# 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)

## 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)

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

## FALL Year 2
- 16:125:605 BME Seminar (Attendance required)
- 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)

## SPRING Year 2
- 16:125:605 BME Seminar (Attendance required)
- 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)

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

## FALL Year 3
- 16:125:605 BME Seminar (Attendance required)
- 16:125:701 Research (3+cr)
- Electives (As required)

**Deadline for Defense of Thesis/Dissertation Proposal**

## SPRING Year 3
- 16:125:605 BME Seminar (Attendance required)
- 16:125:702 Research (3+cr)
- Electives (As required)

## Years 4-6
- 16:125:605 BME Seminar (Attendance required)
- 16:125:701/2 Research (3+cr)
- 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.*
**Curriculum Summary**

**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)*

**BME Seminar (Required each semester after taking 601/602)**
1) 16:125:605  BME Seminar (0cr)

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**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>BME Seminars each fall/spring semester after Y1</td>
<td>0</td>
</tr>
</tbody>
</table>

Total 72 credits (35 course credits)

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