

Send us your questions.

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We are located in the Luis Stefani Building, Office S-224 of the Mayagüez Campus. Our office hours are Monday to Friday from 7:45 to 11:45 a.m. and from 1:00 to 4:30 p.m.. Call us at 787-265-3821 or send your information.

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Electrical and Computer Engineering Department



Integrated Experience; Educational and Scientific Merit

Legacy of Outstanding Achievements

The Department of Electrical and Computer Engineering at UPRM has been ranked number one among all Hispanic universities graduating engineers in its area. Among the reasons for this distinction are the high qualification of its faculty (90% of our professors hold Ph.D. degrees), our well-designed academic programs, the high standards established for admission and graduation of our students, and the prestigious ABET accreditation.

The ECE faculty is constituted by 56 highly recognized Engineers and Scientists from P.R. and abroad. We possess 1,283 undergraduate and 110 graduate students. This student population is well gender-balanced, with about 30% of female enrollment. This population is composed of about 95% fully bilingual U.S. citizens. Talking about academic excellence, almost 67% of our graduated class of 2006 achieved a Grade Point Average greater or equal than 3.00.

The Electrical Engineering Program provides a general education in mathematics, sciences, and humanities, and specialized study in selected areas.

There are five areas in Electrical Engineering from which the students select their specialization:

- *Electronics*
- *Communications and Signal Processing*
- *Power Systems*
- *RF Systems & Microwave Remote Sensing*
- *Control Systems*

The Computer Engineering Program provides a general education in mathematics, science, humanities, computer science, electronics, and information systems. There are 3 areas in Computer Engineering from which students select their specialization:

- *Hardware & Embedded Systems*
- *Communications and Signal Processing*
- *Computing Systems*

A well defined curriculum, laboratories oriented toward problems solving and capstone courses give our students the needed skills to outstandingly perform in the workplace. These areas are described as follows:

Electrical Engineering Specialization Areas

Electronics

The Electronics area develops electrical engineers specialized in the analysis and design of integrated circuits, analogical electronic systems, digital systems, and mixed signal circuit. The facilities are devoted to educate undergraduate students to use basic equipment for electrical measurements in digital and analog circuits, design and test of analog systems, digital systems, and mixed-signal electronics circuits.

Students earn a solid educational experience in design and analytic problem solving skills.

Communications and Signal Processing

Students choosing the Communications and Signal Processing option will further enhance their core knowledge by specializing in communications, image and signal analysis, and the design of software and hardware for image and signal processing. Students learn to use computer programs such as MATLAB, which enhance student's intuitive development in a graphic environment. Students also learn to use mathematical tools in signal analysis and systems design. This process culminates with the design course supervised by a Faculty member.

The Communications and Signal Processing area provides students the following specialized courses:

- Digital Signal Processing
- Digital Filters
- Pattern Recognition
- Image processing involved in the design of software and hardware systems to process signals.

Power Systems

The Electrical Power area develops in our students a solid theoretical formation all together with a practical vision of Power Engineering. This option provides plenty of opportunities for undergraduate research. As part of the most recent curricular revision, this area was divided in two tracks; Power Electronics and Power Systems.

Students are exposed to various courses with significant relevance in day to day workplace environment:

- Power systems analysis
- Design of industrial systems
- Electricity distribution systems
- Electronics for control circuits
- Electronics for generation, transmission and usage of electric power.

RF Systems & Microwave Remote Sensing

Students choosing this area will develop their core knowledge in the generation, transmission and reception of electromagnetic waves and its interaction with natural and artificial targets. The area includes applications of telecommunications and remote sensing. Telecommunications expose the students to the study of microwaves and optical circuits, theory and design of antennas, wave emissions on space, transmission lines and waveguides. These components are fundamental in the development of wireless communication systems, telephone and satellite communications. Remote sensing use active sensors like radars and passive ones like radiometers to collect information about physical properties of the object under observation. Students earn experience through various courses such as Antennas Theory and Design, Microwave Engineering, Design of Communication Systems and Optical Communications.

Control Systems

Students choosing this option will receive courses that provides mathematical and theoretical fundamental in automatic control, and courses related to applications and implementation of control systems. A sequence of three courses related to applications will provide the equivalent to the culminating design experience requested by ABET. These courses are:

- Digital control
- Linear system control
- Robotics and automation and process control

These courses are related to the "Process Instrumentation and Control Laboratory" and "Robotics Laboratory". The Robotics and Automation Laboratory provides a sound theoretical and practical background in the robotics, control and automation related applications.

Note:

Our students have the opportunity to experience scientific research and development in the **capstone** courses offered in each specialization areas as well as in the **technical** and the **undergraduate research** course. Some of our research centers are NSF Engineering Research Center (ERC) recognized internationally.

Computer Engineering Specialization Areas

Hardware and Embedded Systems

Students choosing the Hardware and Embedded Systems option further develop their core knowledge by following a series of courses that will enhance and allow them to acquire depth of knowledge in Computer Engineering. These students can choose among several courses in Computer Architecture, Microprocessor Interfacing and Embedded Systems, and Digital Design. Students choosing this option are also required to develop their skills in Software Engineering and/or Database Systems. The Capstone course is designed so that students from any of the areas in Computer Engineering are required to work in a real life problem where they get to integrate their knowledge of both Hardware and Software design and problem solving skills.

Communication and Signal Processing

In this area students develop depth in Communications Systems, Digital Signal Processing, Image Processing, Pattern Recognition, and Computer Networking. Students choosing this option are also required to develop their skills in Microprocessor Interfacing, Digital Systems Design and/or Analog Design and are also required to develop their skills in Software Engineering and/or Database Systems. The Capstone course is designed so that students from any of the areas in Computer Engineering are required to work in a real life problem where they get to integrate their knowledge of both Hardware and Software design and problem solving skills.

Computing Systems

The students choosing this area further specialize in Software systems such as Database Systems, Software Engineering, Compiler Construction, Object Oriented Programming and Network Administration and Security among others. Students choosing this option are also required to develop their skills in Microprocessor Interfacing, Digital Systems Design and/or Analog Design. The Capstone course is designed so that students from any of the areas in Computer Engineering are required to work in a real life problem where they get to integrate their knowledge of both Hardware and Software design and problem solving skills.

The Electrical and Computer Engineering Department is ABET accredited. Due to such accreditation our academic programs generate the following outcomes in our students:

- Ability to apply knowledge of mathematics, science, and engineering necessary to carry out analysis and design appropriate to electrical/computer engineering problems.**
- Ability to design and conduct experiments as well as analyze and interpret data.**
- Ability to design an electrical/computer system to meet desired needs.**
- Ability to function on multidisciplinary teams.**
- Ability to identify, formulates, and solves engineering problems.**
- Understanding of professional and ethical responsibility.**
- Ability to communicate effectively.**
- Broad education necessary to understand impact of engineering solutions in a global/societal context.**
- Recognition of the need for and ability to engage in lifelong learning.**
- Knowledge of contemporary issues.**
- Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.**