The PhD program is a dynamic, hands-on and research-focused degree program. Overseen by the Graduate Group in Mechanical Engineering and Applied Mechanics, students interact closely with faculty to pursue a degree tailored to their research interests. Each student’s course of study is selected with the help of their advisor and is approved by the Graduate Group Chair. Dissertation research is guided by a faculty research advisor and a small committee of faculty with interests and competence in areas related to the dissertation.

The Ph.D. requirements include the completion of a minimum of 10 course units of graduate level coursework beyond the undergraduate program with a grade-point average of at least 3.0, satisfactory performance in the PhD-related exams, presentation of a departmental seminar, completion of the teaching practicum, and the submission and successful defense of an original and significant dissertation. The milestones in the PhD program are noted in the PhD Handbook.

For more information: [http://www.me.upenn.edu/prospective-students/doctoral/degree-overview.php](http://www.me.upenn.edu/prospective-students/doctoral/degree-overview.php)

View the University's Academic Requirements for PhD Degrees ([http://catalog.upenn.edu/pennbook/academic-rules-phd/](http://catalog.upenn.edu/pennbook/academic-rules-phd/)).

### Required Courses

The Ph.D. requirements include the completion of a minimum of 10 course units of graduate level coursework.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Course Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENM 520</td>
<td>Principles and Techniques of Applied Math I</td>
<td></td>
</tr>
<tr>
<td>ENM 521</td>
<td>Principles and Techniques of Applied Math II</td>
<td></td>
</tr>
</tbody>
</table>

**MEAM Core Requirements**

Select three of the following:

- MEAM 519 Elasticity and Micromechanics of Materials
- MEAM 530 Continuum Mechanics
- MEAM 535 Advanced Dynamics
- MEAM 561 Thermodynamics: Foundations, Energy, Materials
- MEAM 570 Transport Processes I
- MEAM 620 Advanced Robotics

**Depth Requirement**

At least one graduate course outside MEAM that is related to the student’s research is required to fulfill the Depth Requirement (not including ENM 520 Principles and Techniques of Applied Math I or ENM 521 Principles and Techniques of Applied Math II).

**Breadth Requirement**

At least three additional graduate courses that are related to the student’s research are required to fulfill the Research Requirement.

In addition to the ten course units of graduate level work, students will complete:

- Responsible Conduct of Research in Engineering workshop in the first year (EAS 900 Responsible Conduct for Research in Engineering)
- Three semesters of Teaching Practicum (MEAM 895 Teaching Practicum; normally taken in 3rd, 4th and 5th semesters)
- Six semesters of the MEAM Seminar (MEAM 699 MEAM Seminar)

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2020 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.

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1 At least one graduate course in MEAM beyond the core requirements is required to fulfill the Depth Requirement.

2 At least one graduate course outside MEAM that is related to the student’s research is required to fulfill the Breadth Requirement (not including ENM 520 Principles and Techniques of Applied Math I or ENM 521 Principles and Techniques of Applied Math II).

3 At least three additional graduate courses that are related to the student’s research are required to fulfill the Research Requirement.