BACHELOR OF SCIENCE IN CIVIL ENGINEERING

B.S. in Civil Engineering Program
Civil engineering, 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.

Educational Objective
Graduates who pursue a career in civil engineering will successfully engage in professional engineering practice or graduate studies in the analysis, design, construction, and operation of public and private infrastructure systems.

Combined Civil Engineering and Business Program
A student who wants to combine business with engineering 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 Business (http://www.business.ku.edu) and of Engineering (http://www.engr.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 (http://engr.ku.edu/sites/engr.drupal.ku.edu/files/docs/pdfs/Majors_and_Curriculum_Guide_2014_Online.pdf) 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 and ACT scores (or equivalent SAT scores) are required.

Minimum Academic Standards for Admission
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 (http://admissions.ku.edu/apply/requirements/usfreshmen) to the University of Kansas by assured admissions or individual review AND
- Have a 3.0+ GPA AND
- Have a mathematics ACT score of 22 (or math SAT score of 540).

Important: Simply meeting these requirements won’t guarantee admission to a School of Engineering degree program. Students who perform beyond these minimums will have a better probability of being admitted to their selected major.

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) (http://catalog.ku.edu/liberal-arts-sciences/math/#undergraduatetext) may be admitted directly into their chosen major, with the exception of those seeking admission into an EECS program. Electrical Engineering, Computer Science, Computer Engineering, and Interdisciplinary Computing students must have a 28+ Math ACT (640+ Math SAT) or eligibility for MATH 125 for direct admission.

First-Year General Engineering Program
Students with a 22-25 Math ACT (540-580 Math SAT) or meet eligibility requirements for Math 104 (Pre-Calculus) (http://catalog.ku.edu/liberal-arts-sciences/math/#undergraduatetext) are admitted to the School of Engineering First-Year Experience non-degree program for undergraduate students.
First-year Engineering students have one academic year (two semesters and one summer) to transition into a degree program. Admission to a degree program is possible after one of the following is met:

- Complete 12+ credit hours at KU, earn a "B" or higher in Math 104 (Pre-Calculus), earn a "C" or higher in all science and engineering courses, and earn a KU GPA of 2.5+ OR
- Earn a "C" or better in MATH 125 (Calculus I), earn a "C" or better in all science and engineering courses, and earn a KU GPA of 2.5+

Pre-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 a 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 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.

Students interested in the Information Technology program are admitted as juniors. They must have completed 60 hours of pre-requisite courses including foundational courses in math, science, and computer science and have a 2.5+ cumulative GPA or better. The Information Technology program resides at the Edwards Campus in Overland Park, KS. Click here (http://edwards campus.ku.edu/overview-bachelors-information-technology) for more information.

Current KU Students admitted to other academic units may apply to the School of Engineering by completing a Change of School form (http://engineering.ku.edu/forms). This must be turned in to the School of Engineering Dean’s Office by the appropriate deadlines indicated below.

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

<table>
<thead>
<tr>
<th>Semester</th>
<th>Applicants</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 15</td>
<td>Priority deadline for current KU students to apply for spring admission to Engineering.</td>
<td></td>
</tr>
<tr>
<td>November 1</td>
<td>Final deadline for scholarship consideration for incoming freshmen planning to enter in fall or summer semesters.</td>
<td></td>
</tr>
<tr>
<td>December 1</td>
<td>Final deadline to apply for the Self Engineering Leadership Fellows Program for incoming freshmen</td>
<td></td>
</tr>
<tr>
<td>February 1</td>
<td>Final deadline for scholarship consideration for transfer students planning to enter in fall or summer semesters. Applications available for the Engineering Learning Community</td>
<td></td>
</tr>
<tr>
<td>February 15</td>
<td>Priority deadline for current KU students to apply for summer or fall admission to Engineering.</td>
<td></td>
</tr>
<tr>
<td>May 1</td>
<td>Enrollment Deposit due.</td>
<td></td>
</tr>
</tbody>
</table>

Civil Engineering (general emphasis) 4-Year Graduation Plan

The following are recommended enrollments:

**Freshman**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 125 (KU Core GE1.2)</td>
<td>4 MATH 126</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 101 (KU Core GE 2.1)</td>
<td>3 ENGL 102 (KU Core GE 2.1)</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 150 (KU Core GE 3N)</td>
<td>5 CE 192</td>
<td>3</td>
</tr>
<tr>
<td>CE 191</td>
<td>2 PHSX 210</td>
<td>3</td>
</tr>
<tr>
<td>KU Core GE 3H Arts &amp; Humanities</td>
<td>3 PHSX 216</td>
<td>1</td>
</tr>
<tr>
<td>KU Core GE 2.2 Oral Communication</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

| Total | 17 |

**Sophomore**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 301</td>
<td>5 CE 240</td>
<td>3</td>
</tr>
<tr>
<td>MATH 127</td>
<td>4 CE 310</td>
<td>4</td>
</tr>
<tr>
<td>PHSX 212</td>
<td>3 MATH 220</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total | 17 |
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 132 credit hours is required for graduation.

