

Electrical and Computer Engineering

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The Department of Electrical and Computer Engineering offers two undergraduate programs leading to the degree of Bachelor of Science in Electrical Engineering or Computer Engineering. The department provides programs that incorporate analysis, design and development of electrical, electronic, and computer systems, and prepares graduates for entry into the profession as productive and effective engineers.

Electrical Engineering (B.S.)

The program is directed toward sequential development of course work to provide breadth and depth in engineering. It provides instructions to cover broad areas that include electronics, communication systems, computer systems, control systems, power systems, electromagnetics and signal processing. The program is intended to develop the ability of graduates to apply knowledge of mathematics, sciences and engineering. It ensures that graduates have an opportunity to work on multi-disciplinary teams, and also develop effective communication skills. In addition to a strong focus on computer skills and computer software, the program provides a design experience, which is developed and integrated throughout the program by introducing fundamental elements of design process in course work. The program also includes a two-semester design sequence to provide a meaningful, major engineering design experience that also focuses on professional practice. Several modern laboratories in the program provide “hands-on” experience. There is also a strong emphasis on the studies of humanities and social sciences that serve not only to fulfill an objective appropriate to the engineering profession but also to meet Saint Louis University’s educational objectives. The overall program provides an integrated educational experience and training to maintain professional competency through life-long learning.

Students also have the option to receive B.S. in Electrical Engineering with concentration in

Bioelectronics. (Emphasis in Engineering or Pre-Med) Students are highly encouraged and assisted to seek **internship and co-op opportunities** with local and national companies. Qualified students are also invited to join department faculty to carry out cutting edge research.

Student professional organizations such as the Institute of Electrical and Electronics Engineers (IEEE), Society of Women Engineer (SWE) and others are active and very successful in local and national competitions such as “Black Box”, Hardware Design, Robotics, and Ethics.

Program Mission

Within the context of Saint Louis University and Parks College of Engineering and Aviation, the mission of the Electrical Engineering Program is to adequately prepare graduate to enter into the engineering professions, especially in the areas of analysis, design, and development of electrical and/or computer systems and components.

Program Educational Objectives

- To pursue scientific and technical careers beginning with entry-level electrical engineering positions in industry or government.
- To pursue continuing education through graduate studies in related engineering fields, as well as law, business, or management.
- To fulfill the needs of society in solving technical problems using electrical engineering principles, tools, and practices

The Electrical Engineering Program at Parks is accredited by the Accrediting Board of Engineering and Technology (ABET).

Degree Requirements

Basic Science & Math Requirements

CHEM	163	General Chemistry I	3
CHEM	165	General Chemistry I Lab	1
PHYS	161	Engineering Physics I	3
PHYS	162	Engineering Physics I Lab	1
PHYS	163	Engineering Physics II	3
PHYS	164	Engineering Physics II Lab	1
MATH	135	Discrete Mathematics	3
MATH	142	Calculus I	4
MATH	143	Calculus II	4
MATH	244	Calculus III	4
MATH	311	Linear Algebra	3
MATH	355	Differential Equations	3
MATH	403	Probability and Statistics	3

Communications Requirements

CMM	120	Public Speaking	3
CMM	293	Small Group Presentations	1

ENGL 190	Adv Strategies Rhetoric & Research	3
ENGL 300	Technical Writing	3

Computer Requirement

CSCI 150	Intro Object Oriented Program	4
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Liberal Arts Requirements

PHIL 340	Ethics and Engineering	3
THEO 100	Theological Foundations	3
	Cultural Diversity	3
	Humanities	3
	Social & Behavioral Science	3

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.

Electrical Engineering Core Requirements

ECE 101	Intro to ECE	1
ECE 205	Digital Design	3
ECE 206	Digital Design Lab	1
ECE 210	Engineering Circuits I	3
ECE 211	Engineering Circuits II	3
ECE 212	Electrical Science Lab	1
ECE 301	Signals & Systems	3
ECE 302	Electromagnetic Fields	3
ECE 303	Semiconductor Devices	3
ECE 304	ECE Systems Modeling Lab	1
ECE 305	Microprocessors	3
ECE 306	Microprocessors Lab	1
ECE 307	Electric Energy Conversion	3
ECE 309	Electronic Circuit Design	3
ECE 310	Electronic Circuit Design Lab	1
ECE 403	Communication Systems	3
ECE 404	Automatic Control Systems	3
ECE 407	Lines and Waves	3
ECE 490	ECE Design I	3
ECE 491	ECE Design II	3

ECE Electives taken from the following:

Students are required to take at least six (6) credit hours from the following list. Please check with ECE Dept. for a complete list of approved electives.

