have demonstrated excellence in their senior papers are nominated for honors. Final determination of honors status is made by a committee of faculty in the Weinberg College of Arts and Sciences.

Advising

Advising is coordinated through the office of the Program Director. Questions relating to courses, scheduling, credit, transfers of credit, petitions to graduate, and general advising should be addressed to the director or associate director.

FACULTY

Environmental Sciences Program Committee, 2006

Kimberly Gray, Chair: Director of the Environmental Sciences Program, Professor of Civil and Environmental Engineering. PhD Johns Hopkins, 1988. Environmental chemistry, physico-chemical processes in aquatic systems, resource and energy sustainability. k-gray@northwestern.edu.

John C. Hudson, Associate Director of the Environmental Sciences Program, Director of the Program in Geography, Professor. PhD Iowa, 1967. Cultural and physical geography of North America; geographic information science. j-hudson@northwestern.edu.

Jean-Francois Gaillard, Associate Professor of Civil and Environmental Engineering. D.Sc. Paris, 1987. Biogeochemical processes in aquatic systems; environmental bio-inorganic geochemistry. jf-gaillard@northwestern.edu.

Franz Geiger, Assistant Professor of Chemistry, PhD Georgetown, 1998. Geochemistry, aquatic chemistry, atmospheric chemistry. f-geiger@northwestern.edu.

Aaron Packman, Assistant Professor of Civil and Environmental Engineering. PhD California Institute of Technology, 1997. Hydrodynamic and reactive transport processes in the environment; fluid mechanics. a-packman@northwestern.edu.

Francesca Smith, Assistant Professor of Earth and Planetary Sciences. PhD University of Chicago, 2002. Paleocology, evolution of photosynthetic pathways in grasses. cesca@earth.northwestern.edu

Joseph Walsh, Lecturer in Biological Sciences. PhD University of Chicago. Restoration ecology, mammalian systematics, biogeography. j-walsh1@northwestern.edu.

Eric Weitz, Professor of Chemistry. PhD Columbia, 1972. Physical, analytical, and environmental chemistry. weitz@northwestern.edu.

Additional Faculty offering Environmental Sciences Courses

Barry Coddens, PhD Wayne State, Lecturer and Director of Undergraduate Studies, Department of Chemistry (Chem 210).

Charles Dowding, PhD Illinois, Professor of Civil Engineering (Civ Eng 358).

Joseph Fitzpatrick, PhD Harvard, Associate Professor of Civil Engineering (Civ Eng 359).

Paul Friesema, PhD Iowa, Professor of Political Science (Pol Sci 204, 371).

Gary Galbreath, PhD Chicago, College Lecturer and Associate Director, Program in Biological Sciences (Biol 210).

Robert Gemmell, PhD Harvard, Professor of Civil Engineering (Civ Eng 363).

Andrew Jacobson, PhD Michigan, Assistant Professor of Earth and Planetary Sciences (Geol Sci 327).

Martina Hausner, PhD Munich, Assistant Professor of Civil and Environmental Engineering (Civ Eng 441).

Matthew Hurtgen, PhD Penn State, Assistant Professor of Earth and Planetary Sciences

L. Lynne Kiesling, PhD Northwestern, Senior Lecturer in Economics (Econ 370).

Abraham Lerman, PhD Harvard, Professor of Earth and Planetary Sciences (Geol Sci 301).

Bradley Sageman, PhD Colorado, Professor and chair of Earth and Planetary Sciences

Yael Wolinsky, PhD Chicago, Lecturer in Political Science (Pol Sci 349).