

Minors Offered by the Mellon College of Science

The Mellon College of Science offers several minors to students interested in broadening their scientific training or acquiring a level of expertise in a particular scientific field. The intercollege minors described below are designed to supplement your degree in science; the departmental minors offer you a means of exploring another field and are open to students throughout the university.

Intercollege Minors

Please see the descriptions below.

- Environmental Science
- Health Care Policy and Management
- Scientific Computing

Departmental Minors in the Mellon College of Science

For descriptions, please see the departmental sections which follow.

- Biological Sciences
- Chemistry
- Computational Finance
- Discrete Mathematics and Logic
- Mathematical Sciences
- Physics

The Minor in Health Care Policy and Management

Sponsored by:

H. John Heinz III School of Public Policy and Management
College of Humanities and Social Sciences
Mellon College of Science

Faculty Advisors:

Caroline Acker, College of Humanities and Social Sciences
Brenda Peyser, H. John Heinz III School of Public Policy and Management, Amy Burkert, Mellon College of Science

The face of health care is changing. The practice of medicine is being fundamentally altered by the forces of change in public policy, health care organizations and in the industry as a whole. The role of individual professionals in this industry is changing as rapidly as the industry itself. Traditional career paths have disappeared overnight to be replaced by new opportunities that require new skills. New organizations are placing new demands on their professional and medical staffs. The criteria of efficiency and financial stability are entering the domains of diagnosis and treatment.

This minor is designed to provide students considering a career in the health professions with an understanding of how these changes are likely to affect their careers. Students will become familiar with the critical policy and management issues and will begin to learn to operate effectively in the emerging health care environment. The curriculum combines economic, organizational, managerial, historical and psychological perspectives on these issues to provide a foundation for a deepened understanding of the changing structure of health care organizations and policy.

Curriculum (minimum) 60 units

Seven courses (a minimum of 60 units) are required to complete this minor. Entry into the minor requires completion of 73-100, Economics or 88-220, Policy Analysis I or the equivalent by approval.

Required Courses 33 units

Students are required to take the following courses.

79-384	Medicine and Society (9 units)
90-735	Health Economics (12 units)
90-836	Health Systems (6 units)
90-861	Health Policy I (6 units)

Elective Courses 27 units

Complete a minimum of 27 units.

Heinz School Courses

91-830	Financial Management of Health Systems
91-836	Legal Issues in Health Systems Management
91-844	Managing Quality Improvement
91-853	Health Care Information Systems
91-xxx	Health Policy II
91-862	Managed Care

Humanities and Social Sciences Courses (9 units each)

76-494	Healthcare Communications
79-335	Drug Use and Drug Policy
79-336	Epidemic Disease and Public Health
80-245	Medical Ethics
80-247	Health, Development, and Human Rights
85-241	Social Psychology
85-442	Health Psychology
85-446	The Psychology of Gender

Please note that some of these courses have prerequisites that will not count toward the completion of the requirements for this minor.

Minor in Environmental Science

Faculty Contact:

Neil Donahue, Chemistry and Chemical Engineering Departments

The primary mission of the environmental sciences minor is to prepare students in the Mellon College of Science for careers or postgraduate education in the diverse fields of environmental science. We feel strongly that these endeavors must be grounded in strong fundamental science; consequently, the program extends majors in the Mellon College of Science. We also award minors to students from other colleges, provided that they can build a course of study with sufficient scientific rigor to meet the standards of the program.

As a capstone program, the minor is built around advanced courses that extend as well as broaden the specialized education associated with the major programs. Environmental sciences are highly interdisciplinary in nature, and while it is necessary that students have an exposure to introductory courses in several of these disciplines, it is by no means sufficient; in-depth knowledge is required. We encourage all students to pursue generally broad studies, including subjects that encompass human interactions with the environment, and will provide guidance to all students interested in the area. We encourage those students who intend to devote focused attention to environmental sciences to pursue this minor.

