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 and Sustainability Studies
• 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
• Neuroscience
• Physics

Minor in Environmental and Sustainability Studies
Maggie Braun, MCS Associate Dean for Undergraduate Affairs
Abigail Owen, Program Director and Faculty Advisor, Steenbrenner Institute for Environmental Education and Research

Please see the Intercollege Section (http://coursecatalog.web.cmu.edu/intercollegeprograms/environmentalandsustainabilitystudies/textcontainer) of the catalog for details about this minor.

Minor in Health Care Policy and Management
Sponsored by:
Heinz College of Information Systems and Public Policy
Dietrich College of Humanities and Social Sciences
Mellon College of Science

Faculty Advisors:
James F. Jordan, J. John Heinz III College

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.

Required Courses for HCPM Minor
A total of 54 units are required to complete this minor. Entry into the minor requires completion of 73-102 Principles of Microeconomics or the equivalent by approval.

Required Courses
Complete a total of 21 units from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>79-330</td>
<td>Medicine and Society: Health, Healers, and Hospitals</td>
<td>9</td>
</tr>
<tr>
<td>90-436</td>
<td>Health Systems</td>
<td>6</td>
</tr>
<tr>
<td>90-472</td>
<td>Health Policy</td>
<td>6</td>
</tr>
</tbody>
</table>

Minor in Scientific Computing
Dr. Maggie Braun, Advisor, MCS Dean’s Office
mabraun@andrew.cmu.edu

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.

B. Computational Science Requirement (18-24 units)
Complete 2 of the following courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>03-511</td>
<td>Computational Molecular Biology and Genomics</td>
<td>9</td>
</tr>
<tr>
<td>09-560</td>
<td>Computational Chemistry</td>
<td>12</td>
</tr>
</tbody>
</table>
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<thead>
<tr>
<th>Course Code</th>
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<th>Units</th>
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</thead>
<tbody>
<tr>
<td>15-386</td>
<td>Neural Computation</td>
<td>9</td>
</tr>
<tr>
<td>33-241</td>
<td>Introduction to Computational Physics</td>
<td>9</td>
</tr>
</tbody>
</table>

C. Computational Methods Requirement (9 units)
Complete one of the following courses from outside of your home department.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-369</td>
<td>Numerical Methods</td>
<td>12</td>
</tr>
<tr>
<td>33-658</td>
<td>Quantum Computation and Quantum Information Theory</td>
<td>10</td>
</tr>
<tr>
<td>33-232</td>
<td>Mathematical Methods of Physics</td>
<td>10</td>
</tr>
<tr>
<td>33-456</td>
<td>Advanced Computational Physics</td>
<td>9</td>
</tr>
<tr>
<td>36-410</td>
<td>Introduction to Probability Modeling</td>
<td>9</td>
</tr>
</tbody>
</table>

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)