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/admission-requirements/) 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.

Freshman Admission Standards to the School of Engineering

To be considered for admission to the School of Engineering, beginning freshmen (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.

Pre-Engineering

Students not admitted directly to the School of Engineering and their department but who are admissible to the university may be admitted to the College of Liberal Arts and Sciences as an pre-engineering student.

They can later re-apply to the School of Engineering during the semester they are completing the admission requirements for transfer students.

Transfer Student Admission Standards to the School of Engineering

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**
- Earn a cumulative college transferable grade-point average of 2.5+, **AND**
- Earn a grade of C or better in MATH 125 (Calculus I, or its direct equivalent), **AND**
- Earn grades of C or better in math, science, and engineering courses applicable to the engineering degree.

Students must also complete their last 30 hours of credit at KU (http://policy.ku.edu/governance/FSRR/#art4sect5).

Current Student Admission Standards to the School of Engineering

Students who are currently enrolled at KU, need to meet the following:

- Earn a 2.5+ KU GPA, **AND**
- Earn a grade of C or better in MATH 125 or its direct equivalent, **AND**
- Earn a grade of C or better in all math, science, and engineering courses.

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). Contact the engineering recruitment team (studyengineering@ku.edu) if you have any questions. Per University Registrar deadlines for processing, Change of School applications for the fall semester will be accepted until the last Friday in October of each school year; Change of School applications for the spring semester will be accepted until the last Friday in March of each school year.

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

November 1	Priority scholarship deadline for incoming freshmen.
December 1	Deadline to apply for the Self Engineering Leadership Fellows Program for incoming freshmen.
May 1	Enrollment Deposit due.
Last Friday in October	Deadline to submit Change of School applications for fall semester admission.
Last Friday in March	Deadline to submit Change of School applications for spring semester admission.

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. Students who are exempt from one or more of the specific requirements below take additional electives in selected areas of emphasis to meet the total credit hour requirement.

Code	Title	Hours
Mathematics		
MATH 125	Calculus I (Core 34: Math and Statistics (SGE)) [030]	4
or MATH 145	Calculus I, Honors	
or MATH 115 & MATH 116	Calculus I and Calculus II	
MATH 126	Calculus II	4
or MATH 146	Calculus II, Honors	
MATH 127	Calculus III	4
or MATH 147	Calculus III, Honors	
MATH 220	Applied Differential Equations	3
or MATH 221	Applied Differential Equations, Honors	
CE 525	Applied Probability and Statistics	3
Basic Sciences		
EPHX 210	General Physics I for Engineers (Core 34: Natural and Physical Sciences (SGE)) [040]	3
or PHSX 211	General Physics I	
or PHSX 213	General Physics I Honors	
or PHSX 114 & PHSX 201	College Physics I and Calculus Supplement to College Physics I	
PHSX 216	General Physics I Laboratory (Core 34: Natural and Physical Sciences (SGE)) [040]	1
or PHSX 213	General Physics I Honors	
PHSX 212	General Physics II	3
or PHSX 214	General Physics II Honors	
or PHSX 115 & PHSX 202	College Physics II and Calculus Supplement to College Physics II	
CHEM 150	Chemistry for Engineers	5
or CHEM 130 & CHEM 149	General Chemistry I and Chemistry for Engineers Supplement	
or CHEM 130 & CHEM 135	General Chemistry I and General Chemistry II	

