

COMPUTER ENGINEERING, B.S.

At Saint Louis University's Parks College of Engineering, Aviation and Technology, we have developed a unique, hands-on computer engineering program that incorporates analysis, design and development of computer systems containing hardware and software components.

As a student in the computer engineering program at Parks College, you will gain a solid foundation through a combination of coursework and hands-on learning. You will use computing theory and tools to design solutions for today's technology-based devices and systems, analyze and design micro-controller-based computing hardware, and produce embedded systems that go into robots, unmanned aerial vehicles, smart cars, gaming controllers, avionics and autopilots.

With easy access to a sophisticated computer-aided design laboratory and other technological spaces, graduates will have the necessary skills for entry into the profession as productive and effective engineers or to pursue graduate education.

Curriculum Overview

SLU's computer engineering program coursework provides students with both breadth and depth in computer engineering. Students develop the ability to apply their knowledge of mathematics, sciences and computer engineering to find solutions to practical problems. The program also ensures that graduates have an opportunity to work on multidisciplinary teams and develop effective communication skills.

In addition to a strong focus on computer skills and computer hardware and software, the program provides a broad design experience that is integrated throughout the program by introducing fundamental elements of the design process in coursework.

SLU's computer engineering program also includes a two-semester design sequence to provide a meaningful and significant engineering design experience that focuses on and prepares students for professional practice.

Fieldwork and Research Opportunities

Benefits of SLU's computer engineering program also include several internship, research and career opportunities. Students are encouraged and assisted in obtaining summer internships with local and global companies through career services.

Undergraduate research opportunities within the college are available during the summer or regular semesters. Undergraduate students are also encouraged to seek opportunities for research with faculty of the program or faculty in other programs.

Careers

Computer engineers enjoy a variety of career paths spanning industrial or consulting positions. Students in this program are also prepared for graduate school and professional schools such as law, business administration or medicine.

Computer engineering graduates from SLU have found employment at such companies as:

- Amazon
- AT&T
- Boeing
- Citibank
- Department of Defense
- Emerson Electric
- Express Scripts
- Garmin
- General Motors
- Intel
- Rockwell
- Samsung
- SpaceX
- Texas Instruments
- U.S. Air Force

Admission Requirements

Begin Your Application (<http://www.slu.edu/apply.php>)

Saint Louis University also accepts the Common Application.

Freshman

All applications are thoroughly reviewed with the highest degree of individual care and consideration to all credentials that are submitted. Solid academic performance in college preparatory coursework is a primary concern in reviewing a freshman applicant's file.

To be considered for admission to any Saint Louis University undergraduate program, applicants must be graduating from an accredited high school, have an acceptable HiSET exam score or take the General Education Development (GED) test.

Transfer

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED.

Students who have attempted fewer than 24 semester credits (or 30 quarter credits) of college credit must follow the above freshmen admission requirements. Students who have completed 24 or more semester credits (or 30 quarter credits) of college credit must submit transcripts from all previously attended college(s).

In reviewing a transfer applicant's file, the Office of Admission holistically examines the student's academic performance in college-level coursework as an indicator of the student's ability to meet the academic rigors of Saint Louis University. Where applicable, transfer students will be evaluated on any courses outlined in the continuation standards of their preferred major.

International Applicants

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency
- Proof of financial support must include:
 - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
 - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University

- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Additional Admission Requirements

In addition to the general admission and matriculation requirements of the University, applicants to Parks College engineering programs must meet the following requirements:

- **GPA:** Minimum cumulative 3.00 high school GPA for freshmen applicants and 2.70 college GPA for transfer applicants.
- **Coursework:** Fifteen total units of high school work are required: three or four units of English; four or more units of mathematics including algebra I and II, geometry and precalculus (Algebra II with Trigonometry is not sufficient). Students should be prepared to start the first semester freshmen year in Calculus I or higher; three or four units of science including general science, introduction to physical science, earth science, biology, physics or chemistry; two or three units of social sciences including history, psychology or sociology; and three units of electives.

Admission to Parks College of Engineering, Aviation and Technology degree programs is based on a combination of secondary school grades, college admission test scores, co-curricular activities and attempted college course work, as well as other indicators of the applicant's ability, career focus and character. This process respects the non-discrimination policy of the University and is designed to select a qualified, competent and diverse student body with high standards of scholarship and character, consistent with the mission of the University.

