COMPUTER ENGINEERING, B.S.

In Saint Louis University's School of Science and Engineering, 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 SLU, 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 (https://catalog.slu.edu/academic-policies/office-admission/undergraduate/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 SLU's 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 of 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 the School of Science and Engineering's degree programs is based on a combination of secondary school grades, college admission test scores, co-curricular activities and attempted college coursework, 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.

Tuition

Tuition	Cost Per Year
Undergraduate Tuition	$52,260

Additional charges may apply. Other resources are listed below:

Net Price Calculator (https://www.slu.edu/financial-aid/tuition-and-costs/calculator.php)

Information on Tuition and Fees (https://catalog.slu.edu/academic-policies/student-financial-services/tuition/)

Miscellaneous Fees (https://catalog.slu.edu/academic-policies/student-financial-services/fees/)

Information on Summer Tuition (https://catalog.slu.edu/academic-policies/student-financial-services/tuition-summer/)

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 through grants and loans, some of which require repayment.

Saint Louis University makes every effort to keep our education affordable. In fiscal year 2022, 99% of first-time freshmen and 90% of all students received financial aid (https://www.slu.edu/financial-aid/) and students received more than $445 million in aid University-wide.

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

For information on other scholarships and financial aid, visit 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/science-and-engineering/_pdfs/2018-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:

An ability to:

1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science and mathematics.
2. 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. Communicate effectively with a range of audiences.
4. 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. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. Acquire and apply new knowledge as needed, using appropriate learning strategies.

Requirements

Code	Title	Credits
University Undergraduate Core (https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/)		32-35
Basic Engineering and Communication		
SE 1700	Engineering Fundamentals	2
ECE 1001	Introduction to Electrical and Computer Engineering I	1
ENGL 1920	Advanced Writing for Professionals	3
Basic Science and Mathematics		
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
Computer Science		
CSCI 1300	Introduction to Object-Oriented Programming	4
CSCI 2100	Data Structures	4
CSCI 2300	Object-Oriented Software Design	3
CSCI 2510	Principles of Computing Systems	3
Computer Engineering Core		
ECE 1100	Electrical Engineering 101	2
ECE 1200	Computer Engineering 101	2
ECE 2101	Electrical Circuits I	3
ECE 2103	Electrical Circuits Lab	1
ECE 2205 & ECE 2206	Digital Design and Digital Design Lab	4
ECE 3205	Advanced Digital Design	3
ECE 3215 & ECE 3216	Computer Systems Design and Computer Systems Design Lab	4
ECE 3217	Computer Architecture and Organization	3
ECE 3225 & ECE 3226	Microprocessors and Microprocessors Laboratory	4
ECE 3130	Semiconductor Devices	3
ECE 3131 & ECE 3132	Electronic Circuit Design and Electronic Circuit Design Lab	4
ECE 3150 & ECE 3151	Linear Systems and Linear Systems Lab	4
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		**6**
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.		
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 4710	Databases	
CSCI 4740	Artificial Intelligence	
Technical Elective		**3**
Select one 3-credit course [1]		
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		**133-136**

[1] 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.

Non-Course Requirements

All Science and Engineering B.A. and B.S. students must complete an exit interview/survey near the end of their bachelor's program.

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
SE 1700	Engineering Fundamentals	2
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
ECE 1200 or ECE 1100	Computer Engineering 101 or Electrical Engineering 101	2
CORE	Equity and Global Identities: Identities in Context	0-3
	Credits	**16-19**
Spring		
CSCI 1300	Introduction to Object-Oriented Programming	4
MATH 1660	Discrete Mathematics	3
MATH 1520	Calculus II	4
! PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4
ECE 1100 or ECE 1200	Electrical Engineering 101 or Computer Engineering 101	2
	Credits	**17**
Year Two		
Fall		
! ECE 2101 & ECE 2103	Electrical Circuits I and Electrical Circuits Lab	4
MATH 2530	Calculus III	4
CORE 1200	Eloquentia Perfecta 2: Oral and Visual Communication	3
PHYS 1630 & PHYS 1640	University Physics II and University Physics II Laboratory	4
CORE 2500	Cura Personalis 2: Self in Contemplation	0
CORE 2800	Eloquentia Perfecta 3: Creative Expression	2-3
	Credits	**17-18**
Spring		
CSCI 2100	Data Structures	4
ECE 2205 & ECE 2206	Digital Design and Digital Design Lab	4
MATH 3110	Linear Algebra for Engineers	3
MATH 3550	Differential Equations	3
ECE 3052	Probability and Random Variables for Engineers	3
	Credits	**17**
Year Three		
Fall		
ECE 3217	Computer Architecture and Organization	3
ECE 3130	Semiconductor Devices	3
! ECE 3150 & ECE 3151	Linear Systems and Linear Systems Lab [2]	4
ECE 3225 & ECE 3226	Microprocessors and Microprocessors Laboratory [2]	4

Course	Title	Credits
ECE 3205	Advanced Digital Design	3
	Credits	**17**
Spring		
CSCI 2510	Principles of Computing Systems	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
CSCI 2300	Object-Oriented Software Design	3
CORE 3500	Cura Personalis 3: Self in the World	1
CORE	Equity and Global Identities: Global Interdependence	0-3
	Credits	**16-19**
Year Four		
Fall		
ECE 4800	Electrical and Computer Engineering Design I [4]	3
CORE 1600	Ultimate Questions: Theology	3
ECE/CSCI Elective [5]		3
CORE 1700	Ultimate Questions: Philosophy	3
CORE 3600	Ways of Thinking: Social and Behavioral Sciences	3
CORE	Eloquentia Perfecta: Writing Intensive	0-3
CORE 4000	Collaborative Inquiry	0-3
	Credits	**15-21**
Spring		
ECE 4810	Electrical and Computer Engineering Design II	3
ECE 4245	Computer Networks Design	3
ECE/CSCI Elective [5]		3
CORE 3400	Ways of Thinking: Aesthetics, History, and Culture	3
Technical Elective [3]		3
CORE 4500	Reflection-in-Action	0
CORE	Equity and Global Identities: Dignity, Ethics, and a Just Society	0-3
	Credits	**15-18**
	Total Credits	**130-146**

[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] Prerequisite requirement of computer programming, either CSCI 1060, CSCI 1300, or BME 2000

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

[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.