BIOMEDICAL ENGINEERING: BIOMEDICAL INNOVATION, DESIGN, AND ENTREPRENEURSHIP, M.S.

**REQUIREMENTS**

**MINIMUM GRADUATE SCHOOL REQUIREMENTS**

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.

**NAMED OPTION REQUIREMENTS**

**MODE OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
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</table>

**Mode of Instruction Definitions**

**Accelerated:** Accelerated programs are offered at a fast pace that condenses the time to completion. Students are able to complete a program with minimal disruptions to careers and other commitments.

**Evening/Weekend:** Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

**Face-to-Face:** Courses typically meet during weekdays on the UW-Madison Campus.

**Hybrid:** These programs combine face-to-face and online learning formats. Contact the program for more specific information.

**Online:** These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

**CURRICULAR REQUIREMENTS**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
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</thead>
<tbody>
<tr>
<td>Minimum Credit Requirement</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Residence Credit Requirement</td>
<td>16 credits</td>
</tr>
<tr>
<td>Minimum Graduate Coursework Requirement</td>
<td>15 credits must be graduate-level coursework. Details can be found in the Graduate School's Minimum Graduate Coursework (50%) policy (<a href="https://policy.wisc.edu/library/UW-1244">https://policy.wisc.edu/library/UW-1244</a>).</td>
</tr>
</tbody>
</table>

| Overall | 3.00 GPA required. |
| Graduate GPA Requirement | This program follows the Graduate School's policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/). |
| Other Grade Requirements | n/a |
| Assessments and Examinations | There are no degree-specific assessments and examinations outside of those given in individual courses. |
| Language Requirements | n/a |

**REQUIRED COURSES**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 semesters of B M E 701</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>9 credits of engineering courses in design, prototyping and manufacturing</td>
<td>9</td>
</tr>
<tr>
<td>B M E 601</td>
<td>Special Topics in Biomedical Engineering</td>
<td></td>
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<tr>
<td>B M E 601</td>
<td>Special Topics in Biomedical Engineering (Design for Rehabilitation)</td>
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<tr>
<td>B M E 602</td>
<td>Special Topics in Biomedical Engineering</td>
<td></td>
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<tr>
<td>B M E 602</td>
<td>Special Topics in Biomedical Engineering (Microfluidics and Rapid Prototyping)</td>
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<tr>
<td>B M E/M E 603</td>
<td>Topics in Bio-Medical Engineering</td>
<td></td>
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<tr>
<td>B M E/I S Y E 662</td>
<td>Design and Human Disability and Aging</td>
<td></td>
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<tr>
<td>M E 449</td>
<td>Redesign and Prototype Fabrication</td>
<td></td>
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<tr>
<td>M E 514</td>
<td>Additive Manufacturing</td>
<td></td>
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<tr>
<td>M E 549</td>
<td>Product Design</td>
<td></td>
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<tr>
<td>M E 601</td>
<td>Special Topics in Mechanical Engineering</td>
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</tr>
<tr>
<td>M E/I S Y E 641</td>
<td>Design and Analysis of Manufacturing Systems</td>
<td></td>
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<tr>
<td>M E 748</td>
<td>Optimum Design of Mechanical Elements and Systems</td>
<td></td>
</tr>
<tr>
<td>I S Y E 415</td>
<td>Introduction to Manufacturing Systems, Design and Analysis</td>
<td></td>
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<tr>
<td>I S Y E 515</td>
<td>Engineering Management of Continuous Process Improvement</td>
<td></td>
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<tr>
<td>I S Y E 517</td>
<td>Decision Making in Health Care</td>
<td></td>
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<tr>
<td>I S Y E 552</td>
<td>Human Factors Engineering Design and Evaluation</td>
<td></td>
</tr>
<tr>
<td>I S Y E 557</td>
<td>Human Factors Engineering for Healthcare Systems</td>
<td></td>
</tr>
<tr>
<td>I S Y E 601</td>
<td>Special Topics in Industrial Engineering</td>
<td></td>
</tr>
<tr>
<td>I S Y E 602</td>
<td>Special Topics in Human Factors</td>
<td></td>
</tr>
<tr>
<td>I S Y E 603</td>
<td>Special Topics in Engineering Analytics and Operations Research</td>
<td></td>
</tr>
<tr>
<td>I S Y E 604</td>
<td>Special Topics in Manufacturing and Supply Chain Management</td>
<td></td>
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</tbody>
</table>
**I SY E 606**  Special Topics in Healthcare Systems Engineering

**INTEREGR 477**  Tools for Prototyping and Manufacturing

**INTEREGR 601**  Topics in Interdisciplinary Engineering

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**6 credits of general business, entrepreneurship and strategic innovation courses**

