Bachelor of Science in Civil Engineering

B.S. in Civil Engineering Program

Civil engineering (CE), the oldest and broadest of the divisions of engineering, implements a range of public and private projects for improving society's physical infrastructure and the environment. The civil engineer integrates scientific principles with engineering experience to plan, design, and construct networks of highways and railroads, airports, bridges and dams, environmental pollution control systems, industrial structures, water purification and distribution systems, and urban transportation systems that maintain, protect, and enhance the quality of life. Civil engineers are trained to consider the social effects as well as the physical and environmental factors that constrain the planning, design, construction, and operation of their projects. Environmental engineering, a technical specialization with its origins in civil engineering, is a growing discipline dedicated to the protection of the environment.

The undergraduate program gives students the theoretical background, instruction in engineering application of scientific principles, and professional attitude to serve the public. It typically leads to entry-level positions or to graduate work in technical specialties (e.g., environmental, geotechnical, structural, and transportation), business administration, or other professions.

Courses that address the behavior and design of steel and reinforced concrete structures, environmental pollution, control systems, water resources systems, foundations, and surface transportation systems are integrated into the curriculum, culminating in a series of senior-level professional design courses. These simulate the design processes used in the major areas of civil engineering and prepare students for entry-level positions. Most faculty members are licensed professional engineers. KU graduates have successful records in professional practice, research in academic institutions, government and private laboratories, and in managing firms and corporations of all sizes.

B.S. CE Mission Statement

Graduates who pursue a career in Civil Engineering will be successfully engaged in professional engineering practice or graduate study in the analysis, design, construction, and operation of public and private infrastructure systems.

Accreditation

The Bachelor of Science in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org.

Combined Civil Engineering and Business Program

A student who wants to combine engineering with business may enroll in a program leading to a B.S. degree in both fields. Full-time enrollment enables the student to earn the two degrees in 5 years. During the first 2 years, the student enrolls in the School of Engineering. After that, the student enrolls simultaneously in the schools of Engineering (http://www.engr.ku.edu/) and Business (https://business.ku.edu/).

Careers

Professional Registration and Licensing

Engineers are involved in projects that directly affect the health and safety of the public. Graduates are strongly encouraged to become registered Professional Engineers. This involves completing a B.S. degree in civil engineering, passing the Fundamentals of Engineering (FE) and Professional Engineering (PE) examinations, and obtaining four years of satisfactory engineering experience under the supervision of a professional engineer. Students in civil engineering must take the FE examination before graduation.

Professional Opportunities

Civil engineers plan, design, construct, and oversee public and private infrastructure systems as well as maintain essential structures such as bridges, buildings, tunnels, roads, and water supply and sewage systems. Civil engineers typically work for major industrial and commercial centers, construction industry, state departments of transportation, manufacturing companies, oil or electrical companies, aerospace industries, or consulting firms.

Undergraduate Admission to the School of Engineering

Admission to the KU School of Engineering (and its degree programs) is selective. Students may be admitted to an engineering or computer science degree program (https://engr.ku.edu/2021-curriculum-guide-links/) as freshmen (first year) students, but all admissions, for both in-state and out-of-state students, are selective. Applications are judged on several factors, such as high school record, scores on national tests, academic record at college or university level, and trend of grades and more. High school transcripts are required.

Minimum Academic Standards for Admission to the School of Engineering

To be considered for admission to the School of Engineering, beginning first-year students must meet or exceed the following minimum standards:

- Must be admissible (https://admissions.ku.edu/major-specific-requirements/) to the University of Kansas by assured admissions or individual review, AND
- Have a 3.0+ high school GPA, AND
- Demonstrate mathematics preparedness by:
  - Obtaining a mathematics ACT score of 22+ (or math SAT score of 540+), or
  - Achieving a 'B' or better in 'college algebra' or a more advanced mathematics course, or
  - Achieving a 'C' or better in a high school calculus course; or
  - Earning credit via IB or AP credit for the above-mentioned courses in accordance with KU placement credit requirements; or
  - Achieving at minimum a qualifying score for MATH 104 on the ALEKS mathematics placement exam.

Minimum Academic Standards for Direct Admission into Degree Program for incoming Freshmen

Students with a 26+ Math ACT (600+ Math SAT) or meet eligibility requirements for MATH 125 (Calculus I) (https://catalog.ku.edu/liberal-

arts-sciences/math/#undergraduatetext) may be admitted directly into their chosen major, with the exception of those seeking admission into the Electrical Engineering, Computer Science, Computer Engineering, and Interdisciplinary Computing (EECS) majors. For EECS program admission, students must:

- Be admissible (https://admissions.ku.edu/major-specific-requirements/) to the University of Kansas by assured admissions or individual review, AND
- Have a 3.0+ high school GPA, AND
- Demonstrate mathematics preparedness by:
  - Obtaining a mathematics ACT score of 28+ (or math SAT score of 660+), or
  - Achieving a 'C' or better in a high school calculus course; or
  - Earning credit via IB or AP credit for the above-mentioned course in accordance with KU placement credit requirements; or
  - Achieving at minimum a qualifying score for MATH 125 on the ALEKS mathematics placement exam.

