

Online Master of Science in Electrical Engineering
Electric Power and Control Systems Specializations with Engineering Management
University of Arkansas - Fayetteville

The online Master of Science in Electrical Engineering provides a structured environment for students to continue their education in a manner to gain proficiency in advanced analysis and design methods without the disruptions of returning to being a full-time student. As examples, the online MSEE program is accessible to those on active duty in the military, engineers who are working part-time or seeking to re-enter the workforce after time-off or being away in other activities, those working in a position that requires extensive travel, or working professionals who want to advance to the next stage of their career.

The MSEE online degree presently emphasizes two areas of specialization: (1) electric power and (2) control systems. Within both of these specialization areas students may elect to either pursue a research topic that leads to thesis, or alternatively may choose a non-thesis option that emphasizes coursework. In each of these degree paths, the MSEE student can take a variety of subjects that includes coursework in engineering management.

Admission Requirements

- A BSEE completed with a 3.0 minimum cumulative GPA, or 3.0 minimum GPA on last 60 hours.
- GRE verbal and quantitative combined minimum score of 302.

An exemption from the GRE may be granted for applicants who meet the following three requirements criteria:

1. Have a BSEE from an ABET-accredited Electrical Engineering program, or have already completed a graduate degree in an engineering related field, and
2. Have passed an equivalent exam, such as the Fundamentals of Engineering exam , and
3. Have one or more years of professional engineering practice after completing the baccalaureate degree;

Degree Requirements

The online MSEE requires 30 credit-hours satisfying either of the following:

1. Thesis Option
 - 6 hours of thesis/research hours
 - 24 hours of coursework
 - ❖ 15 hours must be Electrical Engineering.
 - ❖ 12 hours must be Electrical Engineering 5000/6000-level courses.
2. Non-Thesis Option
 - 30 hours of coursework
 - ❖ 21 hours must be Electrical Engineering.
 - ❖ 12 hours must be Electrical Engineering 5000/6000-level courses.

Online MSEE Thesis Option

The thesis option involves performing research in close collaboration with a faculty adviser. Although not required, the results of MSEE research are often published in the proceedings of a professional conference or possibly in a research journal. The thesis option is encouraged for those seeking positions in developing new electrical and electronic products and systems where advanced analysis and design methods are needed. Students who also might consider working towards a Ph.D. in Electrical Engineering are also encouraged to pursue an MSEE thesis.

Online MSEE Non-Thesis

The non-thesis option provides a strong background in analysis and design of electrical circuits and systems using the software tools presently used in industry. Most courses include a design project that allows a student to gain proficiency in advanced circuit and systems design. In addition, the online MSEE degree program provides for students to select courses in engineering management. This provides increased skills and knowledge to be effective in bringing to successful completion the advanced engineering projects studied in the coursework.

Specializations in the Online MSEE Program

Electric Power Specialization

The MSEE degree with an emphasis in electric power engineering provides those students who have earned a bachelor of science in electrical engineering with the opportunity to learn about future electric energy systems. Specific topics include design of advanced distribution systems, power system control, optimal and nonlinear control, electric power quality, and power electronics. A total of 15 credit hours of course work is required for the specialization in Electric Power Engineering. Course work must be selected from the following list:

Courses in Electric Power Engineering (select 15 credit hours)

ELEG 5403 – Control Systems

ELEG 5473 – Power System Operation and Control

ELEG 5503 – Design of Advanced Electric Power Distribution Systems

ELEG 5513 – Power System Analysis

ELEG 5523 – Electric Power Quality

ELEG 5533 – Power Electronics and Motor Drives

Control Systems Specialization

The MSEE degree with a focus in control systems develops the skills and knowledge for analyzing, simulating and evaluating complex systems that incorporate feedback controls. Applications areas include aerospace and aircraft; automotive and ground vehicles; robotics and industrial systems; biomedical and physiological processes. A total of 15 credit hours of course work is required for the specialization in Control Systems. Course work must be selected from the following list:

Courses in Control Systems (select 15 credit hours)