**GEN BUS 310**  Fundamentals of Accounting and Finance for Non-Business Majors

**GEN BUS 311**  Fundamentals of Management and Marketing for Non-Business Majors

**M H R/A A E 540**  Intellectual Property Rights, Innovation and Technology

**M H R 715**  Strategic Management of Innovation

**M H R 722**  Entrepreneurial Management

**M H R 734**  Venture Creation

**M H R 738**  Weinert Applied Ventures in Entrepreneurship (WAVE)

**R M I 650**  Sustainability, Environmental and Social Risk Management

**B M E 602**  Special Topics in Biomedical Engineering (Advanced Topics in Biomanufacturing Entrepreneurship)

**B M E 602**  Special Topics in Biomedical Engineering (Medical Device Ecosystems)

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**0-6 credits of other technical elective engineering courses**

**B M E/M E 415**  Biomechanics of Human Movement

**B M E/PHM SCI 430**  Biological Interactions with Materials

**B M E/E C E 462**  Medical Instrumentation

**B M E/E C E 463**  Computers in Medicine

**B M E/M E 505**  Biofluidics

**B M E 510**  Introduction to Tissue Engineering

**B M E 511**  Tissue Engineering Laboratory

**B M E 520**  Stem Cell Bioengineering

**B M E/MED PHYS 530**  Medical Imaging Systems

**B M E/MED PHYS 535**  Introduction to Energy-Tissue Interactions

**B M E 545**  Engineering Extracellular Matrices

**B M E 550**  Introduction to Biological and Medical Microsystems

**B M E 556**  Systems Biology: Mammalian Signaling Networks

**B M E/CBE 560**  Biochemical Engineering

**B M E/MED PHYS 573**  Medical Image Science: Mathematical and Conceptual Foundations

**B M E/MED PHYS 574**  Imaging in Medicine: Applications

**B M E/MED PHYS 578**  Non-Ionizing Diagnostic Imaging

**B M E/MED PHYS 615**  Tissue Mechanics

**B M E/MED PHYS/MHMCOL-M/PHYSICS/RADIOL 619**  Microscopy of Life

**B M E/CHEM/MED PHYS 750**  Biological Optical Microscopy

**B M E/E C E/MED PHYS 778**  Machine Learning in Ultrasound Imaging

**CBE 540**  Polymer Science and Technology

**E C E/COMP SCI/ISY E 524**  Introduction to Optimization

**E C E/COMP SCI 533**  Image Processing

**E C E/COMP SCI/M E 539**  Introduction to Artificial Neural Networks

**M E 563**  Intermediate Fluid Dynamics

**M E/E M A 570**  Experimental Mechanics

**M E 573**  Computational Fluid Dynamics

**M S & E 521**  Advanced Polymeric Materials

**MED PHYS/PEDIAT 705**  Women and Leadership: Science, Health and Engineering

**B M E 799**  Advanced Independent Study

**3-6 credits of advanced design or research project**

**B M E/MED PHYS/PEDIAT 619**  Microscopy of Life

**MED PHYS/PEDIAT 705**  Women and Leadership: Science, Health and Engineering

**B M E/CHEM/MED PHYS 750**  Biological Optical Microscopy

**B M E/E C E/MED PHYS 778**  Machine Learning in Ultrasound Imaging

**CBE 540**  Polymer Science and Technology

**E C E/COMP SCI/ISY E 524**  Introduction to Optimization

**E C E/COMP SCI 533**  Image Processing

**E C E/COMP SCI/M E 539**  Introduction to Artificial Neural Networks

**M E 563**  Intermediate Fluid Dynamics

**M E/E M A 570**  Experimental Mechanics

**M E 573**  Computational Fluid Dynamics

**M S & E 521**  Advanced Polymeric Materials

**MED PHYS/PEDIAT 705**  Women and Leadership: Science, Health and Engineering

**B M E 799**  Advanced Independent Study

**Additional credits taken from the list above, in consultation with advisor**

**0-6 credits of advanced design or research project**

**B M E/MED PHYS/PEDIAT 619**  Microscopy of Life

**MED PHYS/PEDIAT 705**  Women and Leadership: Science, Health and Engineering

**B M E/CHEM/MED PHYS 750**  Biological Optical Microscopy

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**MED PHYS/PEDIAT 705**  Women and Leadership: Science, Health and Engineering

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**Total Credits**

**30 credits**

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At least 6 credits in "Engineering courses in design, prototyping, manufacturing" and/or "Technical elective engineering courses" need to be from B M E courses.

Students in this program may not take courses outside the prescribed curriculum without faculty advisor and program director approval. Students in this program cannot enroll concurrently in other undergraduate, graduate or certificate programs.