

CIVIL ENGINEERING, B.S.

The civil engineering program offered at Saint Louis University's Parks College of Engineering, Aviation and Technology is future-focused, incorporating the latest trends in civil engineering to address the current and future needs of the profession and society.

Graduates are well-prepared to enter professional practice and have the comprehensive skill set and leadership background needed to address society's needs at the local, regional and global level. SLU's civil engineering curriculum emphasizes professional practice preparation using project-based, hands-on learning methods.

Some of the student organizations available for civil engineering majors to join include:

- American Society of Civil Engineers: A distinguished professional organization representing the civil engineering profession.
- Engineers Without Borders: Uses engineering as a way to help improve the lives of those living in economically developing nations.

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 structural, environmental, geotechnical, hydraulic and transportation engineering.

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

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

- Green and sustainable design
- Infrastructures design, evaluation and restoration
- Transportation planning, modeling and design
- Hydraulic and water resources modeling and design

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 are very active in research and there are many opportunities for students to help conducting 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 Parks College.

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

Freshman

Begin your application for this program at www.slu.edu/apply. Saint Louis University also accepts the Common App.

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 course work is a primary concern in reviewing a freshman applicant's file. College admission test scores (ACT or SAT) are used as an additional indicator of the student's ability to meet the academic rigors of Saint Louis University and are used as qualifiers for certain University scholarship programs. To be considered for admission to any Saint Louis University undergraduate program, the applicant must be graduating from an accredited high school or have an acceptable score on the General Education Development (GED) test.

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

Transfer

Begin your application for this program at www.slu.edu/apply.

Applicants must be a graduate of an accredited high school or have an acceptable score on the GED. An official high school transcript and official test scores are required only of those students who have attempted fewer than 24 transferable semester credits (or 30 quarter credits) of college credit. Those having completed 24 or more of college credit need only submit a transcript from 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.

International Applicants

Begin your application for this program at www.slu.edu/apply.

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

- Demonstrate English Language Proficiency (<http://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, Parks College engineering programs have the following additional requirements:

- GPA: Minimum cumulative 3.00 high school GPA for freshmen applicants and 2.70 college GPA for transfer applicants.
- ACT/SAT: ACT composite score of 24 or higher, or SAT composite score of 1160 or higher. ACT sub scores minimums of 22 in English, 24 in Mathematics, 22 in Reading Comprehension and 22 in Scientific Reasoning, or SAT Math sub score of 620.
- 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 requirements to Parks College of Engineering, Aviation and Technology degree programs are 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: awarded based on academic achievement, service, leadership and financial need.
- Financial Aid: provided in the form of grants and loans, some of which require repayment.

For priority consideration for merit-based scholarships, applicants should 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://finaid.slu.edu>.

Accreditation

The Aerospace Engineering, Biomedical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Physics 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/parks/pdfs/civil-engineering-enrollment-and-graduation-data.pdf>)

Learning Outcomes

The undergraduate civil engineering program is accredited by the Engineering Accreditation Commission of ABET (<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 apply knowledge of four technical areas appropriate to civil engineering;
9. an ability to explain basic concepts in management, business, public policy, and leadership; and explain the importance of professional licensure.

Requirements

Code	Title	Credits
Basic Science and Mathematics		
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory	4
PHYS 1610 & PHYS 1620	Engineering Physics I and Engineering 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
Math/Science Electives		
	Select seven credits in Math or Science ¹	7
Written and Oral Communication		
ENGL 1920	Advanced Writing for Professionals	3
CMM 2200	Small Group Presentation	1
Liberal Arts		
THEO 1000	Theological Foundations	3
PHIL 3400	Ethics & Engineering	3
	Humanistic Values Electives ²	6
	Cultural Diversity Elective ³	3
Engineering Science Courses		
ESCI 2100	Statics	3
ESCI 2150	Dynamics	3
ESCI 3100 & ESCI 3101	Mechanics of Solids and Mechanics of Solids Lab	4
ESCI 3200 & ESCI 3201	Fluid Dynamics and Fluid Dynamics Laboratory	4
Civil Engineering Courses		
CVNG 1010	Freshman Engineering I	1
CVNG 1020	Freshman Engineering II	1
CVNG 1500	Civil Engineering Computing	3
CVNG 2010 & CVNG 2020	GIS and Surveying in Civil Engineering and GIS and Surveying in Civil Engineering Lab	4
CVNG 3010 & CVNG 3020	Structural Analysis and Structural Analysis Lab	4
CVNG 3030	Civil Engineering Materials	3
CVNG 3040 & CVNG 3041	Sustainability and Environmental Engineering and Sustainability and Environmental Engineering Lab	4
CVNG 3070	Engineering Project Management	2
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
Civil Engineering Electives		