or CHEM 170 & CHEM 175	Chemistry for the Chemical Sciences I and Chemistry for the Chemical Sciences II	
or CHEM 190 & CHEM 195	Foundations of Chemistry I, Honors and Foundations of Chemistry II, Honors	
Science elective. Natural Science course designated as N and not in CHEM, PHSX, or MATH		3
Economics		
ECON 142	Principles of Microeconomics (Core 34: Social and Behavioral Science (SGE)) [050]	3
or ECON 144	Principles of Macroeconomics	
or ECON 104	Introductory Economics	
Basic Engineering Sciences		
Select one of the following:		5
CE 201 & CE 250	Statics and Dynamics	
CE 260	Statics and Dynamics	
CE 310	Strength of Materials	3
or CE 312	Strength of Materials, Honors	
CE 330	Fluid Mechanics	3
CE 331	Fluid Mechanics Lab	1
CMGT 457	Construction Project Management	3
ARCE 217	Computer-Assisted Building Design	3
EECS 138	Introduction to Computing: _____	3
or CE 320	Numerical Methods for Civil Engineering	
Basic Engineering Science Elective (select one of the following)		3
ARCE 315	Electric Circuits and Machines	
or EECS 316	Circuits, Electronics and Instrumentation	
ME 212	Basic Engineering Thermodynamics	
ARCE 350	Building Materials Science	
or ME 306	Science of Materials	
CE 571	Environmental Engineering Laboratory	
Civil and Environmental Engineering Sciences and Introduction to Design		
CE 101	Introduction to Civil and Environmental Engineering	2
CE 240	Geomatics	3
CE 455	Hydrology	3
CE 461	Structural Analysis	3
CE 477	Introduction to Environmental Engineering and Science	3
or CE 479	Introduction to Environmental Engineering and Science, Honors	
CE 484/684	Materials for Transportation Facilities	3
or CE 412	Structural Engineering Materials	
or CE 413	Structural Engineering Materials, Honors	
CE 487	Soil Mechanics	4
CE 501	Engineering Ethics	2
Technical Elective		
CE Technical Elective*		3

*- The CE Technical Elective is selected from 500-level and above courses in Civil Engineering, Architectural Engineering, or Construction Management not already taken for another requirement, or 600-level and above courses from other engineering departments. Courses not meeting these criteria must be pre-approved by the Undergraduate Program Director. All technical electives must meet ABET criteria for engineering science or design content, and the content of an elective course must differ substantially from the content of any course taken to fulfill a degree requirement.

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. Course requirements specific to each of these degree paths are listed below.

Civil Engineering (No Concentration) Degree Path

Students who do not take the environmental concentration take the following additional courses:

civil and environmental engineering sciences and introduction to design

Code	Title	Hours
CE 480	Introduction to Transportation Engineering	3

engineering analysis and design (15 hours)

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

Environmental Concentration

Students may choose to add the environmental engineering concentration within their civil engineering degree. Within the environmental concentration, students may choose courses to fit their environmental engineering electives based on interests to focus on water quality and treatment, bioremediation, solid and hazardous wastes, air quality, and air pollution control.

Students choosing the Environmental Concentration take the courses listed below in place of those listed under Civil Engineering- no concentration.

Engineering Analysis and Design (18 Hours)

Code	Title	Hours
Water Resources and Environmental Engineering Design		
CE 552	Water Resources Engineering Design	3
Capstone Course		
CE 576	Municipal Water Supply and Wastewater Treatment	3
Structural Engineering Design		
CE 562	Design of Steel Structures	3
or CE 563	Design of Reinforced Concrete Structures	
Civil Engineering Design Elective		
Select one of the following:		
CMGT 500	Construction Engineering	3
CE 582	Highway Engineering	3
CE 588	Foundation Engineering	3
Environmental Engineering Principles Elective		
Select one of the following:		
CE 570	Concepts of Environmental Chemistry	3
CE 573	Biological Principles of Environmental Engineering	3
Environmental Design Elective		
Select one of the following:		
CE 550	Life Cycle Assessment	3
CE 574	Design of Air Pollution Control Systems	3
CE 555	Open Channel Flow	3
CE 757	Pipe-Flow Systems	3
CE 775	Stormwater Treatment Systems Design	3

A sample 4-year plan for the Bachelor of Science in Civil Engineering can be found here: BS in Civil Engineering (no concentration) (https://catalog.ku.edu/engineering/civil-environmental-architectural-engineering/bs-civil-engineering/bs-civil-engineering/) or BS in Civil Engineering with an Environmental concentration (https://catalog.ku.edu/engineering/civil-environmental-architectural-engineering/bs-civil-engineering/environmental-conc/), or by using the left-side navigation.