## BiomedE Undergraduate Core Curriculum

<table>
<thead>
<tr>
<th>Subjects required by all programs</th>
<th>Cr. Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 115, 116, 215, 216</td>
<td>16</td>
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<tr>
<td>Engineering 100, Intro to Engineering</td>
<td>4</td>
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<tr>
<td>Engineering 101, Intro to Computing</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 130</td>
<td>3</td>
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<tr>
<td>Physics 140/1, 240/1</td>
<td>10</td>
</tr>
<tr>
<td>Intellectual Breadth</td>
<td>16</td>
</tr>
<tr>
<td><strong>Advanced Science and Engineering Math</strong></td>
<td><strong>53</strong></td>
</tr>
<tr>
<td>Biology 172 or 174, Intro to Biology (F, W)</td>
<td>4</td>
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<tr>
<td>(If using AP Biology credit (195), then Biology 173 (2) is required.)</td>
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<tr>
<td>BiomedE 241, BiomedE Undergraduate Laboratory (F,W)</td>
<td>4</td>
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<tr>
<td>Chemistry 210/1, Structure and Reactivity I (F, W, Sp)</td>
<td>5</td>
</tr>
<tr>
<td>MCDB 310 (F, W, Sp), or BiolChem 415 (F, W), or Chem 351 (F, W), Intro to Biological Chemistry</td>
<td>3-4</td>
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<tr>
<td><strong>Required Program Subjects</strong></td>
<td></td>
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<tr>
<td>BiomedE 211, Circuits and Systems for BiomedE (F,W)</td>
<td>4</td>
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<tr>
<td>(If you are planning on the bioelectrical concentration, it is recommended that you take EECS 215 in place of BiomedE 211.)</td>
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<tr>
<td>BiomedE 221, Biophysical Chemistry and Thermodynamics (F,W)</td>
<td>4</td>
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<tr>
<td>BiomedE 231, Intro to Biomechanics (W)</td>
<td></td>
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<tr>
<td>BiomedE 350, Intro to BiomedE Design (W)</td>
<td>3</td>
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<tr>
<td>BiomedE 418, Quantitative Cell Biology (F,W)</td>
<td>3</td>
</tr>
<tr>
<td>BiomedE 419, Quantitative Physiology (F)</td>
<td>4</td>
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<tr>
<td>BiomedE 450, BiomedE Design (4) (W) <strong>OR</strong></td>
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<tr>
<td>BiomedE 451, BiomedE Design, part 1 (F) (2) <strong>AND</strong></td>
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<tr>
<td>BiomedE 452, BiomedE Design, part 2 (W) (3)</td>
<td>4-5</td>
</tr>
<tr>
<td>BiomedE 458, Biomedical Instrumentation and Design (F,W)</td>
<td>4</td>
</tr>
<tr>
<td>MatScie 250, Principles of Engineering Materials (F,W)</td>
<td>4</td>
</tr>
<tr>
<td><strong>BME Concentration Requirements and Electives</strong>*</td>
<td><strong>14</strong></td>
</tr>
<tr>
<td><strong>Unrestricted Electives</strong></td>
<td><strong>11</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>128</strong></td>
</tr>
</tbody>
</table>

*Must include at least 12 credit hours of engineering courses.
BiomedE Biochemical Concentration

Concentration Requirements (7 credit hours):

BiomedE 321, Bioreaction Engineering and Design (W)  3
BiomedE 331, Intro to Biofluid Mechanics (F)  4

Lab Requirement (1 class):

Biology 226, Animal Physiology Lab (F,W)*  2
MatScie 360, Materials Lab I (F)  3
MCDB 429, Laboratory in Cell and Molecular Biology (W)*  3
Physiol 404, Human Physiology Lab (F,W)*  2

Choose one (1 class):

BiomedE 410, Biomedical Materials (F)  3
BiomedE 479, Biotransport (W)  4

Concentration Electives, if needed:

BiomedE 332, Intro to Biosolid Mechanics (W)  4
BiomedE 410, Biomedical Materials (F)  3
BiomedE 474, Tissue Engineering (F)  3
BiomedE 476, Advanced Biofluid Mechanics (W)  4
BiomedE 479, Biotransport (W)  4
ChE 519, Pharmaceutical Engineering (W)  3
MatScie 350, Structures of Materials (F)  4
MatScie 412, Polymeric Materials (F)  3
MatScie 420, Mechanical Behavior of Materials (F)  3
MatScie 440, Ceramic Materials (W)  3
MatScie 512, Polymer Physics (W)  3

