BIOMEDICAL ENGINEERING

Program Information

The Master’s degree (thesis or nonthesis) requires at least 30 semester hours. The Doctoral degree requires at least 90 semester credit hours beyond the bachelor’s degree. No more than 30 hours of a master’s degree from another institution will be transferred to the Ph.D. degree. If a student holds a master’s degree in a discipline different from the doctoral program, the master’s work will not be counted toward the doctoral degree unless the BME Department successfully petitions the Dean of the Graduate School. Requirements for these degrees are given in the Graduate Degrees section of this catalog.

Complete BME program details and courses available are listed in the Biomedical Engineering Graduate Guidelines, on the BME website (http://www.bme.ufl.edu/) (which also offers information on available research areas).

Combined program: Biomedical Engineering also offers a combined bachelor’s/master’s degree program in collaboration with the other departments in the College of Engineering. This program allows qualified students to earn both a bachelor’s degree and a master’s degree within 5 years for a net savings of 1 year. Contact the BME academic services office for more information or see the BME website (http://www.bme.ufl.edu/academics/combined/).

Degrees Offered

**Degrees Offered with a Major in Biomedical Engineering**

- Doctor of Philosophy
  - without a concentration
  - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees section of this catalog.

**Courses**

### Biomedical Engineering Program Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 5052L</td>
<td>Biomedical Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BME 5085</td>
<td>Biomedical Engineering and Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>BME 5401</td>
<td>Biomedical Engineering and Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>BME 5407</td>
<td>Biomedical Instrumentation</td>
<td>2</td>
</tr>
<tr>
<td>BME 5500</td>
<td>Statistical Methods for Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 5703</td>
<td>Advanced Computational Methods for Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 5743</td>
<td>Applied Data Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>BME 5937</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>BME 6010</td>
<td>Clinical Immersion</td>
<td>1</td>
</tr>
<tr>
<td>BME 6018</td>
<td>Clinical Correlations in BME</td>
<td>3</td>
</tr>
<tr>
<td>BME 6164</td>
<td>Magnetic Biomaterials</td>
<td>3</td>
</tr>
<tr>
<td>BME 6324</td>
<td>Stem Cell Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 6330</td>
<td>Cell and Tissue Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 6360</td>
<td>Neural Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 6505</td>
<td>Advanced Diagnostic Radiological Physics</td>
<td>3</td>
</tr>
<tr>
<td>BME 6522</td>
<td>Biomedical Multivariate Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>BME 6534</td>
<td>Radiological Physics, Measurements and Dosimetry</td>
<td>3</td>
</tr>
<tr>
<td>BME 6592</td>
<td>Therapeutic Radiological Physics II</td>
<td>3</td>
</tr>
<tr>
<td>BME 6605</td>
<td>Individual Work in Biomedical Engineering</td>
<td>1-4</td>
</tr>
<tr>
<td>BME 6907</td>
<td>BME Project</td>
<td>1-9</td>
</tr>
<tr>
<td>BME 6910</td>
<td>Supervised Research</td>
<td>1-5</td>
</tr>
<tr>
<td>BME 6936</td>
<td>Biomedical Engineering Seminar</td>
<td>1</td>
</tr>
<tr>
<td>BME 6938</td>
<td>Special Topics in Biomedical Engineering</td>
<td>1-4</td>
</tr>
<tr>
<td>BME 6940</td>
<td>Supervised Teaching</td>
<td>1-5</td>
</tr>
<tr>
<td>BME 6979</td>
<td>Advanced Research</td>
<td>1-12</td>
</tr>
<tr>
<td>BME 7980</td>
<td>Research for Doctoral Dissertation</td>
<td>1-15</td>
</tr>
<tr>
<td>ENU 5615C</td>
<td>Nuclear Radiation Detection and Instrumentation</td>
<td>4</td>
</tr>
<tr>
<td>ENU 5516L</td>
<td>Nuclear Engineering Laboratory II</td>
<td>2</td>
</tr>
<tr>
<td>ENU 6051</td>
<td>Radiation Interaction Basics and Applications</td>
<td>3</td>
</tr>
<tr>
<td>ENU 6052</td>
<td>Radiation Transport Basics and Applications</td>
<td>3</td>
</tr>
<tr>
<td>ENU 6627</td>
<td>Therapeutic Radiological Physics</td>
<td>3</td>
</tr>
<tr>
<td>ENU 6657</td>
<td>Diagnostic Radiological Physics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Biomedical Engineering Departmental Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 5052L</td>
<td>Biomedical Engineering Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>BME 5401</td>
<td>Biomedical Engineering and Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>BME 5500</td>
<td>Biomedical Instrumentation</td>