CSCE 4753 – Computer Networks

ELEG 5403 – Control Systems

ELEG 5413 – Modern Control Systems

ELEG 5423 – Optimal Control Systems

ELEG 5443 – Nonlinear Systems Analysis and Control

ELEG 5693 – Wireless Communications

Combined Studies in Power, Control and Engineering Management

The online MSEE program also recognizes the increasing use of computer networks, sensors, real-time data analysis and feedback control in the operation of the electric utility grid. Thus, courses in engineering management and operations provide breadth to the MSEE degree program. Students may also in consultation with their faculty adviser select a mixed degree plan of courses from both the power and control areas along with engineering management and operations courses. The purpose is to equip students with the skills needed to be successful in conceiving, planning and executing large complex engineering projects. Relevant courses are:

WCOB 5023 – Sustainability in Business

BENG 5623 – Life Cycle Assessment

INEG 5313 – Engineering Applications of Probability Theory

INEG 5323 – Engineering Applications of Stochastic Processes (a pre-requisite is INEG 5313)

INEG 5433 – Cost Estimation Models INEG 5443 – Decision Models

INEG 5613 – Introduction to Optimization Theory

OMGT 5003 – Introduction to Operations Management

OMGT 5123 – Finance

OMGT 5373 – Quality Management

OMGT 5433 – Cost Estimation Models

OMGT 5463 – Economic Decision Making

OMGT 5783 – Project Management for Operations Managers

The overall degree requirements for the online MSEE program would be in accordance with requirements defined in the Degree Requirements section. For example, a combined online MSEE non-thesis option with emphasis in Power, Control and Engineering Management could be the following:

3 credits in Power & Control area

ELEG 5403 – Control Systems

9 credits in Control Systems

CSCE 4753 – Computer Networks

ELEG 5413 – Modern Control Systems

ELEG 5693 – Wireless Communications

9 credits in Electric Power

ELEG 5503 – Design of Advanced Electric Power Distribution Systems

ELEG 5513 – Power System Analysis

ELEG 5523 – Electric Power Quality

9 credits in Engineering Management

WCOB 5023 – Sustainability in Business

OMGT 5123 – Finance

INEG 5443 – Decision Models

Graduate Certificate in Sustainability with Emphasis Electric Energy Systems

Certificate Requirements

15 credit hours required for completion of the certificate per the following:

Required Course (3 credits):

- WCOB 5023 Sustainability in Business (or an approved substitute)

Elective Courses (12 Credits):

- Students choose 12 hours from the two thematic areas identified below.
 - At least 9 hours must be chosen from courses numbered 5000 or above.
1. Environmental Engineering (select one course)
 - BENG 5623 – Life Cycle Assessment
 - BENG 5933 – Environmental & Ecological Risk Assessment
 - CVEG 4203 – Environmental Regulations and Permits
 - MEEG 4453 – Industrial Waste and Energy Management
 - MEEG 4473 – Indoor Environmental Control
 - INEG 5313 – Engineering Applications of Probability Theory
 - INEG 5323 – Engineering Applications of Stochastic Processes (pre-requisite: INEG 5313)
 - INEG 5433 – Cost Estimation Models
 - INEG 5443 – Decision Models
 - INEG 5613 – Introduction to Optimization Theory
 - OMGT 5003 – Introduction to Operations Management
 - OMGT 5123 – Finance
 - OMGT 5373 – Quality Management
 - OMGT 5433 – Cost Estimation Models
 - OMGT 5463 – Economic Decision Making
 - OMGT 5783 – Project Management for Operations Managers
 2. Electrical Engineering (select three courses)
 - ELEG 5403 – Control Systems
 - ELEG 5413 – Modern Control Systems
 - ELEG 5423 – Optimal Control Systems
 - ELEG 5473 – Control of Electric Power Systems
 - ELEG 5503 – Design of Advanced Electric Power Distribution Systems
 - ELEG 5513 – Power Systems Analysis
 - ELEG 5523 – Electric Power Quality
 - ELEG 5533 – Power Electronics & Motor Drives
 - ELEG 5693 – Wireless Communications