Scholarships and Financial Aid

There are two principal ways to help finance a Saint Louis University education:

- **Scholarships:** Scholarships are awarded based on academic achievement, service, leadership and financial need.
- **Financial Aid:** Financial aid is provided in the form of grants and loans, some of which require repayment.

For priority consideration for merit-based scholarships, apply for admission by Dec. 1 and complete a Free Application for Federal Student Aid (FAFSA) by March 1.

For information on other scholarships and financial aid, visit the student financial services office online at <https://www.slu.edu/financial-aid> (<https://www.slu.edu/financial-aid/>).

Accreditation

The aerospace engineering, biomedical engineering, civil engineering, computer engineering, electrical engineering, and mechanical engineering undergraduate curricula are accredited by the Engineering Accreditation Commission of ABET, www.abet.org (<https://www.abet.org>).

See Enrollment and Graduation Data for Computer Engineering (<https://www.slu.edu/parks/pdfs/computer-engineering-enrollment-and-graduation-data.pdf>)

Learning Outcomes

The undergraduate computer engineering program is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org> (<http://www.abet.org/>)).

Program Educational Objectives

The undergraduate program is designed to meet the following specific objectives in order to fulfill the departmental and institutional missions.

- Our graduates will have acquired advanced degrees or are engaged in advanced study in engineering, business, law, medicine or other appropriate fields.
- Our graduates will have established themselves as practicing engineers in electrical, computer or related engineering fields.
- Our graduates will be filling the technical needs of society by solving engineering problems using electrical or computer engineering principles, tools, and practices.

Student Outcomes

Student outcomes are defined by ABET as the skills that graduates will attain at the time of graduation. Student outcomes are listed below:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to 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
3. an ability to communicate effectively with a range of audiences
4. an ability to 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
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Requirements

Code	Title	Credits
Basic Science and Mathematics Requirements		
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
MATH 1660	Discrete Mathematics	3
MATH 1510	Calculus I	4
MATH 1520	Calculus II	4
MATH 2530	Calculus III	4
MATH 3110	Linear Algebra for Engineers	3
MATH 3550	Differential Equations	3

ECE 3052 Probability and Random Variables for Engineers 3

Written and Oral Communication

ENGL 1920 Advanced Writing for Professionals 3

Computer Science

CSCI 1300 Introduction to Object-Oriented Programming 4

CSCI 2100 Data Structures 4

CSCI 2300 Object-Oriented Software Design 3

CSCI 3500 Operating Systems 3

Liberal Arts Requirements

PHIL 3400 Ethics & Engineering 3

THEO 1000 Theological Foundations 3

Cultural Diversity¹ 3

Humanities¹ 3

Social & Behavioral Science¹ 3

Computer Engineering Core

ECE 1001 Introduction to Electrical and Computer Engineering I 1

ECE 1002 Introduction to Electrical and Computer Engineering II 1

ECE 2101 Electrical Circuits I 3

ECE 2102 Electrical Circuits II 3

ECE 2103 Electrical Circuits Lab 1

ECE 2205 Digital Design 4

& ECE 2206 and Digital Design Lab

ECE 3205 Advanced Digital Design 3

ECE 3215 Computer Systems Design 4

& ECE 3216 and Computer Systems Design Lab

ECE 3217 Computer Architecture and Organization 3

ECE 3225 Microprocessors 4

& ECE 3226 and Microprocessors Laboratory

ECE 3130 Semiconductor Devices 3

ECE 3131 Electronic Circuit Design 4

& ECE 3132 and Electronic Circuit Design Lab

ECE 3150 Linear Systems 4

& ECE 3151 and Linear Systems Lab

ECE 3090 Junior Design 1

ECE 4245 Computer Networks Design 3

ECE 4800 Electrical and Computer Engineering Design I 3

ECE 4810 Electrical and Computer Engineering Design II 3

ECE or CSCI Electives

Students are required to take six (6) credits from an approved list and as offered. A partial list is given below. Please check with the program for a complete list of approved electives. Electives cannot be used to satisfy other curriculum requirements. 6

