University of Wisconsin – Milwaukee
College of Engineering and Applied Science

BIOMEDICAL ENGINEERING CURRICULUM

The minimum number of credits required to complete the Bachelor of Science in Engineering with a major in Biomedical Engineering is 120 credits. Students who need backgroup preparation courses may need additional credits. See information below regarding placement examinations.

<table>
<thead>
<tr>
<th>Engineering Core Courses (26 credits)</th>
<th>Credits</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 101 Fundamentals of Biomedical Engineering</td>
<td>3</td>
<td>MechEng 101 (C)</td>
</tr>
<tr>
<td>Civ Eng 201 Statics</td>
<td>3</td>
<td>Math 232</td>
</tr>
<tr>
<td>Civ Eng 202 Dynamics</td>
<td>3</td>
<td>Civ Eng 201, Math 233(C)</td>
</tr>
<tr>
<td>EAS 200 Professional Seminar</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>ElecEng 301 Electrical Circuits I</td>
<td>3</td>
<td>Physics 210(C)</td>
</tr>
<tr>
<td>ElecEng 305 Electrical Circuits II</td>
<td>4</td>
<td>ElecEng 234, 301</td>
</tr>
<tr>
<td>MechEng 201 Engineering Materials</td>
<td>4</td>
<td>Math 231(C), Chem 100* or score 1 on chem placement test</td>
</tr>
<tr>
<td>MechEng 101 Computational Tools for Engineers</td>
<td>2</td>
<td>Math 221(C) or 231(C)</td>
</tr>
<tr>
<td>MechEng 301 Basic Engineering Thermodynamics</td>
<td>3</td>
<td>Math 233, Physics 209</td>
</tr>
</tbody>
</table>

^Biomedical Engineering Major (37 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio Sci 202 Anatomy &amp; Physiology I</td>
<td>4</td>
<td>None</td>
</tr>
<tr>
<td>Bio Sci 203 Anatomy &amp; Physiology II</td>
<td>4</td>
<td>Bio Sci 202* or 315*</td>
</tr>
<tr>
<td>Bio Sci 465 Biostatistics</td>
<td>3</td>
<td>Jr St, Bio Sci 150, Math 105</td>
</tr>
<tr>
<td>IndEng 367 Intro. Statistics for Physical Science &amp; Engineering Students</td>
<td>3</td>
<td>B- or better Math 211 or 213, C or better Math 221 or 231</td>
</tr>
<tr>
<td>BME 320 Engineering of Biomedical Devices I</td>
<td>3</td>
<td>BME 101(P), ElecEng 234(P), Physics 210(P)</td>
</tr>
<tr>
<td>BME 325 Engineering of Biomedical Devices II</td>
<td>3</td>
<td>BioSci 203(P), BME 320(P)</td>
</tr>
<tr>
<td>BME 385 Introduction to Biomaterials</td>
<td>3</td>
<td>Jr St, MatEng 201</td>
</tr>
<tr>
<td>BME 495 Biomedical Instrumentation Lab/Senior Lab</td>
<td>3</td>
<td>Bio Sci 203, BME 101, ElecEng 301, 436, MechEng 479 (C)</td>
</tr>
<tr>
<td>BME 595 Capstone Design Project</td>
<td>3</td>
<td>BME 495</td>
</tr>
<tr>
<td>ElecEng 310 Signals &amp; Systems</td>
<td>3</td>
<td>ElecEng 305(C)</td>
</tr>
<tr>
<td>MechEng 469 Introduction to Biomechanical Engineering</td>
<td>3</td>
<td>Civ Eng 202,303</td>
</tr>
<tr>
<td>Mech Eng 474 Introduction to Control Systems</td>
<td>4</td>
<td>Sr St, Civ Eng 202*, Elec Eng 234*, 301</td>
</tr>
</tbody>
</table>

^Mathematics (14-16 credits)

One of the following Calculus sequences must be completed:

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Credits</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 231-232-233</td>
<td>12</td>
<td>Math placement score, or previous course with at least “C” grade.</td>
</tr>
<tr>
<td>Or Math 221-222 (Honors)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>And ElecEng 234 Analytical Methods in Engineering</td>
<td>4</td>
<td>Math 232*</td>
</tr>
</tbody>
</table>

Physics (10 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 209 &amp; 214 (Lab), and Physics 210 &amp; 215 (Lab)</td>
<td>10</td>
<td>Physics 209: Math 232(C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Physics 210: Math 233(C), C- or better in Physics 209</td>
</tr>
</tbody>
</table>

General Education Requirements

Distribution Requirements (15 credits)

<table>
<thead>
<tr>
<th>Category</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td>3</td>
</tr>
<tr>
<td>Humanities</td>
<td>3</td>
</tr>
<tr>
<td>Social Science</td>
<td>3</td>
</tr>
<tr>
<td>English 310 Writing, Speaking &amp; Technoscience in the 21st Century</td>
<td>3</td>
</tr>
</tbody>
</table>

Cultural Diversity - One of the arts, humanities, or social science courses selected must also meet the UWM cultural diversity requirement.

