

## Electrical & Computer Engineering

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### Mission:

To prepare students for the profession of Electrical and Computer Engineering; to enable them to solve problems of substance through the application of fundamental principles, disciplined practices and modern methods; to instill the humility of contribution to ventures larger than themselves, and the courage to lead others in the pursuit of such ventures; to inspire an ethic of service to all mankind in the context of a global community; and finally, to instill a lifelong thirst for the knowledge of their craft.

### Goals:

The Program Educational Objectives of the Electrical and Computer Engineering Program are to produce graduates who, within two to four years after graduation have attained:

- A reputation for competence in the skills of engineering practice by solving problems and executing their solutions.
- Sustainment in modern engineering practices relevant to their chosen specialty through continuing education.
- A role as a contributor to teams by demonstrating initiative and leading tasks in an ethical manner.
- Recognition of being an advocate for diversity of ideas when pursuing solutions to problems.

### Outcomes:

At the time of graduation, students in the Electrical and Computer Engineering Program are expected to have developed and demonstrated an ability to:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics
- Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- Communicate effectively with a range of audiences
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
- Develop and conduct appropriate experimentation, analyze, and interpret data and use engineering judgment to draw conclusions
- Acquire and apply new knowledge as needed using appropriate learning strategies

During the first two years, students receive intensive instruction in mathematics and basic physical sciences as well as fundamental principles and techniques of engineering. Students are introduced to the basic tools and problem-solving techniques they will use throughout their careers.

The final two years are spent in courses that are more focused and cover a broad spectrum of electrical and computer engineering topics, half of which

include a laboratory-intensive environment. In these courses, students apply their knowledge to solve discipline-specific engineering problems, often in projects that present open-ended problems.

In the fourth year, a completely open-ended design experience spans the senior year, in which students can exercise creativity to solve current engineering problems. Designing, building, testing, and evaluating projects in such application areas as instrumentation and data acquisition, computer network control, SCADA systems security, robotics, wireless communication, and machinery controls is typical of this experience. Constraints such as economics, safety, reliability, aesthetics, ethics, and social impact are considered. This experience builds upon the fundamental concepts of engineering topics, mathematics, basic sciences, the humanities and social sciences, and communication skills developed earlier in the undergraduate experience. The design team experience allows close coordination with an individual faculty member. The scope of the project is designed to match the requirements of practice within the electrical and computer engineering discipline.

### Careers for this Major:

Graduates have the option of beginning a career in either the military or civilian life, or attending graduate school. Career choices for ECE graduates are extremely diverse; below is an abbreviated list from "Your Career in the Electrical, Electronics, and Computer Engineering Fields," a website published by the Institute for Electrical and Electronics Engineers (IEEE).

- Signal Processing
- Aerospace and Electronic Systems
- Circuits and Systems
- Communications
- Computers
- Consumer Electronics
- Control Systems
- Industrial Electronics
- Industry Applications
- Instrumentation and Measurement
- Power Electronics
- Power Engineering
- Robotics
- Systems, Man and Cybernetics
- Frequency Control
- Vehicular Technology

The IEEE is the largest professional organization that serves Electrical and Computer Engineers, as well as many other types of engineers in related fields. To see the IEEE website that discusses a broader range of ECE career opportunities, please sample a few videos at this IEEE.tv website (<https://ieeetv.ieee.org/careers/>), or visit this website maintained by TryEngineering.org (<http://tryengineering.org/become-an-engineer/electrical-engineering/>).

### Accreditation:

The Electrical and Computer Engineering curriculum is accredited by the Engineering Accreditation Commission (EAC) of ABET, <http://www.abet.org> (<http://www.abet.org/>).