Select nine (9) credits of Civil Engineering Electives are required from the available offerings above a 3000 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 4190	Sustainable Land Development Engineering
CVNG 4210	Sustainable Water Resources Management
CVNG 4330	Open-Channel Flow
CVNG 4350	Hydraulic Modeling
CVNG 4370	River Engineering
CVNG 4450	Traffic Engineering
CVNG 4470	Urban Transportation Planning

Professional Development Electives

Select six (6) credits of Professional Development Electives are required, 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. ⁴

Total Credits 125

¹ The Math and Science elective cannot be a prerequisite course for required courses in the curriculum. Either BIOL 1240 Principles of Biology I (3 cr)/BIOL 1245 Principles of Biology I Laboratory (1 cr) or an EAS course (or both) must be taken to satisfy the ABET basic science requirement.

Acceptable EAS courses include: EAS 1010 Earth Systems I-The Solid Earth (3 cr)/EAS 1020 Earth's Environment I Lab (1 cr), EAS 1030 Earth's Dynamic Environment II (3 cr)/EAS 1040 Earth's Environment II Lab (1 cr), EAS 1050 Introduction to Oceanography (1,3 cr), EAS 1090 Climate Change (3 cr), EAS 2300 Geology for Engineers (3 cr), EAS 2110 Meteorological Analysis (3 cr), EAS 2440 Atmospheric Processes and Systems (3 cr), or EAS 2530 Fundamentals of Climate Systems (3 cr).

Courses for non-science majors and engineering courses will not be accepted. Contact the Faculty Mentor for approval of the Math/Science Electives choices.

² Humanistic Values courses shall be chosen from: Humanities or Social & Behavioral Science.

Humanities courses include: Fine Arts (excludes applied, studio, and performance courses), Literature, History, American Studies and Foreign Languages (excludes English or native language), Philosophy, or Theology.

Social & Behavioral Sciences courses (3-credit) include: Anthropology, Communication, Communication Sciences and Disorders, Economics, Education, Political Science, Psychology, Social Work, Sociology, Criminology and Criminal Justice and Public Health

³ Cultural Diversity elective courses must be selected from an approved Arts & Sciences list. See the description of the Parks College core above for more information.

⁴ Six (6) credits of Professional Development Electives are required, typically upper level. Courses 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.

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		
!CVNG 1010	Freshman Engineering I ¹	1
CHEM 1110 & CHEM 1115	General Chemistry 1 and General Chemistry 1 Laboratory ²	4
ENGL 1920	Advanced Writing for Professionals ³	3
MATH 1510	Calculus I ⁴	4
THEO 1000	Theological Foundations	3
Credits		15
Spring		
!CVNG 1020	Freshman Engineering II	1
!CVNG 1500	Civil Engineering Computing	3
MATH 1520	Calculus II	4
PHYS 1610	Engineering Physics I	3
PHYS 1620	Engineering Physics I Laboratory	1
Humanistic Values Elective ⁵		3
Credits		15
Year Two		
Fall		
! CVNG 2010 & CVNG 2020	GIS and Surveying in Civil Engineering and GIS and Surveying in Civil Engineering Lab	4
CMM 2200	Small Group Presentation	1
Science Elective ⁶		4
ESCI 2100	Statics	3
MATH 2530	Calculus III	4
Credits		16
Spring		
ESCI 2150	Dynamics	3
ESCI 3100 & ESCI 3101	Mechanics of Solids and Mechanics of Solids Lab	4
MATH 3550	Differential Equations	3
STAT 3850	Foundation of Statistics	3

Math/Science Elective ⁷		3
Credits		16
Year Three		
Fall		
! CVNG 3010 & CVNG 3020	Structural Analysis and Structural Analysis Lab	4
!CVNG 3030	Civil Engineering Materials	3
! CVNG 3040 & CVNG 3041	Sustainability and Environmental Engineering and Sustainability and Environmental Engineering Lab	4
!CVNG 3070	Engineering Project Management	2
ESCI 3200 & ESCI 3201	Fluid Dynamics and Fluid Dynamics Laboratory	4
Credits		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
Credits		16
Year Four		
Fall		
!CVNG 4500	Capstone Design I	3
PHIL 3400	Ethics & Engineering	3
Civil Engineering Elective ⁸		3
Civil Engineering Elective ⁸		3
Professional Development Elective ⁹		3
Credits		15
Spring		
!CVNG 4510	Capstone Design II	3
Cultural Diversity Elective ¹⁰		3
Humanistic Values Elective ⁵		3
Civil Engineering Elective ⁸		3
Professional Development Electives ⁹		3
Credits		15
Total Credits		125

