Electrical engineers are individuals who are active in research, design, development, testing, manufacturing, sales, and management of electrical systems and devices. They are playing leading roles in the emerging fields of nano-technology and biomedical technology. Students who like hands-on experience with electronic and optical devices, computers, sound systems, and robots will find the work of electrical engineers interesting.

The undergraduate curriculum, through its required courses, provides preparation in the basic electrical and physical sciences. The elective structure offers the student opportunities for professional specialization, area specialization, or interdisciplinary broadening. The primary focus in early courses is on analysis of analog and digital electrical circuits. Later courses explore how these circuit ideas are used to build complex systems, such as computers, motors, robot controllers, wireless communication systems, and computer networks. The curriculum is a combination of theory and applications. Throughout the undergraduate years, a strong sequence of courses in the humanities and social sciences is taken. These courses provide a balanced, liberal education so that the graduate can participate creatively in society and business and become an educated and effective citizen.

Because of the variety of activities that electrical engineers are involved in, electrical engineering students are hired by a wide range of companies and in many different capacities. Some are involved in design of an electronic component for a specific project, some in embedded software development, some in sales, and some in supporting research activities. Major employers of Pitt graduates include Siemens, Boeing, Texas Instruments, Eaton Cutler-Hammer, General Electric, IBM, Medrad, Respironics, Marconi, Sony, UPMC, and Verizon. Electrical engineering students often continue their education through graduate work leading to a master’s degree or PhD in electrical engineering, either as a full-time student or part-time student while working. Many successful leaders in other fields such as law, medicine, and business have utilized an undergraduate education in electrical engineering as preparation for later professional study.

Electrical Engineering Undergraduate Curriculum
The first-year courses are the same for all engineering disciplines. During the sophomore year, electrical engineering students take required courses in calculus, matrix theory, differential equations, basic physics, and communication skills. Along with these are required electrical engineering courses in circuits and digital systems. In the junior year, students complete the required courses in electrical engineering and begin taking electives. The senior year is composed entirely of electives. There are more than 25 electrical engineering elective courses for students to choose from.

The undergraduate program includes electives in the humanities and social sciences, a communication skills course, an open elective, technical electives, and electrical engineering electives. All humanities and social science electives must be selected from the list of acceptable electives compiled by the Swanson School of Engineering, which is available in the departmental office. The open elective may be satisfied by taking any course that is acceptable for any other elective course category, or by using (for example) three credits of band, physical education, or chorus. Technical electives may include electrical engineering electives, most engineering courses, mathematics courses, or basic science courses.

Focused specialties are readily available for students with specific professional career goals. By properly selecting electives, students can specialize in such areas as electronics, computers, photonics, power, or telecommunications systems. These programs combine courses outside of electrical engineering (such as computer science) with electrical engineering courses to provide students with an interdisciplinary perspective toward the particular application area. Engineering minor programs are available from several other engineering departments, such as biomedical, mechanical, chemical, and industrial engineering.
An outline of the last six terms (three years) of the electrical engineering undergraduate program is given below.

**THIRD TERM**
- MATH 0290 Differential Equations (3 cr.)
- ECE 0031 Linear Circuits and Systems 1 (3 cr.)
- ECE 0132 Digital Logic (3 cr.)
- ECE 1885 Departmental Seminar (0 cr.)
- Humanities/Social Science Elective 3 (3 cr.)
- Communications Skills Elective (3 cr.)

**FIFTH TERM**
- ECE 1201 Electronic Measurements and Circuits Laboratory (3 cr.)
- ECE 1247 Semiconductor Device Theory (3 cr.)
- ECE 1259 Electromagnetics 1 (3 cr.)
- ECE 1552 Signals and Systems Analysis (3 cr.)
- ECE 1885 Departmental Seminar (0 cr.)
- Humanities/Social Science Elective 4 (3 cr.)

**SEVENTH TERM**
- ECE Design Elective (3 cr.)
- ECE Elective 1 (3 cr.)
- ECE Elective 2 (3 cr.)
- ENGR 0020 Probability and Statistics for Engineers (4 cr.)
- Technical Elective 2 (3 cr.)
- ECE 1885 Departmental Seminar (0 cr.)

**SIXTH TERM**
- MATH 0280 Matrices and Linear Algebra (3 cr.)
- ECE 1212 Electronic Circuit Design Lab (3 cr.)
- ECE 1563 Signal Processing Laboratory (3 cr.)
- ECE 1885 Departmental Seminar (0 cr.)
- Technical Elective 1 (3 cr.)
- Humanities/Social Science Elective 5 (3 cr.)

**EIGHTH TERM**
- ECE Elective 3 (3 cr.)
- ECE Elective 4 (3 cr.)
- Technical Elective 3 (3 cr.)
- Humanities/Social Science Elective 6 (3 cr.)
- Open Elective (3 cr.)
- ECE 1885 Departmental Seminar (0 cr.)

