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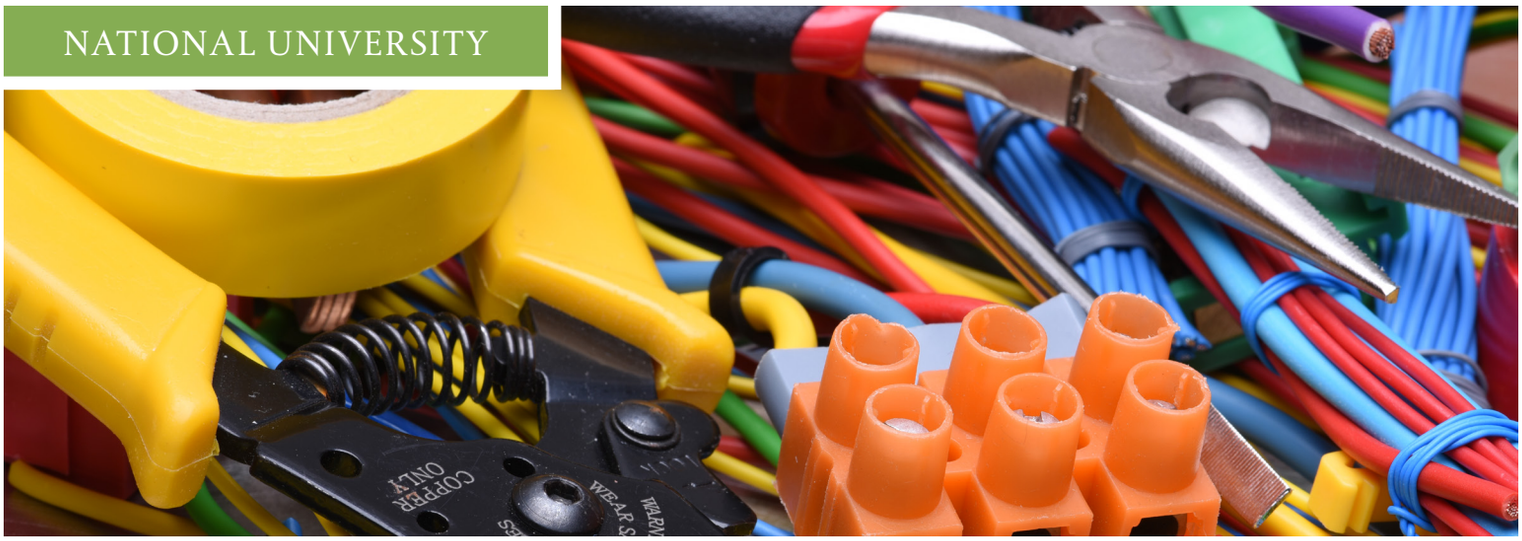

SCHOOL OF ENGINEERING AND COMPUTING

MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

Use Technical Principles to Develop Modern Solutions

A Master of Science in Electrical Engineering will ground you in the mathematical, theoretical, and hands-on skills needed to solve real-world problems in electrical engineering and related fields. The program focuses on core topics such as engineering mathematics, advanced engineering computing, digital signal processing, network systems and security, and engineering economics. It also allows you to pursue select advanced specializations.

- The Wireless Communication Specialization will educate you on electromagnetic field theory, communications standards and protocols, and wireless sensor networks.
- The Computer Engineering Specialization will explore computer architecture, system modeling and simulation, real-time systems, digital image processing, and information storage and retrieval.

Program highlights:

- Entire program can be completed online
- Design and conduct engineering experiments or simulations to develop new products
- Apply both mathematical principles and scientific theories to engineering problems
- Learn to integrate theoretical ideas with practical electrical engineering concepts
- Develop the computing skills for designing and developing new applications in the field
- Design specifications and implement, analyze, and solve engineering problems
- Build a team to work productively and successfully on a technical project

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MASTER OF SCIENCE IN ELECTRICAL ENGINEERING

Academic Program Director: Mohammad Amin; (858) 309-3422; mamin@nu.edu

The Master of Science in Electrical Engineering (MSEE) program will provide students with the mathematical and theoretical foundation and hands-on skills required for solving real-world problems in electrical engineering and other related fields. The MSEE program provides a balanced approach to studying core topics in electrical engineering along with specializations in wireless communication and computer engineering. Core topics include engineering mathematics, advanced engineering computing, digital signal processing, network systems and security, and engineering economics. In addition to the core topics, students will be able to study a specific specialization such as wireless communication or computer engineering. The wireless communication specialization topics include electromagnetic field theory, communications standards and protocols, and wireless sensor networks. The computer engineering specialization topics include computer architecture, system modeling and simulation, real-time systems, digital image processing, and information storage and retrieval.

