

CIVIL ENGINEERING, B.S.

The civil engineering program at Saint Louis University's School of Science and Engineering incorporates the latest trends in the industry to address the current and future needs of the profession and society.

As a student in the civil engineering program at the School of Science and Engineering, you will develop a comprehensive skill set and leadership background needed to address society's needs at local, regional and global levels. Students have the opportunity to solve problems within construction, environmental, geotechnical, structural, transportation and water resources engineering fields. Students also have the opportunity to join many student clubs such as the student chapter of the American Society of Civil Engineers, Engineers Without Borders and Billikens for Clean Water.

SLU's civil engineering curriculum emphasizes professional practice preparation using project-based, hands-on learning methods. With easy access to a sophisticated computer-aided design laboratory, a structures laboratory and more, our graduates gain invaluable experience that helps launch their career and set them on a trajectory to shape our world and beyond.

Curriculum Overview

SLU's civil engineering program provides a solid foundation of coursework in the engineering sciences, including solid mechanics and fluid dynamics. The program also includes courses related to construction, environmental, geotechnical, structural, transportation and water resources engineering fields.

Modern and well-equipped laboratories emphasize experimental methods and measurement techniques.

SLU's civil engineering program includes the following focus areas:

- Structural Engineering
- Environmental and Water Resources Engineering
- Transportation Engineering

In addition, civil engineering majors at SLU are exposed to entrepreneurship and the entrepreneurial mindset through the curriculum and extracurricular opportunities.

Fieldwork and Research Opportunities

Benefits of SLU's civil engineering program include several internship and career opportunities. Competitive summer internships are available within the industry and with government agencies. Independent study on a civil engineering topic can be arranged under the direction of a faculty member.

Located in the heart of St. Louis, SLU offers civil engineering students access to a number of industry contacts from around the area. This allows students to easily partake in internships during the school year and network with professionals before graduation. Plus, SLU's civil engineering faculty is very active in research and there are many opportunities for students to help conduct research during the academic year and summer.

SLU's modern and well-equipped laboratories emphasize experimental methods and measurement techniques. The civil engineering laboratory facilities include a variety of equipment and provide spaces specifically designated for soil mechanics, environmental engineering, construction

materials testing, hydraulic modeling and structural testing. Students in SLU's civil engineering program may specialize in areas such as infrastructure evaluation and design, transportation analysis and planning, and green engineering and sustainable design.

Careers

After graduation, students with a B.S. in civil engineering can pursue graduate study or enter one of the most dynamic industries in the United States. Industry and government agencies have long recognized the quality of engineering graduates from the School of Science and Engineering.

A few of the places where civil engineering graduates can find opportunities include:

- Missouri and Illinois departments of transportation
- Missouri Sewer District
- State, county and municipal engineering offices
- The Army Corps of Engineers
- Private engineering firms such as Black and Veatch, Parsons, etc.
- Construction companies
- U.S. Air Force, Army and Navy

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>).

Enrollment and graduation data for civil engineering is listed here (https://www.slu.edu/science-and-engineering/_pdfs/2018-civil-engineering-enrollment-and-graduation-data.pdf)

Learning Outcomes

The undergraduate civil engineering program at Saint Louis University 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.

- Be employed as engineers or be enrolled in engineering or professional graduate school;
- Demonstrate their commitment to life-long learning and professional development through seeking professional licensure, pursuing graduate studies or participating in other professional continuing education activities;
- Advance into leadership roles in their profession and in service to their communities; and
- Create design solutions that address economic, social and environmental factors in their professional engineering practice.

Student Outcomes

Graduates of the Civil Engineering program at Saint Louis University will demonstrate:

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;
 8. an ability to design a system, component or process in more than one civil engineering context
 9. an ability to explain basic concepts in management, business, public policy and leadership.

Requirements

Unless otherwise stated, all civil engineering courses have prerequisites that require a "C-" or better.