**Areas of Concentration**
Optional areas of concentration have been defined within the electrical engineering undergraduate program to allow a student to develop strength in a particular area of interest. Courses used to satisfy the area of concentration requirements also are used to satisfy requirements for the Bachelor of Science in electrical engineering degree. Areas of Concentration are currently available in: Computers, Electronics (Circuits and Devices), Power Systems, and Telecommunications/Signal Processing. Each area of concentration requires that students choose their ECE elective courses from a subset relating to the field of interest.

For more information about the electrical engineering program, please contact:
University of Pittsburgh
Undergraduate Coordinator
1140 Benedum Hall
Pittsburgh, PA 15261
412-624-8000
www.engr.pitt.edu/ece

For more information about other majors, please contact:
University of Pittsburgh
Office of Admissions and Financial Aid
Alumni Hall, 4227 Fifth Avenue
Pittsburgh, PA 15260-6601
412-624-PITT
E-mail: oafa@pitt.edu
www.oafa.pitt.edu
Special Programs and Opportunities

The Dietrich School of Arts and Sciences/Engineering Joint Degree Program allows you to combine an engineering degree with any degree offered through the School of Arts and Sciences in a challenging five-year program. You can tailor your education to your interests, while developing a range of knowledge and skills that can increase your value in the job market. Choose from more than 50 Arts and Sciences majors, including applied mathematics, architectural studies, biology, economics, environmental studies, geology, history, music, neuroscience, urban studies, and a variety of language programs.

The Co-operative Engineering Education Program allows you to alternate between academic terms and paid full-time work assignments to gain valuable experience with a local, national, or international employer. You begin work assignments during your junior year for an employer in your field of engineering, completing at least three work sessions of approximately 14 weeks each before graduation. With each rotation, you take on increasingly challenging work assignments that complement your academic progression. By working during the summer terms, participating in the co-op program only postpones your graduation by eight months. More than 50 percent of graduates who participate in the co-op program secure jobs with their co-op employer. Participating companies include Argonne National Laboratories, Estee Lauder, the U.S. Department of Energy, General Dynamics, Pennsylvania Department of Transportation, Pratt and Whitney, Ashland Chemical Company, and UPS. Packard Electric offers a unique program that allows you to spend one rotation working at a Packard Electric plant in Mexico and one semester taking classes at the ITESM-Monterrey Institute of Technology in Monterrey, Mexico.

Undergraduate research opportunities let you participate firsthand in cutting-edge research conducted by Pitt faculty. Working with a researcher can help you focus your career path and prepare you for employment or a graduate or professional program. Students usually pursue undergraduate research in their junior and senior years or during summers. In the past, students have contributed to projects involving artificial organs, biomechanics, computer networks, computer simulations, and protein polymers.

The Certificate in International Engineering Studies gives you the unique opportunity to put an international spin on your engineering program. The program requires that you complete a study abroad experience and associated cultural enrichment and language studies. With the increasingly global nature of engineering and business, this program will enhance your education as well as employability and, for the most part, involves little or no extra expenditure of time or money.

Study abroad programs add an international perspective to your education and strengthen your credentials as a graduate. While earning credits toward your engineering degree, you can broaden your personal experiences and gain an appreciation for other cultures and engineering practices. Since only about 5 percent of American students study abroad, the experience also sets you apart as a candidate on the job market. Scholarships are available, and financial aid is applicable. For more information, contact the University of Pittsburgh, Study Abroad for Engineers Office, B-80G Benedum Hall, Pittsburgh, PA 15261; 412-624-5942; fax: 412-624-2827; www.abroad.pitt.edu.

Engineering student organizations on campus can enhance your undergraduate experience through a variety of academic, professional, and social activities. Examples include:

- The Institute of Electrical and Electronic Engineers promotes the development of electrical technology and applied science, the application of those technologies for the benefit of humanity, the advancement of the profession, and the well-being of its members. The University of Pittsburgh student chapter sponsors speakers and field trips, both of which are focused on the electronic engineering discipline.

- The National Society of Black Engineers helps African American students excel academically, become leaders in their field, and positively impact the community. It also gives students a mechanism to voice their opinions and concerns in the Swanson School of Engineering. Activities include hosting a job fair, helping students create resumes, encouraging high school students who are interested in engineering and other technical disciplines, and hosting social functions.

- The Society of Women Engineers promotes the professional development of students by providing career guidance for college and high school students and encouraging interaction and camaraderie among students of different ages and majors. Activities include monthly meetings, a graduate school fair, panel discussions, a corporate banquet, and social functions.

- The Tau Beta Pi national engineering honor society admits distinguished students who have demonstrated outstanding scholarship and character. Members are encouraged to volunteer and participate in community service.

- Eta Kappa Nu is a national honorary society for electrical engineering students. The University of Pittsburgh chapter sponsors tutoring for underclass students in electrical engineering.