**B.S. in Biomedical Engineering**

The following is a model timeline to complete the requirements for the degree. Beyond the 4th semester, semester credits and BME track course credits may differ from those listed, according to the track requirements provided.

### First Year

**1st Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 101</td>
<td>English Composition: Writing, Speaking, Thinking I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 111</td>
<td>Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 111A</td>
<td>Physics I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 125</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 111</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>FED 101</td>
<td>Fundamentals of Engineering Design</td>
<td>2-3</td>
</tr>
<tr>
<td>or BME 111</td>
<td>Introduction to Physiology</td>
<td></td>
</tr>
<tr>
<td>BME 101</td>
<td>Introduction to Biomedical Engineering</td>
<td>0</td>
</tr>
</tbody>
</table>

**Term Credits**

16-17

**2nd Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 102</td>
<td>English Composition: Writing, Speaking, Thinking II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 121</td>
<td>Physics II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 121A</td>
<td>Physics II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 124</td>
<td>General Chemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 126</td>
<td>General Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 112</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>FED 101</td>
<td>Fundamentals of Engineering Design</td>
<td>2-3</td>
</tr>
<tr>
<td>or BME 111</td>
<td>Introduction to Physiology</td>
<td></td>
</tr>
</tbody>
</table>

**Term Credits**

17-18

### Second Year

**1st Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural History (lower-level) GUR Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CS 101</td>
<td>Computer Programming and Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>BME 301</td>
<td>Electrical Fundamentals of Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or BME 302</td>
<td>Mechanical Fundamentals of Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>BME 303</td>
<td>Biological and Chemical Foundations of Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or BME 304</td>
<td>Material fundamentals of Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>MATH 211</td>
<td>Calculus III A</td>
<td>3</td>
</tr>
<tr>
<td>MATH 279</td>
<td>Statistics and Probability for Engineers</td>
<td>2</td>
</tr>
</tbody>
</table>

**Term Credits**

17

**2nd Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Sciences (lower-level) GUR Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BME 301</td>
<td>Electrical Fundamentals of Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or BME 302</td>
<td>Mechanical Fundamentals of Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>CHEM 243</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>BME 303</td>
<td>Biological and Chemical Foundations of Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>or BME 304</td>
<td>Material fundamentals of Biomedical Engineering</td>
<td></td>
</tr>
<tr>
<td>MATH 222</td>
<td>Differential Equations</td>
<td>4</td>
</tr>
<tr>
<td>Physical Education GUR Elective</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Term Credits**

17

### Third Year

**1st Semester**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Term Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Sciences (lower-level):GUR Elective</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BME 382</td>
<td>Engineering Models of Physiological Systems</td>
<td>3</td>
</tr>
<tr>
<td>or BME 383</td>
<td>Measurement Lab for Physiological Systems and Tissue</td>
<td></td>
</tr>
<tr>
<td>BME 310</td>
<td>Biomedical Computing</td>
<td>3</td>
</tr>
</tbody>
</table>
B.S. in Biomedical Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME core concentration course</td>
<td>3</td>
</tr>
<tr>
<td>MATH 337 Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>BME core concentration course</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education GUR Elective</td>
<td>1</td>
</tr>
</tbody>
</table>

**Term Credits** 19

**2nd Semester**

- Humanities and Social Science (upper-level) GUR Elective ¹ 3
- BME 382 Engineering Models of Physiological Systems 3
- or BME 383 Measurement Lab for Physiological Systems and Tissue 3
- BME core concentration course 3
- BME core concentration course 3
- BME core concentration or elective course ³ 3

**Term Credits** 15

**Fourth Year**

**1st Semester**

- MGMT 390 Principles of Management ¹ 3
- BME 495 Capstone Design I 3
- BME core concentration course 3
- BME core concentration course 3
- BME core concentration or elective course 3
- BME concentration laboratory elective 3

**Term Credits** 18

**2nd Semester**

- Capstone seminar or Humanities and Social Science (upper-level) GUR Elective ¹ 3
- Select one of the following:
  - Lit, Hist, Phil (upper-level) GUR Elective 3
  - PHIL 351 Biomedical Ethics
  - HIST 379 History of Medicine
  - HIST 381 Germs Genes and Body: Sci. and Tech. in Modern Medicine
- BME 496 Capstone Design 2 3
- BME concentration elective 3
- BME concentration elective 3

**Term Credits** 15

**Total Credits** 134-136

---

2. MATH 279 Statistics and Probability for Engineers is a co-requisite with BME 302 Mechanical Fundamentals of Biomedical Engineering.

