

# ELECTRICAL ENGINEERING - MASTER OF SCIENCE IN ELECTRICAL ENGINEERING (ONLINE)

## Requirements and Options for the MSEE degree

The Program Educational Objectives for the Master of Science in Electrical Engineering are:

1. That graduates successfully apply advanced skills and techniques in one or more areas of emphasis.
2. That graduates obtain relevant, productive employment with the private sector or in government and/or pursue additional advanced degrees.

Note—the following degree requirement tables outline the **minimum** requirements for an MSEE. 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 6 credits of E E 599 Master's Thesis or 3 credits of E E 598 Master's Technical Report to complete their degree.

### Thesis Option:

Prefix	Title	Credits
<b>Graduate Core Courses (choose 2-3 from 2-3 different areas) <sup>1</sup></b>		<b>6-10</b>
<i>Electromagnetics</i>		
E E 515	Electromagnetic Theory I	
<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 Systems III	
<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 &amp; Robotics</i>		
E E 551	Control Systems Synthesis	
<b>Graduate Breadth Elective (choose 1-0 courses) from a third area <sup>1</sup></b>		<b>4-0</b>
<i>Electromagnetics</i>		
E E 541	Antennas and Radiation	
<i>Microelectronics/VLSI</i>		
E E 512	ASIC Design	
<i>Electric Energy Systems</i>		
E E 537	Power Electronics	
<i>Digital Signal Processing</i>		
E E 565	Machine Learning I	
E E 587	Deep Learning for Image Processing	
E E 588	Advanced Image Processing	

E E 598	Master's Technical Report	
<i>Communications</i>		
E E 581	Digital Communication Systems I	
<i>Controls &amp; Robotics</i>		
E E 576	Geometric Algebra	
<b>Graduate Electives <sup>2</sup></b>		<b>13-15</b>
<b>Master's Thesis</b>		
E E 599	Master's Thesis	
<b>Complete and defend master's thesis <sup>3</sup></b>		
<b>Total Credits</b>		<b>30</b>

<sup>1</sup> Students must take at least two core courses from two different areas of emphasis. In addition, either a third graduate core course OR one graduate breadth elective must be taken from a third area of emphasis.

Students pursuing the MSEE who wish to pursue the Ph.D. in the future are encouraged to select three courses from the graduate core courses to satisfy one of the requirements for the Ph.D. Qualifying exam (see <https://ece.nmsu.edu/grad-study/phd-qualifying.html>) for more information.

<sup>2</sup> E E courses must be numbered 500 or higher. Non-E E courses must be numbered 450 or higher. The total number of E E credits, including the graduate core and/or graduate breadth electives and excluding credits of E E 599 Master's Thesis must be at least 12. Credits of E E 590 Selected Topics which are not subtitled are limited to a total of 6.

<sup>3</sup> The thesis must be completed and orally defended.

Other limitations and requirements that apply to all master's degrees are described elsewhere in this catalog.

### Technical Report Option:

Prefix	Title	Credits
<b>Graduate Core Courses (choose 2-3 from 2-3 different areas) <sup>1</sup></b>		<b>6-10</b>
<i>Electromagnetics</i>		
E E 515	Electromagnetic Theory I	
<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 Systems III	
<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 &amp; Robotics</i>		
E E 551	Control Systems Synthesis	
<b>Graduate Breadth Elective (choose 1-0 courses from a third area <sup>1</sup></b>		<b>4-0</b>
<i>Electromagnetics</i>		
E E 541	Antennas and Radiation	
<i>Microelectronics/VLSI</i>		
E E 512	ASIC Design	
<i>Electric Energy Systems</i>		
E E 537	Power Electronics	
<i>Digital Signal Processing</i>		
E E 565	Machine Learning I	

E E 587	Deep Learning for Image Processing	
E E 588	Advanced Image Processing	
E E 597	Neural Signal Processing	
<i>Communications</i>		
E E 581	Digital Communication Systems I	
<i>Controls &amp; Robotics</i>		
E E 576	Geometric Algebra	
<b>Graduate Electives</b> <sup>2</sup>		<b>16-18</b>
<b>Master's Technical Report</b>		
E E 598	Master's Technical Report	
<b>Complete and defend master's technical report</b> <sup>3</sup>		
<b>Total Credits</b>		<b>30</b>

<sup>1</sup> Students must take at least two core courses from two different areas of emphasis. In addition, either a third graduate core course OR one graduate breadth elective must be taken from a third area of emphasis.