### Major

## Electrical and Computer Engineering(B.S.) – Curriculum Map 2021-2022 Catalog

Course	Cr. Comp.	Course	Cr. Comp.
<b>FRESHMAN</b>			
<b>Fall</b>		<b>Spring</b>	
CH 103 General Chemistry I (General Education Lab Science)	4	EG 110 Introduction to Engineering II	3
EG 109 Introduction to Engineering I	3	EE 200 Engineering Programming	3
EN 110 Writing and Inquiry in Public Contexts	3	EN 111 Writing and Inquiry in Academic Contexts	3
MA 121 Calculus I (General Education Math)	4	MA 122 Calculus II (General Education Math)	4
		General Education History/Literature/Arts & Humanities/Social Science ( <a href="http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/">http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/</a> )	3
<b>Fall Semester Total Cr.:</b>		<b>Spring Semester Total Cr.:</b>	
<b>14</b>		<b>16</b>	
<b>SOPHOMORE</b>			
<b>Fall</b>		<b>Spring</b>	
EE 215 Fundamentals of Digital Design	4	EE 356 Electrical Circuits II	3
EE 204 Electrical Circuits I	3	EE 357 Electronics I	3
MA 223 Calculus III	4	EE 359 Electrical Engineering Laboratory	1
PS 211 University Physics I (General Education Lab Science)	4	MA 224 Differential Equations	4
General Education History/Literature/Arts & Humanities/Social Science ( <a href="http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/">http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/</a> )	3	PS 212 University Physics II	4
		General Education Leadership ( <a href="http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/">http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/</a> )	1-3
<b>Fall Semester Total Cr.:</b>		<b>Spring Semester Total Cr.:</b>	
<b>18</b>		<b>16-18</b>	
<b>JUNIOR</b>			
<b>Fall</b>		<b>Spring</b>	
EE 321 Embedded Systems	4	EE 303 Electromagnetic Field Theory I	3
EE 350 Linear Systems	3	EE 323 Computer Architecture or 478 Control Systems	3
EE 366 Electronics II	4	EE 373 Electrical Energy Conversion	4
MA 306 Discrete Mathematics	3	EG 206 Thermodynamics I	3
General Education History/Literature/Arts & Humanities/Social Science ( <a href="http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/">http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/</a> )	3	EN 204 Professional and Technical Writing	3
<b>Fall Semester Total Cr.:</b>		<b>Spring Semester Total Cr.:</b>	
<b>17</b>		<b>16</b>	
<b>SENIOR</b>			
<b>Fall</b>		<b>Spring</b>	
EE 491 Electrical System Design I (Capstone)	3	EE 411 Infrastructure Control Systems <sup>1</sup>	4
EE 459 Electric Power Systems <sup>1</sup>	3	EE 478 Control Systems or 323 Computer Architecture	3
EE 463 Communication Systems	4	EE 486 Digital Signal Processing <sup>1</sup>	3
EG 450 Professional Issues (General Education Ethics)	3	EE 487 Digital Signal Processing Lab	1
MA 311 Statistical Methodology	3	EE 494 Electrical System Design II	3
		General Education History/Literature/Arts & Humanities/Social Science ( <a href="http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/">http://catalog.norwich.edu/residentialprograms/catalog/generaleducationgoals/</a> )	3

<b>Fall Semester Total Cr.:</b>	<b>16</b>		<b>Spring Semester Total Cr.:</b>	<b>17</b>
<b>TOTAL CREDITS FOR THIS MAJOR: 130-132</b>				

<sup>1</sup> Students must complete at LEAST two of the following three courses: EE 411, EE 486, EE 459. Students may choose to complete all three courses, or they may choose two of the three and select one technical elective from the following approved courses: EE 468, EE 490, EG 301, EG 303, EG 350, EG 400, EG 447, ME 307, CS 301, MA 303, MA 310, MA 312, MA 380, MA 405, MA 407, PS 334, PS 356, PS 341, PS 426.

Students who complete all degree requirements, but do not have a minimum 2.0 cumulative GPA must complete at least 50 percent of all subsequent course work in technical material (subject to approval by the Director of the David Crawford School of Engineering).