Code	Title	Credits
University Undergraduate Core (https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/)¹		
<i>Basic Science and Mathematics</i>		
CHEM 1110 & CHEM 1115	General Chemistry I and General Chemistry I Laboratory	4
PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4
MATH 1510	Calculus I	4
MATH 1520	Calculus II	4
MATH 2530	Calculus III	4
MATH 3550	Differential Equations	3
STAT 3850	Foundation of Statistics	3
Science Elective with Lab ²		4
<i>Engineering Science Courses</i>		
SE 1700	Engineering Fundamentals	2
CVNG 2100	Statics	3
CVNG 3105X	Mechanics of Solids	3
MENG 3200	Fluid Dynamics	3
<i>Civil Engineering Courses</i>		
CVNG 1000	Intro to Civil Engineering	2
CVNG 1001	Civil Engineering Modeling	2
CVNG 2020	GIS and Surveying in Civil Engineering Lab	1
CVNG 2070	Construction & Project Management	3
CVNG 2500	Civil Engineering Computing	3
CVNG 3010 & CVNG 3020	Structural Analysis and Structural Analysis Lab	4
CVNG 3030 & CVNG 3031	Civil Engineering Materials and Civil Engineering Materials Laboratory	3
CVNG 3040 & CVNG 3041	Sustainability and Environmental Engineering and Sustainability and Environmental Engineering Lab	4

CVNG 3090 & CVNG 3100	Geotechnical Engineering and Geotechnical Engineering Lab	4
CVNG 3110 & CVNG 3120	Transportation Engineering and Transportation Engineering Lab	4
CVNG 3130 & CVNG 3140	Hydraulic Engineering and Hydraulic Engineering Lab	4
CVNG 3150 & CVNG 3160	Intro to Structural Design and Structural Design Lab	4
CVNG 4500	Capstone Design I	3
CVNG 4510	Capstone Design II	3
<i>Civil Engineering Electives³</i>		12

Select twelve (12) credits of Civil Engineering Electives from the available offerings from the 4000 level courses in our program. Some of the available civil engineering electives are:

CVNG 4030	Foundation Engineering
CVNG 4050	Advanced Structural Analysis
CVNG 4070	Structural Dynamics
CVNG 4090	Advanced Reinforced Concrete
CVNG 4110	Advanced Steel Design
CVNG 4130	Bridge Engineering
CVNG 4150	Prestressed Concrete
CVNG 4170	Seismic Design
CVNG 4250	Water Treatment Processes
CVNG 4260	Environmental Solutions in Developing Countries
CVNG 4330	Open-Channel Flow
CVNG 4350	Hydraulic Modeling
CVNG 4370	River Engineering
CVNG 4450	Traffic Engineering
CVNG 4470	Urban Transportation Planning
CVNG 4930	Special Topics

Professional Development Electives⁴ 9

Select nine (9) credits of Professional Development Electives, typically upper level. They can be non-engineering courses, but must support professional development goals. Courses can be selected from pre-approved elective tracks or students can develop individualized plans with departmental approval.

Total Credits 132-135

¹ The University Undergraduate Core Curriculum shall be met by selecting courses for each component from the list of pre-approved courses based on those listed on the University Undergraduate Core Courses webpage (https://catalog.slu.edu/academic-policies/academic-policies-procedures/university-core/?_ga=2.99138398.1175066736.1649031780-1814437672.1626874430). Note: some courses required for the major also fulfill University Undergraduate Core requirements.