Candidates seeking admission to the program need to have a baccalaureate degree in electrical engineering, computer engineering, physics, or a related engineering field from a regionally accredited university. No other baccalaureate degrees are eligible for admission into the MSEE program.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Integrate theoretical ideas and practical electrical engineering and computing skills to design and develop new applications in the engineering field.
- Design and conduct engineering experiments or simulations for new product development.
- Analyze engineering problems with both mathematical principles and scientific theories.
- Evaluate the impact of evolving engineering systems on the global economy.
- Design specifications and implement, analyze and solve engineering problems.
- Analyze advanced network systems to meet technological demands, ethical values, and legal standards.
- Assemble a team to work productively and successfully on a technical project.

Degree Requirements

To obtain the Master of Science in Electrical Engineering (MSEE), students must complete 54 quarter units. A total of 13.5 quarter units of graduate credit may be granted for equivalent graduate work completed at another regionally accredited institution, as it applies to this degree, and provided the units were not used in earning another advanced degree. All students must complete the 7 core courses and five Specialization courses in one area of specialization. Please refer to the graduate admissions requirements for specific information regarding application and evaluation.

Program Prerequisites

(2 courses; 9 quarter units)

Students with a physics or engineering baccalaureate degree in a field other than electrical engineering can qualify for admission to the program by taking one or both of the following courses, or receive permission from the academic program director based on equivalent coursework supported by verifiable documented proof:

EEC 501 Application Software Dev.
Recommended Preparation: Baccalaureate degree in electrical engineering, computer engineering, or related field from a regionally accredited university.

EEC 502 Electronic Circuits & Systems
Recommended Preparation: Baccalaureate degree in electrical engineering, computer engineering, or related field from a regionally accredited university.

Core Requirements

(5 courses; 22.5 quarter units)

EEC 605 Adv. Engr. Problem Solving
Prerequisite: EEC 501 and EEC 502

EEC 610 Advanced Engineering Math
Prerequisite: EEC 605

EEC 615 Digital Signal Processing
Prerequisite: EEC 610

EEC 620 Network Systems & Security
Prerequisite: EEC 615

EEC 625 Engr. Economics & Ecosystems

All students must choose one specialization and complete the specialization courses before enrolling in the capstone project courses.

Project Capstone Requirements

(2 courses; 9 quarter units)

The following courses can only be taken after the completion of the core courses and the required area of **Specialization:**

EEC 690 Master's Research Project I
Prerequisite: EEC 659, or EEC 669

EEC 695 Master's Research Project II
Prerequisite: EEC 690

Specialization in Computer Engineering

Academic Program Director: Mohammad Amin; (858) 309-3422; mamin@nu.edu

This specialization is designed to prepare students for a dynamic computer industry as well as for post-graduate students in the field of computer engineering and other related fields. Students take courses to analyze computer architecture, modeling and simulation of real time systems, image processing, and information storage and retrieval. This specialization emphasizes the use of simulation tools to understand various computer engineering concepts.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Compare various computer architectures and evaluate their benefits.
- Evaluate various simulation models for engineering problems.
- Analyze real-time systems.
- Analyze current technologies and various algorithms used for image processing.
- Synthesize principles and functionality of information storage and retrieval systems.

Students must successfully complete the core requirements before starting the specialization.

Requirements for the Specialization

(5 courses; 22.5 quarter units)

EEC 661 Advanced Computer Architecture
Prerequisite: EEC 620

EEC 663 System Modeling & Simulation
Prerequisite: EEC 620

EEC 665 Real-Time Systems
Prerequisite: EEC 661

EEC 667 Digital Image Processing
Prerequisite: EEC 663

EEC 669 Info Storage & Retrieval
Prerequisite: EEC 661

Specialization in Wireless Communication

Academic Program Director: Mohammad Amin; (858) 309-3422; mamin@nu.edu

Students in this specialization will develop skills to analyze different communication systems, apply electromagnetic signal propagation principles, modulation techniques, coding, standards and technologies to build secure and efficient wireless communication systems.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Analyze electromagnetic radiation and propagation principles and apply to wireless communication systems.
- Analyze wireless communication systems for improvement to meet technological, business, and consumer demands.
- Evaluate modulation and demodulation techniques for constructing coding/decoding schemes and detecting and filtering wireless communication signals.
- Evaluate wireless networking, protocols, architectures, and standards to the development and design of wireless communication systems.
- Create a strategic analysis to develop different wireless sensor networks and applications.

Students must successfully complete the core requirements before starting the specialization.

Requirements for the Specialization

(5 courses; 22.5 quarter units)

EEC 651 Electromagnetic Theory, Appl.
Prerequisite: EEC 620

EEC 653 Wireless Principles & Systems
Prerequisite: EEC 651

EEC 655 Wireless Mod Theories & Coding
Prerequisite: EEC 653

EEC 657 Wireless Standards & Protocol
Prerequisite: EEC 653

EEC 659 Wireless Sensor Networks
Prerequisite: EEC 653