Electrical and Computer Engineering

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Chair, Department of Electrical and Computer Engineering

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Director, Graduate Program

Mission

The Master of Science in Electrical Engineering and the Master of Science in Computer Engineering degree programs are designed to provide a higher degree of mastery of electrical and computer engineering fundamentals, emphasizing practical applications, thereby expanding the students’ technological horizons and preparing professionals for advanced level positions and for admission to doctoral programs.

Objectives

The objective of these programs is to prepare graduates for successful and dynamic professional careers through a course of study that provides:

1. a strong grasp of electrical engineering and computer engineering fundamentals through a diverse and flexible curriculum
2. skills in practical applications, contemporary industrial needs and emerging technologies
3. a foundation for increasing professional responsibilities or continued study at the doctoral level

Admission Requirements

Electrical Engineering Degree

Applicants must possess one of the following:

1. A baccalaureate degree in electrical engineering from a program accredited by the Engineering Accreditation Commission of ABET, Inc., or from a recognized foreign institution.

2. Applicants who have a baccalaureate degree in another area of engineering, physics, or mathematics may be admitted into the program provided they complete undergraduate prerequisites specified by the Graduate Program Director. These courses must be completed with a minimum grade point average of 3.00 with no grade lower than C. These courses will not satisfy any requirements for the Master of Science in Electrical Engineering degree. Generally, students must complete prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Graduate Program Director and the approval of the Dean of Engineering.
Computer Engineering Degree

Applicants must possess one of the following:

1. A baccalaureate degree in computer (or electrical) engineering from a program accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology or from a recognized foreign institution.

2. Applicants who have a baccalaureate degree in another area of engineering, physics, or mathematics may be admitted into the program provided they complete undergraduate prerequisites specified by the Graduate Program Director. These courses must be completed with a minimum grade point average of 3.00 with no grade lower than C. These courses will not satisfy any requirements for the Master of Science in Computer Engineering degree. Generally, students must complete prerequisite courses before they are permitted to register for graduate courses. Exceptions require the recommendation of the Graduate Program Director and the approval of the Dean of Engineering.

Degree Requirements

A student must complete a minimum of thirty credit hours of graduate coursework. Specific requirements follow:

Electrical Engineering Degree

Students must select one of the following: 3

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ECEG 701</td>
<td>Signals, Systems and Transforms I</td>
</tr>
<tr>
<td>ECEG 702</td>
<td>Signals, Systems and Transforms II</td>
</tr>
<tr>
<td>ECEG 710</td>
<td>Probability and Stochastic Processes</td>
</tr>
</tbody>
</table>

Students must also take nine courses from any offerings by the Electrical and Computer Engineering Department 27

At most, two of the nine courses can be Graduate Core courses with the advice and approval of the Graduate Program Director

Six courses credits can be substituted by the master's Thesis option under the direction of a Thesis Advisor

Total Credits 30

Any modifications to program requirements must be approved by the Graduate Program Director.

Computer Engineering Degree

One of the following: 3

<table>
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<tbody>
<tr>
<td>ECEG 721</td>
<td>Embedded Systems</td>
</tr>
<tr>
<td>ECEG 727</td>
<td>Computer Network Operations</td>
</tr>
<tr>
<td>ECEG 781</td>
<td>Computer Architecture I</td>
</tr>
</tbody>
</table>

Students must also take nine courses from any offerings by the Electrical and Computer Engineering Department 27
At most, two of the nine courses can be any Graduate Core Courses with the advice and approval of the Graduate Program Director.

[Six course credits can be substituted by the master's Thesis option under the direction of a Thesis Advisor]

| Total Credits | 30 |

Any modifications to program requirements must be approved by the Graduate Program Director.

**Master of Science Degree Description and Options for Electrical Engineering and Computer Engineering**

Master of Science students may elect to complete a Master of Science by coursework or by thesis. The coursework option entails 30 course credits; the thesis option entails 24 course credits and 6 master's thesis research credits, ECEG 799. In both cases, the minimum number of total credits is 30. At this level, research undertaken under the thesis option should exhibit a thorough understanding of advanced scientific thought and an ability to apply advanced engineering design principles, and planning.

**Manuscript Presentation**

Degree candidates must present their research to the appointed guidance committee in final manuscript form for official acceptance no later than two weeks before the end of the semester.

Graduate students registered for thesis credits must submit four final bound copies to the Electrical and Computer Engineering Department for necessary signatures one week before the end of the semester.

**Applications of AI and Machine Learning in Electrical Engineering and Computer Engineering**

Electrical and computer engineers are at the forefront in the design and implementation of tomorrow’s consumer and industrial products. Today, because much of this work is intimately involved with the field of artificial intelligence, it is clear that many of today’s and tomorrow’s ECE jobs will require a considerable knowledge of AI concepts.

Because our department has a commitment to ensure that our students are prepared to assume job leadership roles when they graduate, we have developed a strong AI component in our ECE courses. For example, we currently offer graduate courses in Applied Data Mining for Engineers, Signal Detection & Estimation, Unmanned Autonomous Vehicles, Applied Machine Learning, and Bioinspired Robotic Vision Systems.

**Concentration Option**

The Graduate concentration option consists of prescribed courses in a specific concentration area, and is available through the Electrical Engineering and Computer Engineering graduate programs as follows:

- Cybersecurity
Unless otherwise noted, courses in this program may be applied to a Master of Science Degree in either Electrical and Computer Engineering programs. While approval of the Graduate Program Director is required to enroll in a graduate course, admission to the Graduate Program is not required to participate in a Concentration area. It is expected, however, that individuals desiring to take graduate-level courses in a Concentration Program will have a baccalaureate degree in either an engineering field, a science or applied science field, or mathematics, and will meet the prerequisite requirements of the courses they wish to take in that Concentration. Specific information regarding Graduate Electrical and Computer Engineering Concentration is available on the Electrical and Computer Engineering website (https://manhattan.edu/academics/schools-and-departments/school-of-engineering/.electrical-computer-dept/graduate/).

Find Learning That Matches Your Lifestyle

- The 30-credit electrical engineering and computer engineering programs can be completed within one or two years.
- Courses are available during the fall, spring, and summer semesters with schedules that are suitable for individuals working full-time.
- Most graduate courses are delivered in either a fully online mode or in-person.