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Students who are not admissible to their desired major are
 admitted to the School of Engineering as undecided engineering
 undergraduate students.
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Exploring Engineering

Students not admitted directly to the School of Engineering or their major but who are admissible to the university may be admitted to the College of Liberal Arts and Sciences as an Undecided student. They can later re-apply to the School of Engineering during the semester they are completing the admission requirements for transfer students.

Transfer Admission Standards

Applications from all transfer students, whether from other institutions or from other academic schools at the University of Kansas, are evaluated on a case-by-case basis. Transfer students must be admissible (http://admissions.ku.edu/apply/requirements/ustransfer/) to KU **AND** have a cumulative college transferable grade-point average of 2.5+ to be considered. In addition, students must have grades of "C" or better in those courses in math (must include MATH 125 Calculus I or equivalent), science, and engineering applicable to the engineering degree.

Current KU Students admitted to other academic units may apply to the School of Engineering by completing a Change of School form (https://inowformsprivate.ku.edu/imagenowforms/fs/?form=OUR%20Change%20of%20School%20Form).

Already Applied to KU, But Not Engineering?

Don't worry. It's not too late to change your mind if you've already applied to KU and selected a major outside the School of Engineering. If you think one of the 12 engineering or computer science majors is a better fit for your talents, you can still change your requested major — preferably before May 1 — and be considered for admission to the School of Engineering and all the benefits that go with it.

To update your application, visit Undergraduate Admissions (http://admissions.ku.edu/update-your-application/) and click on "Change application term, major, mailing address, and/or email address."

Please contact a member of our recruitment team (studyengineering@ku.edu), 785-864-3881, if you have any difficulty.

Application Deadlines For New Freshman and Transfer Applicants

September 15	Priority deadline for current KU students to apply for spring admission to Engineering.
November 1	Final deadline for scholarship consideration for incoming freshmen planning to enter in fall or summer semesters.
December 1	Final deadline to apply for the Self Engineering Leadership Fellows Program for incoming freshmen
February 1	Final deadline for scholarship consideration for transfer students planning to enter in fall or summer semesters. Applications available for the Engineering Learning Community
February 15	Priority deadline for current KU students to apply for summer or fall admission to Engineering.
May 1	Enrollment Deposit due.

Civil Engineering (general emphasis) 4-Year Graduation Plan

The following are recommended enrollments:

Freshman

Fall	Hours	Spring	Hours
CE 191	2	ARCE 217	3
ENGL 101 (KU Core GE 2.1)	3	ENGL 102 (KU Core GE 2.1)	3
MATH 125 (KU Core GE1.2)	4	MATH 126	4
CHEM 150 (KU Core GE 3N)	5	PHSX 210 (KU Core GE 1.1)	3
Basic Science Elective	3	PHSX 216	1
		COMS 130	3
	17		**17**

Sophomore

Fall	Hours	Spring	Hours
MATH 127	4	CE 240	3
PHSX 212	3	CE 310	4
PHSX 236	1	EECS 137 or 138	3

CE 260	5	MATH 220	3
Elective KU Core GE 3A&H, AE 4.1, AE 4.2, or AE 5.1	3	MATH 290	2
	16		**15**

Junior

Fall	Hours	Spring	Hours
CE 330	3	CE 455	3
CE 331	1	CE 477 or 484	3
CE 412 or 477	3	CE 480	3
CE 461	4	CE 487	4
MATH 526 or CE 525	3	ECON 104 (or ECON 142 or ECON 144)	4
Basic Engineering Science Elective	3		
	17		**17**

Senior

Fall	Hours	Spring	Hours
CE 562 or 563 (KU Core AE 61)	3	CE 563 or 562 (KU Core AE 6.1)	3
CMGT 457	3	CE 501	3
Civil Engineering Design Elective	4	Civil Engineering Design Elective	3
Civil Engineering Design Elective	3	Elective KU Core GE 3A&H, AE 4.1, AE 4.2, or AE 5.1	3
Elective KU Core GE 3A&H, AE 4.1, AE 4.2, or AE 5.1	3	General Electives (not required for Environmental emphasis when student takes ECON 104)	1
		Fundamentals of Engineering Exam	0
	16		**13**

Total Hours 128

Bachelor of Science in Civil Engineering Degree Requirements

Students take required courses and select electives that best fulfill their personal goals from the following general areas of study. A total of 128 credit hours is required for graduation.