<td>3</td>
</tr>
<tr>
<td>BME 5703</td>
<td>Statistical Methods for Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 5704</td>
<td>Advanced Computational Methods for Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 5743</td>
<td>Applied Data Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>BME 5937</td>
<td>Special Topics</td>
<td>1-4</td>
</tr>
<tr>
<td>BME 6010</td>
<td>Clinical Immersion</td>
<td>1</td>
</tr>
<tr>
<td>BME 6018</td>
<td>Clinical Correlations in BME</td>
<td>3</td>
</tr>
<tr>
<td>BME 6164</td>
<td>Magnetic Biomaterials</td>
<td>3</td>
</tr>
<tr>
<td>BME 6324</td>
<td>Stem Cell Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 6330</td>
<td>Cell and Tissue Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 6360</td>
<td>Neural Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 6505</td>
<td>Advanced Diagnostic Radiological Physics</td>
<td>3</td>
</tr>
<tr>
<td>BME 6522</td>
<td>Biomedical Multivariate Signal Processing</td>
<td>3</td>
</tr>
<tr>
<td>BME 6535</td>
<td>Radiological Physics, Measurements and Dosimetry</td>
<td>3</td>
</tr>
<tr>
<td>BME 6592</td>
<td>Therapeutic Radiological Physics II</td>
<td>3</td>
</tr>
<tr>
<td>BME 6605</td>
<td>Individual Work in Biomedical Engineering</td>
<td>1-4</td>
</tr>
<tr>
<td>BME 6907</td>
<td>BME Project</td>
<td>1-9</td>
</tr>
<tr>
<td>BME 6910</td>
<td>Supervised Research</td>
<td>1-5</td>
</tr>
<tr>
<td>BME 6936</td>
<td>Biomedical Engineering Seminar</td>
<td>1</td>
</tr>
<tr>
<td>BME 6938</td>
<td>Special Topics in Biomedical Engineering</td>
<td>1-4</td>
</tr>
<tr>
<td>BME 6940</td>
<td>Supervised Teaching</td>
<td>1-5</td>
</tr>
<tr>
<td>BME 6971</td>
<td>Research for Master’s Thesis</td>
<td>1-15</td>
</tr>
</tbody>
</table>
College of Engineering and College of Medicine Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEE 5354L</td>
<td>Semiconductor Device Fabrication Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>EEE 5776</td>
<td>Applied Machine Learning</td>
<td>3</td>
</tr>
<tr>
<td>EEE 6778</td>
<td>Applied Machine Learning II</td>
<td>3</td>
</tr>
<tr>
<td>EGN 5010L</td>
<td>NRF Training Lab</td>
<td>1</td>
</tr>
<tr>
<td>EGN 5215</td>
<td>Machine Learning Applications in Civil Engineering</td>
<td>3</td>
</tr>
<tr>
<td>EGN 5442</td>
<td>Programming for Applied Data Science</td>
<td>3</td>
</tr>
<tr>
<td>EGN 6446</td>
<td>Mathematical Foundations for Applied Data Science</td>
<td>3</td>
</tr>
<tr>
<td>EGN 6640</td>
<td>Entrepreneurship for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>EGN 6642</td>
<td>Engineering Innovation</td>
<td>3</td>
</tr>
<tr>
<td>EGN 6913</td>
<td>Engineering Graduate Research</td>
<td>0-3</td>
</tr>
<tr>
<td>EGN 6933</td>
<td>Special Topics</td>
<td>1-3</td>
</tr>
<tr>
<td>EGN 6937</td>
<td>Engineering Fellowship Preparation</td>
<td>0-1</td>
</tr>
<tr>
<td>EGS 6039</td>
<td>Engineering Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EGS 6050</td>
<td>Foundations in Engineering Education</td>
<td>2</td>
</tr>
<tr>
<td>EGS 6056</td>
<td>Learning and Teaching in Engineering</td>
<td>1</td>
</tr>
<tr>
<td>EGS 6101</td>
<td>Divergent Thinking</td>
<td>3</td>
</tr>
<tr>
<td>EGS 6626</td>
<td>Fundamentals of Engineering Project Management</td>
<td>3</td>
</tr>
<tr>
<td>EGS 6628</td>
<td>Advanced Practices in Engineering Project</td>
<td>3</td>
</tr>
<tr>
<td>EGS 6681</td>
<td>Advanced Engineering Leadership</td>
<td>3</td>
</tr>
<tr>
<td>ESI 6900</td>
<td>Principles of Engineering Practice</td>
<td>1-4</td>
</tr>
</tbody>
</table>

Student Learning Outcomes

Biomedical Engineering (PHD)

SLO 1 Knowledge
An ability to develop a broad-based knowledge of Biomedical Engineering problems

SLO 2 Knowledge
An ability to critically read Biomedical Engineering literature

SLO 3 Skills
An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems

SLO 4 Skills
An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data

SLO 5 Professional Behavior
An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions

SLO 6 Professional Behavior
An ability to communicate effectively and work collaboratively

Biomedical Engineering (ME & Ms)

SLO 1 Knowledge
An ability to develop a broad-based knowledge of Biomedical Engineering problems

SLO 2 Knowledge
An ability to critically read Biomedical Engineering literature

SLO 3 Skills
An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems

SLO 4 Skills
An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data

SLO 5 Professional Behavior
An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions

SLO 6 Professional Behavior
An ability to communicate effectively and work collaboratively