This curriculum represents the maximum number of credits per semester for which a student is advised to register. A full-time credit load is 12 credits. First-year students are placed in a curriculum that positions them for success, which may result in additional time needed to complete curriculum requirements. Continuing students should consult with their academic advisor to determine the appropriate credit load.

**BME Tracks:**

(34 credits). BME students are required to select a track before their 4th semester. The curriculum for each track requires 34 credits, 27 of which must be in engineering and science or design.

**Bioinstrumentation Track**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 372</td>
<td>Biomedical Electronics</td>
<td>3</td>
</tr>
<tr>
<td>BME 333</td>
<td>Biomedical Signals and Systems</td>
<td>3</td>
</tr>
<tr>
<td>BME 373</td>
<td>Biomedical Electronics II</td>
<td>3</td>
</tr>
<tr>
<td>BME 489</td>
<td>Medical Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>ECE 251</td>
<td>Digital Design</td>
<td>3</td>
</tr>
<tr>
<td>ECE 252</td>
<td>Microprocessors</td>
<td>3</td>
</tr>
</tbody>
</table>
### New Jersey Institute of Technology

#### BME 386
**Bioinstrumentation Laboratory**

#### Advanced Elective $^1,^2$

#### BME 471
**Principles of Medical Imaging**

**Total Credits**

1 Chosen in consultation with advisor.
2 Six credits must be engineering science or design.

### Biomaterials and Tissue Engineering Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 385</td>
<td>Cell and Biomaterial Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BME 420</td>
<td>Advanced Biomaterials Science</td>
<td>3</td>
</tr>
<tr>
<td>BME 427</td>
<td>Biotransport</td>
<td>3</td>
</tr>
<tr>
<td>BME 430</td>
<td>Fundamentals of Tissue Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 422</td>
<td>Biomaterials Characterization</td>
<td>3</td>
</tr>
<tr>
<td>CHE 210</td>
<td>Chemical Process Calculations I</td>
<td>2</td>
</tr>
<tr>
<td>CHE 230</td>
<td>Chemical Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 244</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>MTSE 301</td>
<td>Principles of Material Science and Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Advanced Elective $^1$

**Total Credits**

1 Chosen in consultation with advisor.

### Biomechanics Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 351</td>
<td>Introduction to Biofluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>BME 384</td>
<td>Biomechanics Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BME 451</td>
<td>Biomechanics I</td>
<td>3</td>
</tr>
<tr>
<td>BME 452</td>
<td>Mechanical Behavior and Performance of Biomaterials</td>
<td>3</td>
</tr>
<tr>
<td>BME 420</td>
<td>Advanced Biomaterials Science</td>
<td>3</td>
</tr>
<tr>
<td>BME 478</td>
<td>Introduction to CAD for Biomechanics</td>
<td>3</td>
</tr>
<tr>
<td>MECH 236</td>
<td>Dynamics</td>
<td>2</td>
</tr>
<tr>
<td>BME 321</td>
<td>Adv Mechanics for Biomed Engr</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Advanced Elective $^1,^2$

**Total Credits**

1 Chosen in consultation with advisor.
2 Four credits must be engineering science or design.

### Pre-Health Track

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 385</td>
<td>Cell and Biomaterial Engineering Laborary</td>
<td>3</td>
</tr>
<tr>
<td>BME 420</td>
<td>Advanced Biomaterials Science</td>
<td>3</td>
</tr>
<tr>
<td>BME 427</td>
<td>Biotransport</td>
<td>3</td>
</tr>
<tr>
<td>BME 430</td>
<td>Fundamentals of Tissue Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 422</td>
<td>Biomaterials Characterization</td>
<td>3</td>
</tr>
<tr>
<td>CHE 210</td>
<td>Chemical Process Calculations I</td>
<td>2</td>
</tr>
<tr>
<td>CHE 230</td>
<td>Chemical Engineering Thermodynamics I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 244</td>
<td>Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>MTSE 301</td>
<td>Principles of Material Science and Engineering</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Advanced Elective $^1$

**Total Credits**

1 Chosen in consultation with advisor.
Five credits must be engineering science or design.