- Radar Systems
- Cellular Communications
- Digital Signal Processing
- Space craft Communications
- Analog Filter Design
- Image Processing
- Computer System Design
- Advanced Digital Design
- Power Systems Analysis I
- Power Systems Analysis II
- Special Topics

Two Technical Electives

2 approved course (3 hours) selected from courses in science, mathematics, or engineering, at the 300-level or higher, or computer science at any level. This course must not be used to satisfy other curriculum requirements.

Internship and Co-op

Although not required, students are encouraged to participate in an internship or cooperative experience before graduation.

ECE 275	Co-op	0-3
ECE 375	Co-op	0-3
ECE 475	Co-op	0-3
ECE 276	Internship	0-3
ECE 376	Internship	0-3
ECE 476	Internship	0-3

Minimum BS Credits 125

Computer Engineering (B.S.)

The Computer Engineering degree program is directed toward sequential development of course work to provide breadth and depth in electrical engineering and computer science. It provides instructions to cover broad areas that include analog and digital electronics, signal processing, computer systems, Computer Architecture, Operating Systems, Advanced Digital Design, Computer Networks and others. The program is intended to develop the ability of graduates to apply knowledge of mathematics, sciences, engineering and computer science. It ensures that graduates have an opportunity to work on multi-disciplinary teams, and also develop effective communication skills. In addition to a strong focus on computer skills and computer software, the program provides a design experience which is developed and integrated throughout the program by introducing fundamental elements of design process in course work. The program also includes a two-semester design sequence to provide a meaningful, major engineering design experience that also focuses on professional practice. Several modern laboratories in the program provide “hands-on” experience. There is also a strong emphasis on the studies of humanities and social sciences that serve not only to fulfill an objective appropriate to the engineering profession but also to meet Saint Louis University’s educational objectives. The overall program provides an integrated educational experience and training to maintain professional competency through life-long learning.

Students are highly encouraged and assisted to seek **internship and co-op opportunities** with local and national companies. Qualified students are also invited to join department faculty to carry out cutting edge research.

Student professional organizations such as the Institute of Electrical and Electronics Engineers (IEEE), Society of Women Engineers (SWE), and others are active and very successful in local and national competitions such as “Black Box”, Hardware Design, Robotics, and others.

Program Mission

Within the context of Saint Louis University and Parks College of Engineering and Aviation, the mission of the Electrical Engineering Program is to adequately prepare graduates to enter into the engineering professions, especially in the areas of analysis, design, and development of electrical and/or computer systems and components.

Degree Requirements

Basic Science & Math

CHEM 163	General Chemistry I	3
CHEM 165	General Chemistry I Lab	1
PHYS 161	Engineering Physics I	3
PHYS 162	Engineering Physics I Lab	1
PHYS 163	Engineering Physics II	3
PHYS 164	Engineering Physics II Lab	1
MATH 135	Discrete Mathematics	3
MATH 142	Calculus I	4
MATH 143	Calculus II	4
MATH 244	Calculus III	4
MATH 311	Linear Algebra	3
MATH 355	Differential Equations	3
MATH 403	Probability and Statistics	3

Communications

CMM 120	Public Speaking	3
CMM 293	Small Group Presentations	1
ENGL 190	Adv Strategies Rhetoric & Research	3
ENGL 300	Technical Writing	3

Computer Science

CSCI 150	Intro Object Oriented Program	4
CSCI 180	Data Structures	4
CSCI 290	Software Design	3
CSCI 224	Computer Architecture	3
CSCI 324	Operating Systems	3

Liberal Arts

PHIL 340	Ethics and Engineering	3
THEO 100	Theological Foundations	3
	Cultural Diversity	3
	Humanities	3
	Social & Behavioral Science	3

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.

