## M.S. in Biomedical Engineering

### Program Requirements

#### Thesis Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 669</td>
<td>Engineering Physiology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One graduate course in physiology or equivalent</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One graduate course in experimental design, statistics, or clinical studies</td>
<td>3</td>
</tr>
<tr>
<td>BME 701</td>
<td>Master's Thesis</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Any approved elective</td>
<td>3</td>
</tr>
<tr>
<td>BME 791</td>
<td>Graduate Seminar (required for two semesters)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>30</td>
</tr>
</tbody>
</table>

#### Non-Thesis Option

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 669</td>
<td>Engineering Physiology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One graduate course in physiology or equivalent</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>One graduate course in experimental design, statistics or clinical studies</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Three approved electives</td>
<td>9</td>
</tr>
<tr>
<td>BME 791</td>
<td>Graduate Seminar (required for two semesters)</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>30</td>
</tr>
</tbody>
</table>

### MS Curriculum Mandatory Courses

1. Admitted students who have not previously taken an upper level physiology course will be required to take BME 669 Engineering Physiology or an equivalent course as one of their required graduate courses.

2. In addition, students must meet a statistics requirement. They may choose one course from the following preapproved statistics courses: MATH 660 Introduction to statistical Computing with SAS and R, MATH 661 Applied Statistics, MATH 663 Introduction to Biostatistics, IE 604 Advanced Engineering Statistics.

All graduate students must additionally select five courses from the following list:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME 651</td>
<td>Principles of Tissue Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 652</td>
<td>Cellular and Molecular Tissue Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 653</td>
<td>Micro/Nanotechnologies for Interfacing Live Cells</td>
<td>3</td>
</tr>
<tr>
<td>BME 654</td>
<td>Cardiovascular Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>BME 661</td>
<td>Neural Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 668</td>
<td>Medical Imaging Systems</td>
<td>3</td>
</tr>
<tr>
<td>BME 670</td>
<td>Introduction to Biomechanical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 671</td>
<td>Biomechanics of Human Structure and Motion</td>
<td>3</td>
</tr>
<tr>
<td>BME 672</td>
<td>Biomaterials</td>
<td>3</td>
</tr>
<tr>
<td>BME 673</td>
<td>Biorobotics</td>
<td>3</td>
</tr>
<tr>
<td>BME 674</td>
<td>Principles of Neuromuscular Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 675</td>
<td>Computer Methods in Biomedical Engineering</td>
<td>3</td>
</tr>
<tr>
<td>BME 676</td>
<td>Computational Biomechanics</td>
<td>3</td>
</tr>
<tr>
<td>BME 678</td>
<td>Design of Orthopedic Implants</td>
<td>3</td>
</tr>
<tr>
<td>BME 679</td>
<td>Advanced Design of Orthopedic Implants</td>
<td>3</td>
</tr>
<tr>
<td>BME 680</td>
<td>BioMEMS Design and Applications</td>
<td>3</td>
</tr>
<tr>
<td>BME 687</td>
<td>Design of Medical Instrument</td>
<td>3</td>
</tr>
<tr>
<td>BME 688</td>
<td>Virtual Biomedical Instrument</td>
<td>3</td>
</tr>
</tbody>
</table>
Elective Courses
The remaining three courses can be selected from any of the BME courses offered. For students taking the MS Thesis Option, two semesters of thesis count as two elective courses.

Other Notes
Students may take up to two courses outside the department, including the statistics course.

Seminars
M.S. students are required to register for the 0 credit graduate seminar in each of a minimum of two semesters. This is a non-additive credit (i.e., it does not count toward the 30 required credits), however participation in the seminar is required for graduation. Graduate seminars are offered weekly during the semesters and include guest speakers as well as NJIT graduate students. The Department also maintains lists of seminars in other departments and in neighboring institutions that are of interest to biomedical engineering. Part-time graduate students may request a waiver of this requirement.

Thesis Requirement
The Thesis Option requires a six (6) credit thesis. Because biomedical engineering exists at the intersection of several traditional engineering and computing fields, and the biological and medical sciences, the thesis demonstrates the student’s ability to define a problem, plan two semesters of independent work in an interdisciplinary environment, and execute a research and/or design that meets NJIT’s standards for a Masters Thesis. The thesis document conforms to the format of the Office of Graduate Studies and is evaluated by a committee of three members, two of whom must be from the NJIT biomedical faculty. External members from industry, medicine or other universities are encouraged. An oral defense before the committee and the departmental community is also required. All NJIT theses are archived in the University Library and are available via the Library’s web site.

Thesis topics are selected by the student in consultation with faculty and other potential advisors. Thesis content can include a research study, the development/design of new technology including software, or the design, execution and evaluation of an experiment. A thesis may be conducted in an NJIT laboratory or in another institutional or industrial facility. The individual nature of the work must be clearly identifiable, as should its novelty and importance to biomedical engineering.

In cases where the intellectual property of an industrial sponsor may be in conflict with the public presentation of the thesis or its availability through the NJIT Library, special arrangements can be made by the M.S. Program Director to protect the firm’s property.