BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING: NEURAL ENGINEERING TRACK

Neural Engineering
This area uses fundamental and applied engineering techniques to help solve basic and clinical problems in the neurosciences. At the fundamental level, it attempts to understand the behavior of individual neurons, their growth, signaling mechanisms between neurons, and how populations of neurons produce complex behavior. Such information has broad application to a better understanding of the communication that occurs between the various parts of the nervous system and the brain. For example, such an understanding can be applied to the development of replacement parts for impaired neural systems, such as the auditory, visual, and motor systems, as well as achieving a better understanding of how normal and diseased systems work.

Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td></td>
<td>Biomedical Engineering Core Requirements</td>
<td>(27)</td>
</tr>
<tr>
<td>BME 100</td>
<td>Introduction to the Profession</td>
<td>2</td>
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<tr>
<td>BME 200</td>
<td>BME Computer Applications</td>
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<tr>
<td>BME 310</td>
<td>Biomaterials</td>
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<tr>
<td>BME 315</td>
<td>Instrumentation Laboratory</td>
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<td>BME 325</td>
<td>Bioelectronics Laboratory</td>
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<tr>
<td>BME 405</td>
<td>Physiology Laboratory</td>
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<tr>
<td>BME 419</td>
<td>Intro Design Concepts in BME</td>
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<tr>
<td>BME 420</td>
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<td>BME 422</td>
<td>Math Methods for Biomedical Engrs</td>
<td>3</td>
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<tr>
<td>BME 433</td>
<td>BME Applications of Statistics</td>
<td>3</td>
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<tr>
<td>BME 453</td>
<td>Quantitative Physiology</td>
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</tr>
<tr>
<td>ECE 308</td>
<td>Signals Systems</td>
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<td></td>
<td>Neural Engineering Requirements</td>
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<tr>
<td>CS 104</td>
<td>Intro to Comp Prgrm for Engrs</td>
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<tr>
<td>ECE 211</td>
<td>Circuit Analysis I</td>
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<tr>
<td>ECE 213</td>
<td>Circuit Analysis II</td>
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<tr>
<td>ECE 218</td>
<td>Digital Systems</td>
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<td>BME 309</td>
<td>Biomedical Imaging</td>
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<td>BME 438</td>
<td>Neuroimaging</td>
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<td>BME 443</td>
<td>Bimdel Instrmtn and Elect</td>
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<tr>
<td>BME 445</td>
<td>Quantitative Neural Function</td>
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<tr>
<td>MATH 333</td>
<td>Matrix Alg &amp; Complex Variables</td>
<td>3-4</td>
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<tr>
<td>or CHEM 237</td>
<td>Organic Chemistry I</td>
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<tr>
<td>CHEM 239</td>
<td>Organic Chemistry II</td>
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<td>Select three BME electives</td>
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<td>Mathematics Requirements</td>
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<tr>
<td>MATH 151</td>
<td>Calculus I</td>
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<tr>
<td>MATH 152</td>
<td>Calculus II</td>
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<td>MATH 251</td>
<td>Multivariate &amp; Vector Calculus</td>
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<td>MATH 252</td>
<td>Introduction to Diff Equations</td>
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<td></td>
<td>Physics Requirements</td>
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<tr>
<td>PHYS 123</td>
<td>General Physics I: Mechanics</td>
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<tr>
<td>PHYS 221</td>
<td>Gen Physics II: Elect&amp;Magnetism</td>
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<td>Chemistry Requirements</td>
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<td>CHEM 124</td>
<td>Princ of Chemistry I with Lab</td>
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</tr>
<tr>
<td>CHEM 125</td>
<td>Princ of Chemistry II w/Lab</td>
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<td>Biology Requirements</td>
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Bachelor of Science in Biomedical Engineering: Neural Engineering Track

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BIOL 115</td>
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<td>BIOL 117</td>
<td>Human Biology Lab</td>
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<tr>
<td><strong>Interprofessional Projects (IPRO)</strong></td>
<td><strong>(6)</strong></td>
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<tr>
<td>See Illinois Tech Core Curriculum, section E</td>
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<td><strong>Humanities and Social Science Requirements</strong></td>
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<tr>
<td>See Illinois Tech Core Curriculum, sections B and C</td>
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<td><strong>Total Credit Hours</strong></td>
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1. A technical elective may substitute for CHEM 239.
2. BME elective must be chosen from the approved list of 300+ level engineering courses in BME, ECE, CHE, MMAE, CAE, or CS. ENGR 497 will apply.
## Bachelor of Science in Biomedical Engineering: Neural Engineering Track Curriculum

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Credit Hours</th>
<th>Semester 2</th>
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<tbody>
<tr>
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<td>CHEM 124</td>
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<td>CS 104</td>
<td>2</td>
<td>PHYS 123</td>
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<tr>
<td>MATH 151</td>
<td>5</td>
<td>Social Sciences Elective</td>
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<tr>
<td>Humanities 200-level Course</td>
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**Year 2**

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<tbody>
<tr>
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<td>BIOL 115</td>
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**Year 3**

<table>
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<td>BME 325</td>
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<td>BME 422</td>
<td>3</td>
<td>BME 443</td>
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<td>BME 453</td>
<td>3</td>
<td>BME 445</td>
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<td>ECE 308</td>
<td>3</td>
<td>MATH 333 or CHEM 237</td>
<td>3-4</td>
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<td>3</td>
<td>IPRO Elective I</td>
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**Year 4**

<table>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>BME 419</td>
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<td>BME 420</td>
<td>3</td>
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<td>BME 433</td>
<td>3</td>
<td>BME 438</td>
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<tr>
<td>CHEM 239&lt;sup&gt;1&lt;/sup&gt;</td>
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<td>BME Elective&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>IPRO Elective II</td>
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<td>BME Elective&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>Social Sciences Elective (300+)</td>
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<tr>
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<td>Humanities or Social Science Elective</td>
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<td>17</td>
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Total Credit Hours: 132-133

<sup>1</sup> A technical elective may substitute for CHEM 239.

<sup>2</sup> BME elective must be chosen from the approved list of 300+ level engineering courses in BME, ECE, CHE, MMAE, CAE, or CS. ENGR 497 will apply.

This program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).