Computer Engineering Core

ECE 101	Intro to ECE	1
ECE 205	Digital Design	3
ECE 206	Digital Design Lab	1
ECE 210	Engineering Circuits I	3
ECE 211	Engineering Circuits II	3
ECE 212	Electrical Science Lab	1
ECE 301	Signals & Systems	3
ECE 303	Semiconductor Devices	3
ECE 304	ECE Systems Modeling Lab	1
ECE 305	Microprocessors	3
ECE 306	Microprocessors Lab	1
ECE 315	Advanced Digital Design	3
ECE 320	Computer Systems Design	3
ECE 321	Computer Systems Design Lab	1
ECE 433	Computer Networks	3
ECE 490	ECE Design I	3
ECE 491	ECE Design II	3

Electrical & Computer Engineering Electives

Students are required to take at least six (6) credit hours from the following list. Please check with ECE Dept. for a complete list of approved electives.

- Digital IC Design
- Robotics
- Hardware Software Co-design
- Digital Signal Processing
- Controls Systems
- Electromagnetic
- Analog Filter Design
- Programmable Logic Controller
- Analog IC Design
- Space Craft Communication
- Special Topics

One Technical Elective

1 approved course (3 hours) selected from courses in science, mathematics, or engineering, at the 300-level or higher, or computer science at any level. This course must not be used to satisfy other curriculum requirements.

Internship and Co-op

Although not required, students are encouraged to participate in an internship or cooperative experience before graduation.

ECE 275	Co-op	0-3
ECE 375	Co-op	0-3
ECE 475	Co-op	0-3
ECE 276	Internship	0-3
ECE 376	Internship	0-3
ECE 476	Internship	0-3

Minimum BS Credits 126

Bioelectronics Concentration (B.S. in Electrical Engineering)

The newly established Bioelectronics concentration is a joint effort by the Electrical and Computer Engineering Department and the Biomedical Engineering Department of Parks College. The course of study combines science and engineering, incorporating courses in biology, chemistry, math, biomedical engineering, electrical and electronic engineering, and others. Students in the Bioelectronics track will pursue either of two emphases, **engineering or pre-med**, and will graduate with a B.S. in Electrical Engineering with a minor in Biomedical Engineering.

While pursuing the degree, the students can expect to spend a good deal of their time in our well-equipped laboratories, complementing classroom instruction with hands-on experience. Design experience is well integrated throughout the four-year curriculum; student begins to conduct laboratory experiments immediately, starting from the freshman year. The program culminates with a full-year senior design experience in which students work in interdisciplinary teams to carry out major projects. Students are also welcome to work with faculty to carry out research and further enhance their educational experience. Faculty members strongly encourage students to bolster their learning experience by seeking internship and co-op opportunities locally and nationally within the bioengineering industry.

When students graduate from the program with the Electrical Engineering Degree with Bioelectronics concentration in hand, they will find a wealth of career opportunities open to them as effective engineers in bioengineering industries. Graduates can find employment with hospitals' Clinical Engineering Divisions, medical equipment and medical device manufacturers, healthcare R&D centers, healthcare services companies, medical laboratories, university laboratories, and equipment vendors. Degree-holders could also choose to work in the electrical engineering and biomedical engineering industries. Graduates will be able to provide much needed training and support in the use of highly sophisticated medical equipment to researchers, clinicians, medical doctors, and other healthcare professionals.

Students pursuing pre-med emphasis are well prepared to enter a highly challenging and rewarding field of medicine. Bioelectronics with pre-med emphasis provides an excellent opportunity for future medical doctors to be well versed in technological advances. It allows for much greater integration and innovation of technology in medicine. Technological advances such as MRI, CAT scan, and many others are clear examples

of such innovative integration.

Degree Requirements

Basic Science & Math

BIOL	104	Biology I & Lab	4
BIOL	106	Biology II & Lab	4
BIOL	260	Human Physiology	3
CHEM	163	General Chemistry I	3
CHEM	164	General Chemistry II	3
CHEM	165	General Chemistry I Lab	1
CHEM	166	General Chemistry II Lab	1
PHYS	161	Engineering Physics I	3
PHYS	162	Engineering Physics I Lab	1
PHYS	163	Engineering Physics II	3
PHYS	164	Engineering Physics II Lab	1
MATH	142	Calculus I	4
MATH	143	Calculus II	4
MATH	244	Calculus III	4
MATH	355	Differential Equations	3
MATH	403	Probability and Statistics	3

Communications

CMM	120	Public Speaking	3
ENGL	190	Adv Strategies Rhetoric & Research	3
ENGL	300	Technical Writing	3

Liberal Arts

PHIL	340	Ethics and Engineering	3
THEO	100	Theological Foundations	3
		Cultural Diversity	3
		Humanities	3
		Social & Behavioral Science	3

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.

