

ENGINEERING (ELECTRICAL ENGINEERING) - DOCTOR OF PHILOSOPHY

Requirements for Ph.D. Degree

The Program Educational Objectives for the Doctorate in Electrical Engineering are:

1. That graduates obtain relevant, productive employment performing research in academia, government or industry, and/or are teaching at institutions of higher education.
2. That graduates obtain relevant, productive employment with the private sector or in government and/or pursue additional advanced degrees.

The Ph.D. program is open to students with a master's degree. Exceptionally well qualified students may petition for direct entry to the Ph.D. program without first obtaining a master's degree.

At the discretion of the advisor, students may complete some or all degree requirements remotely, e.g., by registering in the online sections for courses. All Graduate Assistants must enroll as full-time students for 9 credits, excepting in their final two academic semesters where they may file a request for waiver permitting them to enroll in at least 6 credits in their second to last academic semester and at least 1 credit hour in their final academic semester.

Note—the following degree requirement tables outline the **minimum** requirements for a Ph.D. in Electrical Engineering. As many students must register for a minimum of 9 credits each semester to remain full time, a student will often take more than the minimum of 18 credits of E E 700 Doctoral Dissertation to complete their degree. Furthermore, as students are not eligible for enrollment in E E 700 until they have passed the Ph.D. Qualifying Exam, a student will often take more than the maximum of 6 or 9 hours of E E 600 Doctoral Research.

Option 1 - Ph.D. with Completed Master's Degree

If the student has both master's and bachelor's degrees in fields other than electrical engineering, they must complete undergraduate deficiency coursework, consisting of completion of the BSEE core courses. If the student has a master's degree in a field other than electrical engineering, they must complete graduate deficiency coursework, which consists of three graduate core courses from three different areas of emphasis (see MSEE program of study for more details).

Prefix	Title	Credits
Pass Qualifying Exam ^{1,2}		
Graduate Electives (credits beyond the master's degree) ³		18
Pass Comprehensive Exam ⁴		
Doctoral Dissertation		
E E 700	Doctoral Dissertation ²	
Complete and defend doctoral dissertation ⁵		
Total Credits		36

¹ It is expected that students will take the qualifying exam within one year of their master's or entering the Ph.D. program. The qualifying exam consists of two components: completing the graduate core (see MSEE program of study for details) with a grade of B or better and

presenting a written and oral summary of a topical literature review. For more details on the qualifying exam, see <https://ece.nmsu.edu/grad-study/phd-qualifying.html>.

- ² A student may not enroll in E E 700 Doctoral Dissertation until they have passed the qualifying exam.
- ³ E E courses must be at the 500 level or higher. Non-E E courses must be at the 450 level or higher. At least 9 credits must be taken in E E. At most 6 credits may be E E 600 Doctoral Research. At most 6 credits may be E E 590 Selected Topics courses that are not subtitled. Exclude credits of E E 700 Doctoral Dissertation. Exclude credits for graduate deficiency coursework if master's degree is not E E. Exclude coursework used to satisfy the master's degree requirements. Courses excluded from the MSEE and MEEE degrees are also excluded from the Ph.D. degree.
- ⁴ The candidate must pass a comprehensive examination after the completion of adequate coursework and demonstration of satisfactory progress toward the doctoral dissertation. The examination must be part written and part oral. The specific format of the exam is at the discretion of the examination committee. The written part must include a proposal for the dissertation research, and if the committee requires, it may also include a separate written exam. The written report on the proposal for the dissertation research must include the candidate's current research, planned research directions, and a reasonable timeline for completing the candidate's proposed research. The oral part may also include questions on completed coursework.
- ⁵ The dissertation must be completed and orally defended. Additionally, evidence must be submitted for a minimum of two publications related to the dissertation research, including one of which is submitted to an internationally recognized journal, such as IEEE Transactions, and the second of which may be with a professional conference, such as an IEEE conference. Submissions must be completed prior to the final oral exam. For more details on the publication requirement, see <https://ece.nmsu.edu/grad-study/phd-requirements.html>.