*MCDB 429, Biology 226, and Physiology 404 are not considered engineering courses for ABET requirement: students must have a minimum of 48 hours of engineering course work in their bachelor’s program.
BiomedE Bioelectrical Concentration

Concentration Requirements (8 credit hours):

BiomedE 311, Biosystems and Signals (W) or EECS 216, Intro to Signals and Systems (F,W) 4
BiomedE 417, Electrical Biophysics (F) 4

At least one of the following (3-4 credit hours):

BiomedE 552, Biomedical Optics (F) 3
EECS 320, Intro to Semiconductor Devices (F,W) 4
EECS 351, Digital Signal Processing (F,W) 4
EECS 414, Intro to MEMS (F) 4

Concentration Electives, if needed:

BiomedE 331, Intro to Biofluid Mechanics (F) 4
BiomedE 552, Biomedical Optics (F) 3
EECS 280, Programming and Introduction to Data Structures (F,W) 4
EECS 301, Probabilistic Methods in Engineering (F,W) 4
EECS 311, Analog Circuits (W) 4
EECS 312, Digital Integrated Circuits (F,W) 4
EECS 320, Intro to Semiconductor Devices (F,W) 4
EECS 334, Principles of Optics (W) 4
EECS 414, Intro to MEMS (F) 4
EECS 423, Solid State Device Lab (F) 4
EECS 434, Principles of Photonics (F) 4
EECS 435, Fourier Optics (W numbered years) 3
EECS 438, Advanced Lasers and Optics Lab (W) 4
EECS 452, DSP Lab (F,W) 4
EECS 460, Control Systems, Analysis and Design (F) 3
Math 354, Fourier Analysis and its Applications* (“sporadically”) 3
Math/BiomedE 464, Inverse Problems (W) 3
MechEng/BiomedE 424, Engineering Acoustics (F) 3
NERS/BiomedE 481, Engineering Principles of Radiation Imaging (W) 2

*Math 354 is not considered an engineering course for the ABET requirement: all students have a minimum of 48 credit hours of engineering in their bachelor’s program.
**BiomedE Biomechanical Concentration**

**Concentration Requirements (8 credit hours):**

BiomedE 331, Intro to Biofluid Mechanics (F) 4
BiomedE 332, Intro to Biosolid Mechanics (W) 4

**At least one of the following (3-4 credit hours):**

BiomedE 456, Biomechanics (F) 3
BiomedE 476, Advanced Biofluid Mechanics (W) 4
BiomedE 479, Biotransport (W) 4
IOE 333, Ergonomics (F,W) 3
IOE 463, Measurement and Design of Work (F) 3
IOE 491, Applied Physical Ergonomics (F) 3
IOE/BiomedE 534, Occupational Biomechanics (W) 3

**Concentration Electives, if needed:**

ANAT 403, Human Body* (F,W) 5
BiomedE 456, Biomechanics (F) 3
BiomedE 476, Advanced Biofluid Mechanics (W) 4
BiomedE 479, Biotransport (W) 4
IOE 333, Ergonomics (F,W) 3
IOE 436, Human Factors in Computer Systems (W) 3
IOE 438, Occupational Safety Management (W) 2
IOE 463, Measurement and Design of Work (F) 3
IOE 491, Applied Physical Ergonomics (F) 3
IOE/BiomedE 534, Occupational Biomechanics (W) 3
MechEng 250, Design and Manufacturing I (F,W) 4
MechEng 360, Modeling, Analysis and Control of Dynamic Systems (F,W) 4
MechEng 406, Biomechanics for Engineering Students (W) 3
MoveSci 230, Musculoskeletal Anatomy (F,W) 3
MoveSci 231, Musculoskeletal Anatomy Lab (F,W) 1
MoveSci 435, Biomechanics of Human Locomotion (F every other even year) 3

*ANAT 403 and MoveSci 230, 231, and 435 are not considered an engineering course for the ABET requirement: all students have a minimum of 48 credit hours of engineering in their bachelor’s program.