The MSE in Scientific Computing (SCMP) program at Penn provides multifaceted education in the fundamentals and applications of computational science. This education program provides a rigorous computational foundation for applications to a broad range of scientific disciplines. An education in SCMP combines a comprehensive set of core courses centered on numerical methods, algorithm development for high performance computational platforms, and the analysis of large data, and offers flexibility to specialize in different computational science application areas. Students may elect to pursue a thesis in computationally-oriented research within the School of Engineering and Applied Science.

We welcome applications from candidates who have a strong background in physical or theoretical sciences, engineering, math, or computer science. Some experience with computer programming is also strongly recommended.

For more information: [https://pics.upenn.edu/masters-science-engineering-scientific-computing/](https://pics.upenn.edu/masters-science-engineering-scientific-computing/)

### Curriculum

10 course units are required for the MSE in Scientific Computing.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
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<tbody>
<tr>
<td><strong>Foundations</strong></td>
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<tr>
<td>CIT 5900 Programming Languages and Techniques</td>
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<tr>
<td>or CIT 5910 Introduction to Software Development</td>
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<tr>
<td>CIT 5960 Algorithms and Computation</td>
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<td><strong>Core Requirements</strong></td>
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<tr>
<td>ENM 5020 Numerical Methods and Modeling</td>
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<tr>
<td>CIS 5450 Big Data Analytics</td>
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<td>Select 1 of the following:</td>
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<tr>
<td>CIS 5190 Applied Machine Learning</td>
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<td>or CIS 5200 Machine Learning</td>
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<tr>
<td>or STAT 5711 Modern Data Mining</td>
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<tr>
<td><strong>Methods and Applications Electives</strong></td>
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<tr>
<td>Select 2 Methods for Natural Science/Engineering courses</td>
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<tr>
<td>Select Thesis/Independent Study or 2 Applications/Engineering electives</td>
<td>2</td>
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<tr>
<td>Select 1 free elective. Any course in math, science and/or engineering. Subject to advisor approval</td>
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<td><strong>Total Course Units</strong></td>
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### Technical & Depth Area Electives

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<th>Title</th>
<th>Course Units</th>
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<tbody>
<tr>
<td><strong>Applications</strong> - Any graduate course which focuses on applications in natural science and engineering. Subject to advisor approval</td>
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<tr>
<td>Thesis/Independent Study 1</td>
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<td><strong>Methods</strong></td>
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<td>CIS 5800 Machine Perception</td>
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