BME M.S./M.Eng Program Curriculum

FALL Year 1
16:125:xxx BME Core Course (3cr)
16:125:xxx BME Core Course (3cr)*
16:125:xxx Bioengineering Elective (3cr)
16:125:501 Mathematical Modeling for BME (3cr)
16:125:601 Engineering Ethics/Seminar (1cr)
BME Seminars (attendance required)

SPRING Year 1
16:125:xxx BME Core Course (3cr)
16:125:xxx BME Core Course (3cr)*
16:125:xxx Bioengineering Elective (3cr)
16:125:586 Structure and Dynamics in Adult and Stem Cell Biology (3cr)
16:125:602 Engineering Writing/Seminar (1cr)
BME Seminars (attendance required)

FALL & SPRING Year 2
16:125:xxx Bioengineering Elective (3cr)
16:125:xxx Bioengineering Elective (3cr) (As Needed)
16:125:628 Clinical Practicum (1cr)
16:125:701/702 Research (3cr/3cr)
16:125:699 Non-Thesis Study (3cr) (M.Eng Only)
BME Seminars (attendance required)

BME Core Courses Must take 3 out of 5:
1) 16:125:561 BioImaging Methods (3cr)
2) 16:125:571 Biosignal Processing and Biomedical Imaging (3cr)
3) 16:125:572 Biocontrol, Modeling and Computation (3cr)
4) 16:125:573 Kinetics, Thermodynamics and Transport in Biomedicine (3cr)
5) 16:125:574 Biomechanics and Biomaterials (3cr)

Physiology Students must have taken an UG level Physiology course previously or the following course must be taken.
1) 16:125:581 Mammalian Physiology (online course-3cr)
OR Other Rutgers or RWJMS Physiology Courses – Contact the Graduate Program for information

Advanced Engineering Mathematics^ 1) 16:125:501 Mathematical Modeling for BME (3cr)

^Students may be asked to complete an alternate graduate-level math course based on need or availability. Students wishing to take an alternate math class should petition the graduate program director.

Advanced Cell Biology 1) 16:125:586 Structure and Dynamics in Adult and Stem Cell Biology (3cr)

Professional Developmental Courses Must take 1, 2 and 5...3&4 are optional
1) 16:125:601 Engineering Ethics and Seminar (1cr)
2) 16:125:602 Engineering Writing and Seminar (1cr)
3) 16:125:607 Preparing Future Faculty I (1cr)
4) 16:125:608 Preparing Future Faculty II (1cr)
5) 16:125:628 Clinical Practicum (1cr)

Summary of Minimum M.S./M.Eng Requirements
3 out of 5 BME Core Courses 9 credits
Advanced Engineering Math Course 3 credits
Advanced Cell Biology Course 3 credits
3 Bioengineering Electives (4 if M.Eng) 9 credits (12 credits if M.Eng)
3 out of 5 Professional Developmental Courses 3 credits
Research (M.S. ONLY) 6 credits
Non-Thesis Study (M.Eng ONLY) 3 credits (MUST take an additional 3 credit elective)
Total 33 credits

* If schedule allows, take up to two core classes per semester. Minimum of three core classes required.
BME Ph.D. Program Curriculum

Fall Year 1
16:125:xxx  BME Core Course (3cr) (Register for one, possibly two core courses)
16:125:xxx  BME Core Course (3cr)
16:155:501  Mathematical Modeling for BME (3cr)
16:125:699  Non-Thesis Rotation (3cr)
16:125:601  Engineering Ethics/Seminar (1cr)
BME Seminars  (attendance required)

SPRING Year 1
16:125:xxx  BME Core Course (3cr) (Register for one or two core courses)
16:125:xxx  Bioengineering Elective (3cr)
16:125:586  Structure and Dynamics in Adult and Stem Cell Biology (3cr)
16:125:602  Engineering Writing/Seminar (1cr)
16:125:702  Research (3+cr)
BME Seminars  (attendance required)

SUMMER Year 1
Research Based Qualifying Exam for Doctoral Studies tied in with “Engineering Writing 602”
(May/June)

