MECHANICAL ENGINEERING AND APPLIED MECHANICS, PHD

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 8 course units of graduate level coursework 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: https://www.me.upenn.edu/academics/doctoral/

The degree and major requirements displayed are intended as a guide for students entering in the Fall of 2026 and later. Students should consult with their academic program regarding final certifications and requirements for graduation.

Curriculum

Code	Title	Course Units
Mathematics		
ENM 5200	Principles and Techniques of Applied Math I	1
Select one of the following:		1
ENM 5210	Principles and Techniques of Applied Math II	
ENM 5220	Numerical Methods for PDEs	
ENM 5310	Data-driven Modeling and Probabilistic Scientific Computing	
MATH 5000	Topology	
ESE 5000	Linear Systems Theory	
ESE 6050	Modern Convex Optimization	
MEAM Core Courses		**3**
Select three of the following:		
MEAM 5190	Elasticity and Micromechanics of Materials	
MEAM 5300	Continuum Mechanics	
MEAM 5350	Advanced Dynamics	
MEAM 5610	Thermodynamics: Foundations, Energy, Materials	
MEAM 5700	Transport Processes I	
MEAM 6200	Advanced Robotics	
Research-Related Courses [1]		**3**
Teaching Practicum		**1.5**
MEAM 8950	Teaching Practicum (Taken 3 times) [2]	
Dissertation/Research [3]		**9.5**
MEAM 9999	Independent Study Research	
MEAM 9950	Dissertation	
Seminar [3]		**0**
MEAM 6990	MEAM Seminar (Taken 6 times)	
Responsible Conduct of Research Requirement		
EAS 9000	Responsible Conduct for Research (RCR), Engineering	0.5
Total Course Units		**19.5**

University PhD Benchmarks

In addition to Program requirements, the following milestones must be completed:

Code	Title	Course Units
Qualifying Evaluation		
Candidacy Examination		
Dissertation Defense/Oral Exam		
Dissertation Deposit		

For more information view the University's Academic Rules for PhD Programs (https://catalog.upenn.edu/pennbook/academic-rules-phd/).

1. At least three additional graduate courses that are related to the student's research are required to fulfill the Research Requirement.
2. Three semesters of Teaching Practicum normally taken in 3rd, 4th and 5th semesters.
3. Doctoral students are expected to maintain full-time status and to enroll in MEAM 9999 Independent Study Research while conducting research, in consultation with their advisor. A student should enroll in MEAM 9950 in year three and beyond once they advance to candidacy. A student must be enrolled in MEAM 9950 in their final semester.

Sample Plan of Study

Code	Title	Course Units
First Year		
Fall		
2 CU's MEAM core courses		2
ENM 5200	Principles and Techniques of Applied Math I	1
MEAM 6990	MEAM Seminar [1]	0
EAS 9000	Responsible Conduct for Research (RCR), Engineering	0.5
Spring		
ENM 5210	Principles and Techniques of Applied Math II	1
or ENM 5220	Numerical Methods for PDEs	
or ENM 5310	Data-driven Modeling and Probabilistic Scientific Computing	
or MATH 5000	Topology	

or ESE 5000	Linear Systems Theory	
or ESE 6050	Modern Convex Optimization	
1 CU MEAM core course		1
1 CU research related course		1
Qualifier Exam/MEAM 8990 [2]		
MEAM 6990	MEAM Seminar	0
Second Year		
Fall		
2 CU's research related course		2
MEAM 8950	Teaching Practicum [3]	0.5
MEAM 9999	Independent Study Research	1
Spring		
MEAM 9999	Independent Study Research	2.5
MEAM 6990	MEAM Seminar	0
MEAM 8950	Teaching Practicum	0.5
Third Year and Beyond		
Fall		
MEAM 9999	Independent Study Research	3
MEAM 6990	MEAM Seminar	0
MEAM 8950	Teaching Practicum	0.5
Spring		
MEAM 9950	Dissertation	3
MEAM 6990	MEAM Seminar	0
Total Course Units		**19.5**

1. MEAM 6990 needs to be completed six times before graduation. These six do not need to be in consecutive order.
2. Students must complete either 2 CUs of MEAM core courses or 1 CU of a MEAM core and 1 CU of the math requirement before they can take the qualifying exam. The Qualifying Exam (recorded as MEAM 8990) is held in the second semester of the PhD program if the student matriculated in Fall, or in the third semester for students who matriculate in Spring.
3. Students are eligible to participate in Teaching Practicum (MEAM 8950) as soon as they pass their qualifying exam. Typically a student passing the qualifying exam in their second semester, would normally complete the teaching practicum in semesters 3 (Fall semester in year 2), 4 (Spring year 2), and 5 (Fall year 3).
4. Candidacy Exam/Thesis Proposal is completed in the student's third or fourth year. The Dissertation Defense is typically held in the student's fifth or sixth year.
5. Students are expected to complete course requirements in the first three years of study. However, the combination of when the specific requirement (Mathematics, Core, and Research Related) is completed isn't as strict. The above listing is a general plan of study on when to complete them.