² The 4 credit Science elective must be a 3 credit lecture plus 1 credit lab from the list of pre-approved courses. The 4 credit Science elective may not be a chemistry or physics course. Pre-approved courses include BIOL 1240 General Biology: Information Flow and Evolution/BIOL 1245 Principles of Biology I Laboratory, BIOL 1260 General Biology: Transformations of Energy and Matter/BIOL Principles of Biology II Laboratory, EAS 1080 Introduction to Environmental Science/EAS 1081 Introduction to Environmental Science Laboratory, EAS 1420 Introduction to Atmosphere Science/EAS 1425 Introduction to Atmospheric Science Lab, EAS 1430 Introduction to Solid Earth/EAS

1435 Introduction to Solid Earth Lab, and EAS 1450 Introduction to Oceanography/Introduction to Oceanography Lab.

³ Twelve (12) credits of Civil Engineering Electives are required at the 4000 level or above. Students who pursue a pre-approved minor may substitute six (6) credits of required courses for a minor for six (6) credits of Civil Engineering Electives. If a student starts, but drops a minor, that student must complete the 12 credits of Civil Engineering Electives

⁴ Nine (9) credits of Professional Development Electives are required from the pre-approved courses list. Exceptions for professional development electives may be granted with departmental approval. Students who pursue a pre-approved minor may use the 9 credits of professional development electives for courses that count toward that minor.

Pre-approved Minors

Pre-approved minors align with the civil engineering profession. Students may count courses required for the following list of minors for their three professional development electives and substitute two of the required courses for civil engineering electives. Students who minor in Engineering Mathematics or Math may not substitute courses for civil engineering electives.

- Aerospace Engineering (<https://catalog.slu.edu/colleges-schools/science-engineering/aerospace-mechanical/aerospace-engineering-minor/>)
- Engineering Mathematics (<https://catalog.slu.edu/colleges-schools/arts-sciences/mathematics-statistics/engineering-mathematics-minor/>)
- Entrepreneurship (<https://catalog.slu.edu/colleges-schools/business/management/entrepreneurship-minor/>)
- Environmental Science (<https://catalog.slu.edu/colleges-schools/science-engineering/earth-atmospheric-sciences/environmental-science-minor/>)
- Math (<https://catalog.slu.edu/colleges-schools/arts-sciences/mathematics-statistics/mathematics-minor/#text>)
- Mechanical Engineering (<https://catalog.slu.edu/colleges-schools/science-engineering/aerospace-mechanical/mechanical-engineering-minor/>)
- Physics (<https://catalog.slu.edu/colleges-schools/science-engineering/physics/physics-minor/>)
- Project Management (<https://catalog.slu.edu/colleges-schools/professional-studies/project-management-minor/>)
- Studio Art (<https://catalog.slu.edu/colleges-schools/arts-sciences/fine-performing-arts/studio-art-minor/>)

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		
MATH 1510	Calculus I ¹	4
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory ²	4
SE 1700	Engineering Fundamentals	2
CORE 1500	Cura Personalis 1: Self in Community	1
CORE 1900	Eloquentia Perfecta 1: Written and Visual Communication	3
CORE 1200	Eloquentia Perfecta 2: Oral and Visual Communication	3
Credits		17
Spring		
MATH 1520	Calculus II	4
! PHYS 1610 & PHYS 1620	University Physics I and University Physics I Laboratory	4
CVNG 1000	Intro to Civil Engineering	2
CVNG 1001	Civil Engineering Modeling	2
CORE 1600	Ultimate Questions: Theology	3
CORE	Equity and Global Identities: Identities in Context	3
Credits		18
Year Two		
Fall		
CVNG 2100	Statics	3
CVNG 2020	GIS and Surveying in Civil Engineering Lab	1
CVNG 2070	Construction & Project Management	3
CVNG 2500	Civil Engineering Computing	3
CORE 3400	Ways of Thinking: Aesthetics, History, and Culture	3
MATH 2530	Calculus III	4
Credits		17
Spring		
MATH 3550	Differential Equations	3
STAT 3850	Foundation of Statistics	3
Science Elective with Lab ³		4
CVNG 3105X	Mechanics of Solids	3
Professional Development Elective		3
CORE 2500	Cura Personalis 2: Self in Contemplation	0
CORE	Eloquentia Perfecta: Creative Expression	1-3
Credits		17-19
Year Three		
Fall		
MENG 3200	Fluid Dynamics	3