Code	Title	Hours
Mathematics		
MATH 125	Calculus I (KU Core GE 1.2)	4
MATH 126	Calculus II	4
MATH 127	Calculus III	4
MATH 220	Applied Differential Equations	3
MATH 290	Elementary Linear Algebra	2
MATH 526	Applied Mathematical Statistics I	3
or CE 625	Applied Probability and Statistics	
Basic Sciences		
PHSX 210	General Physics I for Engineers (KU Core GE 1.1)	3
PHSX 216	General Physics I Laboratory	1
PHSX 212	General Physics II	3
PHSX 236	General Physics II Laboratory	1
CHEM 150	Chemistry for Engineers (KU Core GE 3N)	5
Science elective (minimum of 3 hours). Select one of the following:		3
General Civil Engineering students select from:		
GEOL 101	The Way The Earth Works	
GEOL 105	History of the Earth	
GEOL 351	Environmental Geology	
Approved physics or chemistry elective		
Environmental Engineering students select from:		
ATMO 105	Introductory Meteorology	
ATMO 521	Microclimatology	
BIOL 100	Principles of Biology	
BIOL 400	Fundamentals of Microbiology	
BIOL 414	Principles of Ecology	
BIOL 661	Ecology of Rivers and Lakes	
CHEM 530	Physical Chemistry I	
EVRN 148	Scientific Principles of Environmental Studies	3
GEOG 358	Introduction to Geographic Information Systems	
GEOG 521	Microclimatology	
GEOL 101	The Way The Earth Works	
GEOL 302	Oceanography	
GEOL 351	Environmental Geology	
KU Core Component		
Written Communication (KU Core GE 2.1)		6
COMS 130	Speaker-Audience Communication (or any other GE2.2 course)	3
Economics electives, Select one of the following:		3-4
ECON 104	Introductory Economics (KU Core GE 3S)	
ECON 142	Principles of Microeconomics (KU Core GE 3S)	
ECON 144	Principles of Macroeconomics (KU Core GE 3S)	
KU Core GE 3H Arts & Humanities		3
KU Core AE 4.1 Human Diversity		3
KU Core AE 4.2 Global Awareness		3
KU Core AE 5 Ethics & Social Responsibility		3
Basic Engineering Sciences		
Select one of the following:		5
CE 201 & CE 250	Statics and Dynamics	
CE 260	Statics and Dynamics	5
CE 310	Strength of Materials	4
CE 330	Fluid Mechanics	3
CE 331	Fluid Mechanics Lab	1
CMGT 457	Construction Project Management	3
ARCE 217	Computer-Assisted Building Design	3
Computer Programming Elective		
EECS 138	Introduction to Computing: _____ (C++, Fortran, or Matlab) *	3
or EECS 137	Visual Basic for Engineers	
Engineering Science (select one of the following)		**3**
ARCE 315	Electric Circuits and Machines	
or EECS 316	Circuits, Electronics and Instrumentation	
ME 212	Basic Engineering Thermodynamics	3
ARCE 350	Building Materials Science	

or ME 306	Science of Materials
CE 571	Environmental Engineering Laboratory

*EECS 137 is preferred; EECS 138 Web option is not allowed.

Undergraduate Concentrations

Students may identify broad concentrations in either general civil engineering or environmental engineering. Within these, students may choose elective courses to permit additional exposure to selected areas of civil or environmental engineering such as transportation, structural, geotechnical, environmental, and water resources engineering. In environmental engineering, electives may be selected to focus on water quality and treatment, bioremediation, solid and hazardous wastes, air quality, and air pollution control.

Civil and Environmental Engineering Sciences and Introduction to Design

Code	Title	Hours
General Civil Engineering Option		
CE 240	Geomatics	3
CE 455	Hydrology	3
CE 461	Structural Analysis	4
CE 477	Introduction to Environmental Engineering and Science	3
CE 487	Soil Mechanics	4
CE 480	Introduction to Transportation Engineering	3
CE 484/684	Materials for Transportation Facilities	3
or CE 412	Structural Engineering Materials	

Code	Title	Hours
Environmental Engineering Option		
CE 240	Geomatics	3
CE 455	Hydrology	3
CE 461	Structural Analysis	4
CE 477	Introduction to Environmental Engineering and Science	3
CE 487	Soil Mechanics	4
CE 484/684	Materials for Transportation Facilities	3
or CE 412	Structural Engineering Materials	

Engineering Analysis and Design

General Civil Engineering Concentration (16 hours)

