MASTER OF SCIENCE IN COMPUTER SCIENCE/MASTER OF CHEMICAL ENGINEERING

Collaborative program with the Department of Chemical and Biological Engineering

This combined program in computer science and chemical engineering addresses the growing need for process engineers with expertise in computational modeling and simulation of chemical processes. Similarly, the program provides a strong engineering background that is required today in many areas of computer science. The program is jointly offered by the Department of Computer Science and the Department of Chemical and Biological Engineering. Students in this program earn both Master of Science in Computer Science and Master of Chemical Engineering degrees.

Students must fulfill the core course requirements of both departments. Students are required to take 18 credit hours in graduate chemical engineering courses (courses numbered 500 or higher) and 26 credit hours in computer science courses (of which 20 credit hours must be 500-level courses).

### Curriculum

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 406</td>
<td>Transport Phenomena</td>
<td>3</td>
</tr>
<tr>
<td>CHE 503</td>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>CHE 525</td>
<td>Chemical Reaction Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHE 535</td>
<td>Applications of Mathematics to Chemical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Select a minimum of two courses from the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CHE 508</td>
<td>Process Design Optimization</td>
<td>3</td>
</tr>
<tr>
<td>CHE 530</td>
<td>Advanced Process Control</td>
<td>3</td>
</tr>
<tr>
<td>CHE 536</td>
<td>Computational Techniques in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CHE 560</td>
<td>Statistical Quality and Process Control</td>
<td>3</td>
</tr>
<tr>
<td>Any other 500-level course must be approved by the academic adviser</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Computer Science Courses

Students are required to take 12 credit hours of core courses and 14 credit hours of elective courses. At least 20 of the 26 credit hours must be 500-level CS courses.

#### Programming Core Courses

Select a minimum of one course from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 511</td>
<td>Topics in Computer Graphics</td>
<td>3</td>
</tr>
<tr>
<td>CS 512</td>
<td>Computer Vision</td>
<td>3</td>
</tr>
<tr>
<td>CS 525</td>
<td>Advanced Database Organization</td>
<td>3</td>
</tr>
<tr>
<td>CS 540</td>
<td>Syntactic Analysis of Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>CS 541</td>
<td>Topics in Compiler Construction</td>
<td>3</td>
</tr>
<tr>
<td>CS 546</td>
<td>Parallel and Distributed Processing</td>
<td>3</td>
</tr>
<tr>
<td>CS 551</td>
<td>Operating System Design and Implementation</td>
<td>3</td>
</tr>
<tr>
<td>CS 553</td>
<td>Cloud Computing</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Systems Core Courses

Select a minimum of one course from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 542</td>
<td>Computer Networks I: Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CS 544</td>
<td>Computer Networks II: Network Services</td>
<td>3</td>
</tr>
<tr>
<td>CS 547</td>
<td>Wireless Networking</td>
<td>3</td>
</tr>
<tr>
<td>CS 550</td>
<td>Advanced Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS 555</td>
<td>Analytic Models and Simulation of Computer Systems</td>
<td>3</td>
</tr>
<tr>
<td>CS 570</td>
<td>Advanced Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>CS 586</td>
<td>Software Systems Architectures</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Theory Core Courses

Select a minimum of two courses from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 530</td>
<td>Theory of Computation</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>CS 533</td>
<td>Computational Geometry</td>
<td>3</td>
</tr>
<tr>
<td>CS 535</td>
<td>Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>CS 536</td>
<td>Science of Programming</td>
<td>3</td>
</tr>
<tr>
<td>CS 538</td>
<td>Combinatorial Optimization</td>
<td>3</td>
</tr>
<tr>
<td>CS 539</td>
<td>Game Theory: Algorithms and Applications</td>
<td>3</td>
</tr>
</tbody>
</table>

**Computer Science Electives**

Select 14 credit hours: 14

**Total Credit Hours**: 44

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1. Courses transferred for credit cannot be used to satisfy core course requirements. All core course requirements must be satisfied by courses taken at Illinois Institute of Technology. Up to six credit hours of accelerated courses may be applied to the program. CSP courses cannot be applied to the program. Consult the computer science department website (science.iit.edu/computer-science) for details.