Students pursuing the MSEE who wish to pursue the Ph.D. in the future are encouraged to select three courses from the graduate core courses to satisfy one of the requirements for the Ph.D. Qualifying exam (see <https://ece.nmsu.edu/grad-study/phd-qualifying.html>) for more information.

<sup>2</sup> E E courses must be numbered 500 or higher. Non-E E courses must be numbered 450 or higher. The total number of E E credits, including the graduate core and/or graduate breadth electives and excluding credits of E E 598 Master's Technical Report must be at least 12. Credits of E E 590 Selected Topics which are not subtitled are limited to a total of 6.

<sup>3</sup> The technical report must be completed and orally defended.

Other limitations and requirements that apply to all master's degrees are described elsewhere in this catalog.

### Included Prefixes

Graduate course work credits from the following prefixes are permitted for the MSEE degree. If a graduate course outside this list of prefixes logically fits into the MSEE program, see your graduate advisor about requesting an exception.

Prefix	Title	Credits
<i>College of Agriculture/Consumer/Environmental Sciences</i>		
AEEC		
ENVS		
GENE		
<i>College of Arts and Sciences</i>		
ASTR		
BCHE		
BIOL		
C S		
CHEM		
GEOL		
GPHY		
LING		
MATH		
MOLB		
PHYS		
STAT		
<i>College of Business</i>		
ECON		
MGMT		

### College of Engineering

A E
A EN
CHME
E E
ENVE
I E
M E
SUR

New Mexico State University master's accelerated program provides **the opportunity for academically qualified undergraduate students** to begin working on a master's degree **during their junior and senior years** while completing a bachelor's degree. Typically, a bachelor's degree requires four years to complete, and a master's degree requires an additional two years. The master's accelerated programs allow students the opportunity to complete a graduate program in an accelerated manner. Students can take up to 12 credits of E E graduate courses and get dual course credit that can be applied to both an undergraduate and master's degree.

You can also check NMSU's catalog for additional information about our programs.

## MAP Requirements

- The Graduate School allows qualified junior or senior students to substitute its graduate courses for required or elective courses in an undergraduate degree program and then subsequently count those same course as fulfilling graduate requirements in a related graduate program.
- Undergraduate students may apply for acceptance to the accelerated master's program after completing 60 semester hours of undergraduate coursework of which a minimum of 25 semester credit hours must be completed at NMSU.
- The grade point average must be at a minimum of 2.75.
- Students must receive a grade of B or higher in this coursework to be counted for graduate credit. If a grade of B- or lower is earned, it will not count toward the graduate degree.

## Accepted MAP Courses

The following courses are accepted for use in the MAP program.

Any other E E 500+ course that is taught concurrently with an E E 400+ course may be considered after a consultation with an advisor. An exception will need to be made to the degree audit in order for the additional course(s) to be included on both the Undergraduate and Graduate degrees. E E 450+ courses are not eligible for MAP credit nor are E E 500+ courses that are not taught concurrently with an E E 400+ course. The following course list specifies which undergraduate BSEE concentration electives may count toward the MAP. Courses are listed according to the most relevant BSEE concentration, but some courses may count toward multiple concentrations; please refer to the corresponding BSEE concentrations in the NMSU catalog for more details on concentration courses.

Prefix	Title	Credits
Artificial Intelligence, Machine Learning, & Data Science		
E E 506	Quantum Computing	3
E E 565	Machine Learning I	3
Communications and Signal Processing		
E E 573	Signal Compression	3
E E 581	Digital Communication Systems I	3
E E 588	Advanced Image Processing	3

E E 596	Digital Image Processing	3
E E 597	Neural Signal Processing	3
Computers and Microelectronics		
E E 510	Introduction to Analog and Digital VLSI	3
E E 512	ASIC Design	3
E E 523	Analog VLSI Design	3
E E 556	Hardware & Software Codesign	3
E E 558	Hardware Security and Trust	3
E E 562	Computer Systems Architecture	3
E E 567	ARM SOC Design	3
E E 593	Mobile Application Development	3
Controls & Robotics		
E E 551	Control Systems Synthesis	3
E E 576	Geometric Algebra	3
Electromagnetics and Photonics		
E E 521	Microwave Engineering	3
E E 528	Fundamentals of Photonics	4
E E 541	Antennas and Radiation	4
E E 548	Introduction to Radar	3
E E 549	Smart Antennas	3
Power		
E E 502	Electricity Markets	3
E E 537	Power Electronics	3
E E 540	Photovoltaic Devices and Systems	3
E E 537	Power Electronics	3
E E 540	Photovoltaic Devices and Systems	3
E E 542	Power Systems II	3
E E 543	Power Systems III	3