FALL Year 2
16:125:xxx  BME Core Course (3cr) (Register for one remaining core course, if any – see note*)
16:125:xxx  Bioengineering Elective (3cr) (Register for one or two core courses)
16:125:607  Preparing Future Faculty I (1cr)
16:125:701  Research (3+cr)
BME Seminars  (attendance required)

SPRING Year 2
16:125:578  Interdisciplinary BioStatistics Research Training (3cr)
16:125:xxx  Bioengineering Elective (3cr)
16:125:xxx  Life/Medical Sciences Elective (3cr)
16:125:608  Preparing Future Faculty II (1cr)
16:125:628  Clinical Practicum (1cr)
16:125:702  Research (3+cr)
BME Seminars  (attendance required)

SUMMER Year 2
Annual Research Verification Meeting
IDP Meeting
Prepare Thesis/Dissertation Proposal

FALL Year 3
BME Seminars  (Attendance required)
16:125:701  Research (3+cr)
Electives  (As required)

Deadline for Defense of Thesis/Dissertation Proposal

SPRING Year 3
16:125:702  Research (3+cr)
Electives  (As required)

Years 4-6
16:125:701/2  Research (3+cr)
BME Seminars  (Attendance required)
Electives  (Optional)

Annual Research Verification Meetings (Summers of years 4-6)
IDP Meetings (Summers of years 4-6)
Final Thesis/Dissertation and Defense (Year 5 or 6)

*Students are required to complete a total of 3 core BME courses, in addition to Math, Cell Biology and BioStatistics within the first four academic semesters.
**BME Core Courses** Must take 3 out of 5:
1) 16:125:561 BioImaging Methods (3cr)
2) 16:125:571 Biosignal Processing and Biomedical Imaging (3cr)
3) 16:125:572 Biocontrol, Modeling and Computation (3cr)
4) 16:125:573 Kinetics, Thermodynamics and Transport in Biomedicine (3cr)
5) 16:125:574 Biomechanics and Biomaterials (3cr)

**Physiology**
Students must have taken an UG level Physiology course previously or the following course must be taken.
1) 16:125:581 Mammalian Physiology (online course - 3cr)
OR Other Rutgers or RWJMS Physiology Courses – Contact the Graduate Program for information

**Advanced Engineering Mathematics**^
1) 16:125:501 Mathematical Modeling for BME (3cr)
^Students may be asked to complete an alternate graduate-level math course based on need or availability. Students wishing to take an alternate math class should petition the graduate program director.

**Advanced Cell Biology**
1) 16:125:586 Structure and Dynamics in Adult and Stem Cell Biology (3cr)

**Rigor and Reproducibility**
1) 16:125:578 Interdisciplinary BioStatistics Research Training (3cr)

**Medical/Life Science Elective**
1) Life Science elective from the list in the Graduate Handbook or recommendation from Program Director

**Developmental Courses**
1) 16:125:601 Engineering Ethics (1cr) (Required during 1st year)
2) 16:125:602 Engineering Writing (1cr) (Required during 1st year)
3) 16:125:607 Preparing Future Faculty I (1cr) (Required)
4) 16:125:608 Preparing Future Faculty II (1cr) (Required)
5) 16:125:628 Clinical Practicum (1cr) (Required)

**Summary of Minimum Ph.D. Requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 out of 5 BME Core Courses</td>
<td>9</td>
</tr>
<tr>
<td>Advanced Engineering Math Course</td>
<td>3</td>
</tr>
<tr>
<td>Advanced Cell Biology Course</td>
<td>3</td>
</tr>
<tr>
<td>BioStatistics Course</td>
<td>3</td>
</tr>
<tr>
<td>Life Science/Medical Elective</td>
<td>3</td>
</tr>
<tr>
<td>3 Bioengineering Electives</td>
<td>9</td>
</tr>
<tr>
<td>5 Developmental Courses</td>
<td>5</td>
</tr>
<tr>
<td>Non-Thesis Study (1st year Rotation)</td>
<td>3</td>
</tr>
<tr>
<td>Research (minimum)</td>
<td>34</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>72 credits (35 course credits)</strong></td>
</tr>
</tbody>
</table>

**Note:**
- Prerequisite work may not count as an elective. Please check with the program first.