Other limitations and requirements that apply to all Ph.D. degrees are described elsewhere in this catalog.

Option 2 - Direct Ph.D. with BSEE or Equivalent, but no Master's Degree

Prefix	Title	Credits
Graduate core courses (choose 3 from 3 different areas)		9-10
<i>Microelectronics/VLSI</i>		
E E 523	Analog VLSI Design	
<i>Photonics/Optics</i>		
E E 528	Fundamentals of Photonics	
<i>Electric Energy Systems</i>		
E E 543	Power System Faults and Stability	
<i>Digital Signal Processing</i>		
E E 545	Digital Signal Processing II	
or E E 596	Digital Image Processing	
<i>Computer Engineering</i>		
E E 562	Computer Systems Architecture	
<i>Communications</i>		
E E 571	Random Signal Analysis	
<i>Controls & Robotics</i>		
E E 551	Control Systems Synthesis	
Pass Qualifying Exam ^{1,2}		
Graduate Electives ³		33-32
Pass Comprehensive Exam ⁴		

Doctoral Dissertation

E E 700	Doctoral Dissertation ²
Complete and defend doctoral dissertation ⁵	
Total Credits	60

¹ It is expected that students will take the qualifying exam within one year of their MSEE or entering the Ph.D. program. The qualifying exam consists of two components: completing the graduate core (see MSEE program of study for details) with a grade of B or better and presenting a written and oral summary of a topical literature review. For more details on the qualifying exam, see <https://ece.nmsu.edu/grad-study/phd-qualifying.html>.

² A student may not enroll in E E 700 Doctoral Dissertation until they have passed the qualifying exam.

³ E E courses must be at the 500 level or higher. Non-E E courses must be at the 450 level or higher. The total number of E E credits, including the graduate core and excluding credits of E E 700 Doctoral Dissertation must be at least 21. At most 9 credits may be E E 600 Doctoral Research. At most 9 credits may be E E 590 Selected Topics courses that are not subtitled. Courses excluded from the MSEE and MEEE degrees are also excluded from the Ph.D. degree.

⁴ The candidate must pass a comprehensive examination after the completion of adequate coursework and demonstration of satisfactory progress toward the doctoral dissertation. The examination must be part written and part oral. The specific format of the exam is at the discretion of the examination committee. The written part must include a proposal for the dissertation research, and if the committee requires, it may also include a separate written exam. The written report on the proposal for the dissertation research must include the candidate's current research, planned research directions, and a reasonable timeline for completing the candidate's proposed research. The oral part may also include questions on completed coursework.

⁵ The dissertation must be completed and orally defended. Additionally, evidence must be submitted for a minimum of two publications related to the dissertation research, including one of which is submitted to an internationally recognized journal, such as IEEE Transactions, and the second of which may be with a professional conference, such as an IEEE conference. Submissions must be completed prior to the final oral exam. For more details on the publication requirement, see <https://gradschool.nmsu.edu/Current%20Students/College-of-Engineering-Ph.D.-Publication-Requirement-Form1.pdf>.

Other limitations and requirements that apply to all Ph.D. degrees are described elsewhere in this catalog.

Included Prefixes

Graduate course work credits from the following prefixes are permitted for the Ph.D. degree. If a graduate course outside this list of prefixes logically fits into the Ph.D. program, see your graduate advisor about requesting an exception; note that exceptions must be approved before taking the class.

Prefix	Title	Credits
<i>College of Agriculture/Consumer/Environmental Sciences</i>		
AEEC		
ENVS		
GENE		
<i>College of Arts and Sciences</i>		
ASTR		
BCHE		

BIOL
CSCI
CHEM
GEOL
GPHY
LING
MATH
MOLB
PHYS
STAT
<i>College of Business</i>
ECON
MGMT
<i>College of Engineering</i>
A E
A EN
CHME
E E
ENVE
I E
M E
SUR