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. The 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

The civil engineering program provides a solid foundation of coursework in the engineering sciences, including structural, environmental, geotechnical, hydraulic and transportation engineering. Solid mechanics, fluid sciences and graphics are also covered.

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

The 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, students are exposed to entrepreneurship and the entrepreneurial mindset through the curriculum and extracurricular opportunities.

Fieldwork and Research Opportunities

Benefits of the civil engineering program include several internship and career opportunities. Competitive summer internships and cooperative education programs 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, students gain 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, the 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.

Modern and well-equipped laboratories emphasize experimental methods and measurement techniques. The civil engineering laboratory facilities include a variety of equipment. In addition to the existing laboratory facilities in Oliver Hall, such as universal testing machines, vibration apparatus, and fluid dynamics laboratory; additional facilities include: soil mechanics, environmental, and construction materials testing laboratories. Students in the 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

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 rigor 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.

Transfer

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 rigor of Saint Louis University.

International Applicants

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

- Demonstrate English Language Proficiency (http://catalog.slu.edu/previous-catalogs/2018-2019/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

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- 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 http://finaid.slu.edu.

Accreditation

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:

a. an ability to apply knowledge of mathematics, science, and engineering;
b. an ability to design and conduct experiments, as well as to analyze and interpret data;
c. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
d. an ability to function on multi-disciplinary teams;
e. an ability to identify, formulate, and solve engineering problems;
f. an understanding of professional and ethical responsibility;
g. an ability to communicate effectively;
h. the broad education necessary to understand the impact of engineering solutions in a global and societial context;
i. a recognition of the need for, and an ability to engage in life-long learning;
j. a knowledge of contemporary issues;
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice;
l. apply knowledge of four technical areas appropriate to civil engineering;
m. explain basic concepts in management, business, public policy, and leadership; and explain the importance of professional licensure.

Requirements

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<td>and Engineering Physics I Laboratory</td>
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<td>MATH 1520</td>
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<tr>
<td>MATH 2530</td>
<td>Calculus III</td>
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</tbody>
</table>
Some of the available civil engineering electives are:

the available offerings above a 3000 level courses in our program.

Select nine (9) credits of Civil Engineering Electives are required from

CVNG 4510
CVNG 4500
& CVNG 3160
CVNG 3150
& CVNG 3120
CVNG 3110
& CVNG 3100
CVNG 3090
& CVNG 3041
CVNG 3070
& CVNG 3100
CVNG 3040
& CVNG 3130
CVNG 3030
& CVNG 3020
CVNG 3010
& CVNG 3010
CVNG 1010
CVNG 1020
CVNG 1500
CVNG 2010
& CVNG 2020
CVNG 3010
& CVNG 3020
CVNG 3030
& CVNG 3040

Civil Engineering Courses

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

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.

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

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.

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.

Theoretical Foundations

Ethics & Engineering

Humanistic Values Electives

Cultural Diversity Elective

Civil Engineering Courses

ESCI 2100
Statics

ESCI 2150
Dynamics

ESCI 3100
Mechanics of Solids

& ESCI 3101
and Mechanics of Solids Lab

ESCI 3200
Fluid Dynamics

& ESCI 3201
and Fluid Dynamics Laboratory

Civil Engineering Courses

CVNG 1010
Freshman Engineering I

CVNG 1020
Freshman Engineering II

CVNG 1500
Civil Engineering Computing

CVNG 2010
GIS and Surveying in Civil Engineering

& CVNG 2020
and GIS and Surveying in Civil Engineering Lab

CVNG 3010
Structural Analysis

& CVNG 3020
and Structural Analysis Lab

CVNG 3030
Civil Engineering Materials

CVNG 3040
Sustainability and Environmental Engineering

& CVNG 3041
and Sustainability and Environmental Engineering Lab

CVNG 3070
Engineering Project Management

CVNG 3090
Geotechnical Engineering

& CVNG 3100
and Geotechnical Engineering Lab

CVNG 3110
Transportation Engineering

& CVNG 3120
and Transportation Engineering Lab

CVNG 3130
Hydraulic Engineering

& CVNG 3140
and Hydraulic Engineering Lab

CVNG 3150
Intro to Structural Design

& CVNG 3160
and Structural Design Lab

CVNG 4500
Capstone Design I

CVNG 4510
Capstone Design II

Civil Engineering Electives

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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

Total Credits

3

3

3

4

4

4

4

4

4

4

4

3

3

9

6

125

1

2

3

4

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:

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and Disorders, Economics, Education, Political Science,

Psychology, Social Work, Sociology, Criminology and Criminal Justice

and Public Health

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.

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.

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<thead>
<tr>
<th>Course</th>
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<td>Humanistic Values Elective</td>
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<td><strong>Year Two</strong></td>
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<td>GIS and Surveying in Civil Engineering and GIS and Surveying in Civil Engineering Lab</td>
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<td>CMM 2200</td>
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<td>Structural Analysis and Structural Analysis Lab</td>
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<td>!CVNG 3030</td>
<td>Civil Engineering Materials</td>
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<td>!CVNG 3040 &amp; CVNG 3041</td>
<td>Sustainability and Environmental Engineering and Sustainability and Environmental Engineering Lab</td>
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<td>!CVNG 4500</td>
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<td>PHIL 3400</td>
<td>Ethics &amp; Engineering</td>
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<td>Civil Engineering Elective</td>
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<td>Professional Development Elective</td>
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<td>Civil Engineering Elective</td>
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<td><strong>Total Credits</strong></td>
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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 Writing for Professionals (3 cr).
4. Student must meet the required Math Index before enrolling in MATH 1510 Calculus I (4 cr).
Courses shall be chosen from Philosophy, Theology, Social and Behavioral Sciences, or Humanities (guidelines below):


**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).

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 (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)

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.

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

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.

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<td>CVNG 4190</td>
<td>Sustainable Land Development Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CVNG 4210</td>
<td>Sustainable Water Resources Management</td>
<td>3</td>
</tr>
<tr>
<td>CVNG 4330</td>
<td>Open-Channel Flow</td>
<td>3</td>
</tr>
</tbody>
</table>

**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