

The Department of Engineering

Electrical Engineering, B.S.

Electrical and Computer Engineering Interim Chair: Dr. Maggie Wang
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About

- Bachelor of Science in Electrical Engineering
- Bachelor of Science in Electrical Engineering, Honors

Electrical Engineering is traditionally associated with the generation and distribution of power. While this is still true today, the field has branched out into numerous areas that may not be easily identified with electrical engineering, such as radio frequency (RF) systems, telecommunications, remote sensing, signal processing, digital circuits, instrumentation, audio, video and optoelectronics, satellites, GPS, radar and navigation, biomedical engineering and devices as well as renewable energy sources. The Villanova electrical engineering curriculum touches upon every one of these technology areas.

Mission Statement

The mission of Villanova University's Department of Electrical and Computer Engineering is to empower students to become leaders in their chosen professions and to prepare them for a life of service to others.

Program Educational Objectives

The Program Educational Objectives of the Computer Engineering program are to produce graduates who:

- Use their knowledge, analytical, and design skills to generate and validate sustainable and technically appropriate solutions to practical real-world problems;
- Communicate and work effectively with others having different roles or responsibilities in their professional work environments;
- Continue to develop their professional knowledge and skills throughout their career;
- Succeed in their career by practicing their chosen discipline with professionalism, care, and integrity.

The curriculum is structured to provide a thorough foundation in the fundamentals of electrical and computer engineering. Analysis and design are emphasized throughout the curriculum, using a project-based structure to teach students how to work on their own and in teams and to synthesize engineering

solutions by utilizing their analytical skills and knowledge. Heavy emphasis is placed on developing oral and written communication skills. The curriculum also provides opportunities for an increased awareness of the broader implications of technology and of the social responsibilities of the profession. The design process is emphasized throughout all four years, and design projects are included in the laboratory courses. The sophomore and junior years include core courses that provide a foundation for the senior year, which includes technical and professional electives and an in-depth design project.

The electrical engineering program offers technical elective courses in the following specialized areas: microwave networks and high-frequency circuit design, digital signal processing, linear integrated electronics, communication electronics, optoelectronics, digital integrated electronics and microfabrication, embedded systems, control systems, electric machines and power systems, electronic measurement and conversion, and renewable energy systems.

Students in the electrical engineering program acquire experience with computers and their engineering applications, beginning with the engineering programming and applications course in the freshman year and continuing throughout the curriculum in the sophomore-level fundamentals courses, junior-level core courses, and senior-level technical electives.

In addition to the activities and services offered by the university and the College of Engineering, the Electrical and Computer Engineering (ECE) Department provides the following additional services and activities for its students: an academic advisor, to assist students with the implementations of their academic plans; the ECE Walk-in Tutoring Office, to assist ECE students with their upper-level courses; and college-level and departmental student organizations.

Freshman Year

First Semester

Course	Title	Credits
ACS 1000	Ancients	3
THL 1000	Faith, Reason, and Culture	3
MAT 1500	Calculus I	4
CHM 1103	General Chemistry Lab I	1
CHM 1151	General Chemistry I	4
EGR 1200	Engineering Design Cornerstone	3
EGR 1001	Career Compass IA	0.5

Second Semester

Course	Title	Credits
ACS 1001	Moderns	3
MAT 1505	Calculus II	4
PHY 2400	Physics I Mechanics	3
ECE 1205	ECE Freshman Projects	3
ECE 1260	EGR Prog and Applic	3
ECE 1261	EGR Prog and Applic Lab	1
EGR 1002	Career Compass IB	0.5

Sophomore Year

First Semester

Course	Title	Credits
ECE 2030	Electric Circuits Fundamentals	3
ECE 2031	Elect Circuit Fundamentals Lab	1
MAT 2705	Diff Equation with Linear Alg	4
PHY 2402	Physics II Elec & Magnet	3
PHY 2403	Phy Lab for Engineering	1
	Elective - Ethics	3
EGR 2003	Career Compass IIA	0.5

Second Semester

Course	Title	Credits
ECE 2292	Engineering Probability&Stats	3
ECE 2430	Embedded Systems	3
ECE 2431	Embedded Systems Lab	1
ECE 2530	Analog Electronics I	3
ECE 2531	Analog Electronics I Lab	1
MAT 2500	Calculus III	4
EGR 2004	Career Compass IIB	0.5

Junior Year

First Semester

Course	Title	Credits
ECE 2172	Digital Systems	3
ECE 2173	Digital Systems Lab	1
ECE 3020	Intro to Electric Energy Syste	3
ECE 3242	Fundamentals of Signal Process	3
ECE 3530	Analog Electronics II	3
ECE 3531	Analog Electronics II Lab	1
	Elective - Free	3
EGR 3005	Career Compass IIIA	0.5

Second Semester

Course	Title	Credits
ECE 3000	Engr Systems Models & Control	3
ECE 3001	Engr Systems Model&Control Lab	1
ECE 3030	Engr Electromagnetics	3
ECE 3031	Engr Electromagnetics Lab	1
ECE 3040	Electrical Communications	3
ECE 3970	Design Seminar - EE	2
	Elective - Free	3
EGR 3006	Career Compass IIIB	0.5

Senior Year

First Semester

Course	Title	Credits
ECE 4970	Design Project - EE	3
	Elective - EE Track	3
	Elective - Science, Technical or Math	3
	Elective - Free	3
	Elective - Humanities	3

Second Semester

Course	Title	Credits
ECE 4972	Design Project Report - EE	1
	Elective - EE Track	3
	Elective - Free	3
	Elective - Free	3
	Elective - THL (2000 or above)	3
	Elective - ECE 5000 or above	3