Environmental Sciences are broadly defined as pursuits designed to develop fundamental understanding of the natural environment and human interactions with the environment. Research problems are frequently motivated by perceived problems (air, water and soil pollution, reduction in biodiversity, global climate change, etc...), but inevitably extend to the fundamental mechanisms underlying these phenomena. Research can be highly specialized (focusing for example on the biochemistry of a particular enzyme or the synthesis of a particular catalyst) or highly general (focusing for example on the complex, nonlinear interactions of populations on complex ecosystems). Our program is designed to ensure that students of the field are conversant with questions on all of these scales, from the microscopic to the global.

Required Courses:**Science Requirements (27 units)**

09-217	Organic Chemistry I
09-218	Organic Chemistry II
03-231/ 232	Biochemistry I

Laboratory Requirement (12 units)

09-221	Laboratory 1: Introduction to Chemical Analysis
12-252	Environmental Engineering Lab

Statistics Requirement (9 units)

36-247	Statistics for Laboratory Sciences
12-251	Introduction to Environmental Engineering

Additional Course Requirements:

Complete one course from each of the following groups (substitutions can be made with the approval of the Environmental Science Advisor).

Note: Courses taken in these categories cannot also be counted toward requirements for a primary major.

Science (Mechanism)

03-442	Molecular Biology of Eukaryotes
09-510	Introduction to Green Chemistry
09-520	Special Topics in Atmospheric Chemistry
06-630	Atmospheric Chemistry: Air Pollution & Global Change
12-726	Mathematical Modeling of Environmental Quality Systems

Engineering (Process)

12-651	Air Quality Engineering
12-655	Water Quality Engineering
12-720	Water Resource Chemistry
42-606	Biotechnology & Environmental Processes

Policy

19-446	Quantitative Research Analysis
19-448	Science, Technology, & Ethics
73-358	Economics of the Environmental & Natural Resources
79-365	Climate Change, Environmental Policy & Practice
80-244	Management, the Environment, & Ethics
80-352	International Environmental Law & Policy

Minor in Scientific Computing

Advisor: Dr. Eric Grotzinger

Sometimes called "computational science," scientific computing is the application of high-performance computers and modern computational technologies to problems in the sciences and engineering. Research in this area is inherently multidisciplinary, requiring strong ties with a scientific discipline.

MCS students can easily build on their scientific training with this applied computational program. The curriculum consists of five areas of concentration, which span the natural sciences, mathematics, programming and research. The curriculum is structured to allow flexibility in choosing courses that meet students' particular interests or best complement their major. The minor is also a natural choice for students majoring in any technical area.

Required Courses

Students must meet the requirements of the following categories:

A. Non-Introductory Science Requirement (9-12 units)

Complete 1 course from Biological Sciences, Chemistry, or Physics at the 200 level or higher, excluding those courses listed below as part of the requirements of the minor. Courses with a significant science component from other colleges may be substituted with approval from the program administrator.

B. Computational Science Requirement (18-24 units)

Complete 2 of the following courses:

03-310	Introduction to Computational Biology
or	
03-510	Computational Biology
09-560	Computational Chemistry
33-241	Introduction to Computational Physics

C. Computational Methods Requirement (9 units)

Complete one of the following courses from outside of your home department.

21-320	Symbolic Programming Methods
21-369	Numerical Methods
21-380	Introduction to Mathematical Modeling
33-232	Physical Analysis
33-456	Advanced Computational Physics
36-410	Introduction to Probability Modeling

D. Applied Scientific Computing Research Project(s) (9 units)

Complete one approved research project in an area of applied scientific computing. In some cases, this research could be replaced with 9 units of an approved project-based course in advanced scientific computing. The administrator of the minor will maintain a list of appropriate courses. Under special circumstances summer research may count toward this requirement, although it cannot be counted toward the units required for graduation.

E. Complete any additional course from category C or D (9 units)