¹ ESCI 1010 Freshman Engineering I (1 cr), MENG 1001 Introduction to Aerospace & Mechanical Engineering (1 cr) or MENG 1002 Computer-Aided Engineering Design (1 cr) are acceptable for transfer credit. External transfer students may substitute with equivalent course transferred.

² Requires one year of high school chemistry with a grade of "C" or better and Pre-Calculus placement. Transfer credit can be given for CHEM 1070/1075.

³ Enrollment in this course is based on your SAT or ACT score in English. Students can take ENGL 1900 Advanced Strategies of Rhetoric and Research (3 cr) in lieu of ENGL 1920 Advanced Writing for Professionals (3 cr).

4 Student must meet the required Math Index before enrolling in MATH 1510 Calculus I (4 cr).

5 Courses shall be chosen from Philosophy, Theology, Social and Behavioral Sciences, or Humanities (guidelines below):
Social & Behavioral Sciences - A course in Anthropology, Communications, Communication Disorders, Economics, Education, Political Science, Psychology, Sociology, Social Work or Public Policy Studies.

Humanities - Courses include: Fine Arts (excludes applied, studio, and performance courses), Literature, History, and Foreign Languages (excludes English or native language).

Social & Behavioral Sciences - Courses (3-credit) include: Anthropology, Communication, Communication Disorders, Economics, Education, Political Science, Psychology, Social Work, Sociology, Criminal Justice, and Public Policy Studies (excludes field service courses).

6 These electives shall satisfy the ABET basic science requirements, which require at least one of these electives to be other than Math, Physics or Chemistry. The 4-credit science elective must be a lab course selected from the following list:

- BIOL 1240 Principles of Biology I (3 cr) and BIOL 1245 Principles of Biology I Laboratory (1 cr)
- EAS 1010 Earth Systems I-The Solid Earth (3 cr) and EAS 1020 Earth's Environment I Lab (1 cr)
- CHEM 1120 General Chemistry 2 (0,3 cr) and CHEM 1125 General Chemistry 2 Laboratory (1 cr)
- EAS 1030 Earth's Dynamic Environment II (3 cr) and EAS 1040 Earth's Environment II Lab (1 cr)
- PHYS 1630 Engineering Physics II (3 cr) and PHYS 1640 Engineering Physics II Laboratory (1 cr)

7 The 3-hour Math/Science elective must be sophomore level engineering student. Example courses include:

- EAS 1050 Introduction to Oceanography (1,3 cr)
- EAS 1090 Climate Change (3 cr)
- EAS 2110 Meteorological Analysis (3 cr)
- EAS 2300 Geology for Engineers (3 cr)
- EAS 2440 Atmospheric Processes and Systems (3 cr)
- EAS 2530 Fundamentals of Climate Systems (3 cr)
- MATH 3110 Linear Algebra for Engineers (3 cr)
- MATH 3240 Numerical Analysis (3 cr)
- PHYS 1130 Introduction to Astronomy (1,3 cr)

Courses for non-science majors and engineering courses will not be accepted.

8 Select nine (9) credits of Civil Engineering Electives are required from the available offerings above a 3000 level courses in our program.

9 Six (6) credits of Professional Development Electives are required, typically upper level. Courses 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.

CVNG 4150	Prestressed Concrete	3-6
Environmental and Sustainable Engineering		
CVNG 4190	Sustainable Land Development Engineering	3
CVNG 4210	Sustainable Water Resources Management	3
CVNG 4330	Open-Channel Flow	3
Transportation Analysis, Planning, and Design		
CVNG 4130	Bridge Engineering	3
CVNG 4450	Traffic Engineering	3
CVNG 4470	Urban Transportation Planning	3
Water Resources		
CVNG 4350	Hydraulic Modeling	3
CVNG 4370	River Engineering	3
EAS 4190	Geospatial Methods in Environmental Studies	1,3
EAS 4260	Environmental Geophysics	3

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