Electrical Engineering Core

ECE	101	Intro to ECE	1
ECE	205	Digital Design	3
ECE	206	Digital Design Lab	1
ECE	210	Engineering Circuits I	3
ECE	211	Engineering Circuits II	3
ECE	212	Electrical Science Lab	1
ECE	301	Signals & Systems	3
ECE	302	Electromagnetic Fields	3
ECE	303	Semiconductor Devices	3
ECE	304	ECE Systems Modeling Lab	1
ECE	305	Microprocessors	3
ECE	306	Microprocessors Lab	1
ECE	309	Electronic Circuit Design	3
ECE	310	Electronic Circuit Design Lab	1
ECE	490	ECE Design I	3
ECE	491	ECE Design II	3

Biomedical Engineering Core

BME 200	Computing	3
BME 305	Measurements	3
BME 405	Biomedical Instrumentation	3
BME 410	Biomedical Signals	3
BME 415	BME Sensory Systems	3

Electrical & Computer Engineering Elective

Students are required to take at least three (3) credit hours from the following list. Please check with ECE

Dept. for a complete list of approved electives.

- Electromagnetic
- Radar Systems
- Digital Signal Processing
- Control Systems
- Analog Filter Design
- Computer System Design
- Advanced Digital Design
- Digital IC Design
- Analog IC Design
- Special Topics in bioelectronics

One Technical Elective

1 approved course (3 hours) selected from courses in science, mathematics, or engineering, at the 300-level or higher, or computer science at any level. This course must not be used to satisfy other degree requirements.

Internship and Co-op

Although not required, students are encouraged to participate in an internship or cooperative experience before graduation.

ECE 275	Co-op	0-3
ECE 375	Co-op	0-3
ECE 475	Co-op	0-3
ECE 276	Internship	0-3
ECE 376	Internship	0-3
ECE 476	Internship	0-3

Minimum BS Credits 126

Bioelectronics Concentration (B.S. in Electrical Engineering) Pre-Med Emphasis

Degree Requirements

Basic Science & Math

BIOL 104	Biology I & Lab	4
BIOL 106	Biology II & Lab	4
BIOL 302	Molecular Cell Biology I & Lab	4
CHEM 163	General Chemistry I	3
CHEM 164	General Chemistry II	3
CHEM 165	General Chemistry I Lab	1
CHEM 166	General Chemistry II Lab	1

PHYS 161	Engineering Physics I	3
PHYS 162	Engineering Physics I Lab	1
PHYS 163	Engineering Physics II	3
PHYS 164	Engineering Physics II Lab	1
MATH 142	Calculus I	4
MATH 143	Calculus II	4
MATH 244	Calculus III	4
MATH 355	Differential Equations	3
MATH 403	Probability and Statistics	3

Communications

CMM 120	Public Speaking	3
ENGL 190	Adv Strategies Rhetoric & Research	3
ENGL 300	Technical Writing	3

Liberal Arts

PHIL 340	Ethics and Engineering	3
THEO 100	Theological Foundations	3
	Cultural Diversity	3
	Humanities	3
	Social & Behavioral Science	3

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.

Electrical Engineering Core

ECE 101	Intro to ECE	1
ECE 205	Digital Design	3
ECE 206	Digital Design Lab	1
ECE 210	Engineering Circuits I	3
ECE 211	Engineering Circuits II	3
ECE 212	Electrical Science Lab	1
ECE 301	Signals & Systems	3
ECE 303	Semiconductor Devices	3
ECE 304	ECE Systems Modeling Lab	1
ECE 305	Microprocessors	3
ECE 306	Microprocessors Lab	1
ECE 309	Electronic Circuit Design	3
ECE 310	Electronic Circuit Design Lab	1
ECE 490	ECE Design I	3
ECE 491	ECE Design II	3

Biomedical Engineering Core

BME 305	Measurements	3
BME 405	Biomedical Instrumentation	3
BME 415	BME Sensory Systems	3

Biomedical, Electrical, Computer Engineering Option

Select one 3 credit hour course from the following.

ECE 302	EM Fields	3
BME 410	Biomedical Signals	3

Minimum BS Credits 128