! CVNG 3010 & CVNG 3020	Structural Analysis and Structural Analysis Lab	4
! CVNG 3030 & CVNG 3031	Civil Engineering Materials and Civil Engineering Materials Laboratory	3
! CVNG 3040 & CVNG 3041	Sustainability and Environmental Engineering and Sustainability and Environmental Engineering Lab	4
CORE	Eloquentia Perfecta: Writing Intensive	0-3
Credits		14-17

Spring

! CVNG 3090 & CVNG 3100	Geotechnical Engineering and Geotechnical Engineering Lab	4
! CVNG 3110 & CVNG 3120	Transportation Engineering and Transportation Engineering Lab	4
! CVNG 3130 & CVNG 3140	Hydraulic Engineering and Hydraulic Engineering Lab	4
! CVNG 3150 & CVNG 3160	Intro to Structural Design and Structural Design Lab	4
CORE	Equity and Global Identities: Dignity, Ethics, and a Just Society	0-3
Credits		16-19

Year Four**Fall**

CVNG 4500	Capstone Design I	3
Civil Engineering Elective		3
Civil Engineering Elective		3
Professional Development Elective		3
CORE 1700	Ultimate Questions: Philosophy	3
CORE 4500	Reflection-in-Action	0
CORE 3500	Cura Personalis 3: Self in the World	1
CORE	Equity and Global Identities: Global Interdependence	0-3
Credits		16-19

Spring

CVNG 4510	Capstone Design II	3
Civil Engineering Elective		3
Civil Engineering Elective		3
Professional Development Elective		3
CORE	Ways of Thinking: Social and Behavioral Sciences	3
CORE 4000	Collaborative Inquiry	2-3
Credits		17-18
Total Credits		132-144

- BIOL 1260 General Biology: Transformations of Energy and Matter/
BIOL Principles of Biology II Laboratory
- EAS 1080 Introduction to Environmental Science/EAS 1081
Introduction to Environmental Science Laboratory
- EAS 1420 Introduction to Atmosphere Science/EAS 1425
Introduction to Atmospheric Science Lab
- EAS 1430 Introduction to Solid Earth/EAS 1435 Introduction to
Solid Earth Lab
- EAS 1450 Introduction to Oceanography/Introduction to
Oceanography Lab.

Code	Title	Credits
Infrastructure Analysis and Design		
CVNG 4030	Foundation Engineering	3
CVNG 4050	Advanced Structural Analysis	3
CVNG 4070	Structural Dynamics	3
CVNG 4090	Advanced Reinforced Concrete	3
CVNG 4110	Advanced Steel Design	3
CVNG 4130	Bridge Engineering	3
CVNG 4150	Prestressed Concrete	3
CVNG 4170	Seismic Design	3
Environmental and Water Resources Engineering		
CVNG 4250	Water Treatment Processes	3
CVNG 4260	Environmental Solutions in Developing Countries	3
CVNG 4330	Open-Channel Flow	3
CVNG 4350	Hydraulic Modeling	3
CVNG 4370	River Engineering	3
Transportation Engineering		
CVNG 4450	Traffic Engineering	3
CVNG 4460	Multimodal Roadway Safety	3
CVNG 4470	Urban Transportation Planning	3

¹ Students must meet the required Math Index before enrolling in MATH 1510 Calculus I (0,4 cr).

² Requires one year of high school chemistry with a grade of "C" or better and Pre-Calculus placement.

³ The 4 credit Science elective must be a 3 credit lecture plus 1 credit lab from the list of pre-approved courses. The 4 credit Science elective may not be a chemistry or physics course. Pre-approved courses include:

- BIOL 1240 General Biology: Information Flow and Evolution/BIOL 1245 Principles of Biology I Laboratory