ECE 3110 Electric Energy Conversion

ECE 3140 Electromagnetic Fields

ECE 4225 Hardware/Software Co-Design

ECE 4226 Mobile Robotics

ECE 4235 Digital IC Design

ECE 4151 Digital Signal Processing

CSCI 3100 Algorithms

CSCI 3200 Programming Languages

CSCI 3200 Programming Languages

CSCI 4710 Databases

CSCI 4740 Artificial Intelligence

Technical Elective

Select one 3-credit course² 3

Internship and Co-op

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

Select from the following: 0

ECE 2910 Co-op in Electrical and Computer Engineering

ECE 3910 Co-op with Industry

ECE 4910 Co-Op with Industry

ECE 2915 Internship with Industry

ECE 3915 Internship with Industry

ECE 4915 Internship with Industry

Total Credits 125

1

Cultural Diversity, Humanities, Social and Behavioral Science must be selected from an approved list.

2

One 3 credit course selected from an approved list in science, mathematics, or engineering, at the 2000-level or higher, or Computer Science at 3000 or higher.

Continuation Standards

Students must maintain a minimum 2.00 GPA.

Roadmap

Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

Course	Title	Credits
Year One		
Fall		
ECE 1001	Introduction to Electrical and Computer Engineering I	1
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
ENGL 1920	Advanced Writing for Professionals ¹	3
MATH 1510	Calculus I	4
THEO 1000	Theological Foundations	3
Credits		15
Spring		
ECE 1002	Introduction to Electrical and Computer Engineering II	1
CSCI 1300	Introduction to Object-Oriented Programming	4
MATH 1660	Discrete Mathematics	3

MATH 1520	Calculus II	4	ECE 4245	Computer Networks Design	3
! PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4	ECE/CSCI Elective ⁵		3
			Core: Cultural Diversity ²		3
			Technical Elective ⁷		3
		Credits			15
Year Two					
Fall					
ECE 2101	Electrical Circuits I	3			
! ECE 2205 & ECE 2206	Digital Design and Digital Design Lab	4			
MATH 2530	Calculus III	4			
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4			
		Credits			15
Spring					
CSCI 2100	Data Structures	4			
ECE 2102 & ECE 2103	Electrical Circuits II and Electrical Circuits Lab	4			
MATH 3110	Linear Algebra for Engineers	3			
MATH 3550	Differential Equations	3			
Core: Humanities ²		3			
		Credits			17
Year Three					
Fall					
CSCI 2300	Object-Oriented Software Design	3			
ECE 3130	Semiconductor Devices	3			
! ECE 3150 & ECE 3151	Linear Systems and Linear Systems Lab ³	4			
ECE 3225 & ECE 3226	Microprocessors and Microprocessors Laboratory ³	4			
ECE 3205	Advanced Digital Design	3			
		Credits			17
Spring					
ECE 3052	Probability and Random Variables for Engineers ³	3			
ECE 3090	Junior Design	1			
ECE 3131 & ECE 3132	Electronic Circuit Design and Electronic Circuit Design Lab	4			
ECE 3215 & ECE 3216	Computer Systems Design and Computer Systems Design Lab	4			
ECE 3217	Computer Architecture and Organization	3			
		Credits			15
Year Four					
Fall					
ECE 4800	Electrical and Computer Engineering Design I ⁴	3			
CSCI 3500	Operating Systems	3			
ECE/CSCI Elective ⁵		3			
PHIL 3400	Ethics & Engineering	3			
Core: Social and Behavioral Science ⁶		3			
		Credits			15
Spring					
ECE 4810	Electrical and Computer Engineering Design II	3			

1

Students needing prerequisite work in writing skills as determined by ACT or SAT scores will be required to take ENGL 1500 The Process of Composition (3 cr)

2

Must not be used to satisfy another core requirement.

3

Prerequisite requirement of computer programming, either CSCI 1060 Introduction to Computer Science: Scientific Programming (3 cr), CSCI 1300 Introduction to Object-Oriented Programming (4 cr), or BME 2000 Biomedical Engineering Computing (3 cr)

4

Requires Senior standing (all required technical courses through the junior year have been completed and passed)

5

Must be taken from an approved list of engineering or CSCI elective courses.

6

Must be taken from an approved list of Social and Behavioral Science courses (including Economics).

7

Must be selected from courses in science, math, computer science, or engineering at the 2000 level or higher.