Competency Requirements

^English Composition (0-6 credits)

The English Composition requirement is satisfied by:

1. Earning a satisfactory score on the English placement test, or
2. Earning a grade of C or higher in English 102
3. Transferring a grade of C or better in a course equivalent to English 102 or higher level expository writing course

Foreign Language (0-8 credits) (for new freshman starting fall 1999)

The foreign language requirement can be completed with one of these options:

1. Two years of a single foreign language in high school
2. Two semesters of a single foreign language in college
3. Demonstrate ability by examination

*C or better in prerequisite

^Advancement to Major: 1. Complete a minimum of 24 credits required for major (Excludes: general education, prerequisite and orientation courses). 2. Complete Math 232 (or 222) with a "C" or better grade. 3. Complete EAS 200 Professional Seminar. 4. Complete the English composition requirement. 5. Obtain a 2.0 GPA in all courses in item 1. The program may impose major status as a prerequisite for courses numbered 300 or above.

^Placement Examinations: Students without previous college level credits in Math, Chemistry or English may be required to take placement exams. The results of these tests determine the appropriate course in which to register. Background prerequisite courses may be required in addition to the courses listed above.
The Biomedical Engineering program requires a total of 16 credits of technical electives, chosen from the following list:

- Bio Sci 150 Foundations of Biological Sciences I
- Bio Sci 152 Foundations of Biological Sciences II
- Bio Sci 375 Introduction to Neuroscience I
- Bio Sci 355 Introduction to Neuroscience II
- BMS 585 Advanced Biomaterials
- BME 590 Senior Thesis
- BME 690 Topics in Biomedical Engineering
- BME 699 Independent Study
- BusAdm 447 Entrepreneurship
- Chem 102 General Chemistry
- Chem 104 General Chemistry & Quantitative Analysis
- Chem 343 Organic Chemistry
- Chem 344 Organic Chemistry Laboratory
- Chem 345 Organic Chemistry
- Civ Eng 303 Strength of Materials
- CompSci 250 Introductory Computer Programming
- EAS 001 Co-op Work Period
- EAS 497 Study Abroad
- ElecEng 410 Principles of Discrete Systems & Digital Signal Processing
- ElecEng 436 Introduction of Medical Instrumentation
- ElecEng 437 Introduction to Biomedical Imaging
- ElecEng 438 Bioanalytics & Biomedical Diagnostics
- ElecEng 537 Fundamentals of Neuroimaging Technology
- ElecEng 539 Introduction to Magnetic Resonance Imaging
- Ind Eng 360 Engineering Economic Analysis
- Ind Eng 584 Biodynamics of Human Motion
- MechEng 320 Introduction to Fluid Mechanics
- MechEng 370 Computer Aided Engineering Laboratory
- OccThpy 593 Introduction to Biomedical and Rehabilitation Instrumentation
- OccThpy 620 Introduction to Assistive and Rehabilitation Technology
- OccThpy 625 Design and Disability
- Physics 305 Medical Physics
- Physics 306 Introduction to Biophysics
- Psych 254 Physiological Psychology

Pre-Medicine Suggested Courses: Students considering medical school should consult with the pre-medical advisor early in their undergraduate career for help in planning a program. The courses listed below are suggested for pre-medical students.

- Bio Sci 150 Foundations of Biological Sciences I
- Bio Sci 152 Foundations of Biological Sciences II
- Bio Sci 150 Foundations of Biological Sciences I
- Bio Sci 152 Foundations of Biological Sciences II
- One Advanced course in Bio Sci with lab
- Chem 102 General Chemistry
- Chem 104 General Chemistry & Quantitative Analysis
- Chem 343 Organic Chemistry
- Chem 344 Organic Chemistry Laboratory
- Chem 345 Organic Chemistry
- Chem 501 Introduction to Biochemistry
- Math – a semester of calculus
- Physics 209 General Physics I
- Physics 210 General Physics II
- Physics 214 Lab Physics I
- Physics 215 Lab Physics II
- Statistics – Any statistics course
- Psych 101 Introduction to Psychology
- Sociol 101 Introduction to Sociology
- PH 101 Introduction to Public Health

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**Technical Electives – Biomedical Engineering Major**

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