Code	Title	Hours
Structural Engineering Design		
CE 562	Design of Steel Structures (KU Core AE 6)	3
CE 563	Design of Reinforced Concrete Structures	3
Water Resources and Environmental Engineering		
CE 576	Municipal Water Supply and Wastewater Treatment (KU Core AE 6)	4
or CE 552	Water Resources Engineering Design	
Elective Courses		
Select two of the following:		6
CMGT 500	Construction Engineering	
CE 582	Highway Engineering	
CE 588	Foundation Engineering	
CE 576	Municipal Water Supply and Wastewater Treatment (if not taken as Water Resources and Environmental Elective)	
CE 552	Water Resources Engineering Design (if not taken as Water Resources and Environmental Elective)	

Environmental Engineering Concentration (20 hours)

Code	Title	Hours
Water Resources and Environmental Engineering		
CE 552	Water Resources Engineering Design	4
CE 576	Municipal Water Supply and Wastewater Treatment	4
Structural Design Elective		
CE 562	Design of Steel Structures (KU Core AE 6)	3
or CE 563	Design of Reinforced Concrete Structures	
Civil Engineering Design Elective		
Select one of the following:		3
CMGT 500	Construction Engineering	
CE 582	Highway Engineering	
CE 588	Foundation Engineering	
Environmental Engineering Principles Elective		
Select one of the following:		3
CE 570	Concepts of Environmental Chemistry	
CE 573	Biological Principles of Environmental Engineering	
Environmental Design Elective		
Select one of the following:		3
CE 550	Life Cycle Assessment	
CE 574	Design of Air Pollution Control Systems	
CE 755	Open Channel Flow	
CE 757	Pipe-Flow Systems	
CE 775	Stormwater Treatment Systems Design	

Electives in Selected Areas of Emphasis

A student who completes the minimum requirements in each of the four areas of the curriculum will have earned 126-127 hours in the general civil concentration and 127-128 hours in the environmental concentration (depending on the ECON choice). Both concentrations require a total of 128 hours for graduation. The remaining hours may be any courses that qualify for inclusion in one or more of the four curricular areas in accordance to the restrictions outlined below.

The content of an elective course must differ substantially from the content of any course taken to fulfill a degree requirement.

Code	Title	Hours
Suggested Electives		
CE 191	Introduction to Civil Engineering	2
ENGL 362	Foundations of Technical Writing	3

Introductory Courses

CE 191 Introduction to Civil Engineering, ENGR 108 Introduction to Engineering, or an introduction to engineering course from another engineering department will count as an elective course. Credit hours

from only one introduction-to-the-profession course may be applied toward graduation.

Mathematics and Basic Sciences

Students may take elective courses designated as natural sciences and mathematics (N). Elective courses in mathematics must require MATH 126 as a prerequisite. Physics courses numbered below 211 and chemistry courses numbered below 130 are not accepted as general electives.

General Education Courses

Students may take elective courses designated as humanities (H) and social sciences (S). The humanities and social sciences courses are identified in the online timetable and in the Undergraduate Catalog with the letters H for humanities and S for social science courses. Western Civilization courses count as general electives. English courses taken as general electives must have ENGL 102 as a prerequisite. Any communication studies course (COMS) may be taken as a general elective.

Architectural Engineering Courses

Any course number above 300 is acceptable.

Architecture Courses

Up to five credit-hours of building technology and site planning courses numbered 250 or above may be used.

Business Courses

Any course offered by the KU School of Business is acceptable. Business courses offered at other colleges or universities will be accepted only if the courses are substantially equivalent to business courses taught at KU.

Urban Planning Courses

Any course offered by the KU Department of Urban Planning is acceptable.

Graduate Courses in Civil and Environmental Engineering

A student who wishes to study a particular civil engineering area in greater depth can take courses at the 600 or 700 level. The 700-level courses are primarily for graduate students but are open to seniors who have completed the prerequisites. The 700-level courses are not recommended for students with low grade point averages. A student not wishing to specialize can attain a broader background in civil engineering design by taking additional courses beyond the minimum requirements in area IV.

Engineering Courses

Any course offered by the various departments of the School of Engineering is acceptable except AE 241 Private Flight Course and AE 242 Private Flight Aeronautics

Honors Courses

Courses with the honors program designation (HNRS) will be accepted as general electives.

ROTC Courses

Students completing the ROTC program may count a maximum of 6 hours of ROTC courses as general electives. A maximum of six hours of ROTC courses in social sciences or humanities may be counted in excess of the 24 hrs required in the general education area. Up to six hours of ROTC courses may be counted as general electives if related to the physical sciences or engineering, and up to 3 credit hours may be used as electives in engineering technology and design.