**Mathematics (20)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 125</td>
<td>Calculus I (KU Core GE 1.2)</td>
<td>4</td>
</tr>
<tr>
<td>MATH 126</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 127</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Applied Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 290</td>
<td>Elementary Linear Algebra</td>
<td>2</td>
</tr>
<tr>
<td>MATH 526</td>
<td>Applied Mathematical Statistics I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Basic Sciences (16)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSX 210</td>
<td>General Physics I for Engineers (KU Core GE 1.1)</td>
<td>3</td>
</tr>
<tr>
<td>PHSX 216</td>
<td>General Physics I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHSX 212</td>
<td>General Physics II</td>
<td>3</td>
</tr>
<tr>
<td>PHSX 236</td>
<td>General Physics II Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 150</td>
<td>Chemistry for Engineers (KU Core GE 3N)</td>
<td>5</td>
</tr>
</tbody>
</table>

**Science elective (minimum of 3 hours). Select one of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOL 101</td>
<td>The Way The Earth Works</td>
</tr>
<tr>
<td>GEOL 105</td>
<td>History of the Earth</td>
</tr>
<tr>
<td>GEOL 351</td>
<td>Environmental Geology</td>
</tr>
</tbody>
</table>

**Basic Engineering Sciences (19)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 301</td>
<td>Statics and Dynamics</td>
<td>5</td>
</tr>
<tr>
<td>CE 201</td>
<td>Statics</td>
<td>4</td>
</tr>
<tr>
<td>&amp; CE 300</td>
<td>and Dynamics</td>
<td></td>
</tr>
<tr>
<td>CE 310</td>
<td>Strength of Materials</td>
<td>4</td>
</tr>
<tr>
<td>CE 330</td>
<td>Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>CMGT 357</td>
<td>Engineering Economics</td>
<td>3</td>
</tr>
<tr>
<td>CE 192</td>
<td>Civil Engineering Graphics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Computer Programming Elective (3)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECS 138</td>
<td>Introduction to Computing: _____ (C++, Fortran, or Matlab)</td>
<td>3</td>
</tr>
<tr>
<td>or EECS 137</td>
<td>Visual Basic for Engineers</td>
<td></td>
</tr>
</tbody>
</table>

**Engineering Science (select one of the following) (3)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 312</td>
<td>Basic Engineering Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>or CPE 221</td>
<td>Chemical Engineering Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>ME 306</td>
<td>Science of Materials</td>
<td>3</td>
</tr>
<tr>
<td>or ARCE 350</td>
<td>Building Materials Science</td>
<td></td>
</tr>
<tr>
<td>EECS 315</td>
<td>Electric Circuits and Machines</td>
<td>3</td>
</tr>
<tr>
<td>or EECS 316</td>
<td>Circuits, Electronics and Instrumentation</td>
<td></td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>General Civil Engineering Option (23)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 240 Geomatics</td>
<td>3</td>
</tr>
<tr>
<td>CE 455 Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CE 461 Structural Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CE 477 Introduction to Environmental and Science</td>
<td>3</td>
</tr>
<tr>
<td>CE 487 Soil Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>CE 480 Introduction to Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>CE 484/684 Material for Transportation Facilities</td>
<td>3</td>
</tr>
<tr>
<td>or CE 412 Structural Engineering Materials</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Engineering Option (20)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 240 Geomatics</td>
<td>3</td>
</tr>
<tr>
<td>CE 455 Hydrology</td>
<td>3</td>
</tr>
<tr>
<td>CE 461 Structural Analysis</td>
<td>4</td>
</tr>
<tr>
<td>CE 477 Introduction to Environmental and Science</td>
<td>3</td>
</tr>
<tr>
<td>CE 487 Soil Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>CE 484/684 Material for Transportation Facilities</td>
<td>3</td>
</tr>
<tr>
<td>or CE 412 Structural Engineering Materials</td>
<td></td>
</tr>
</tbody>
</table>

Engineering Analysis and Design

<table>
<thead>
<tr>
<th>General Civil Engineering Concentration (16 hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 562 Design of Steel Structures (KU Core AE 6)</td>
<td>3</td>
</tr>
<tr>
<td>CE 563 Design of Reinforced Concrete Structures</td>
<td>3</td>
</tr>
<tr>
<td>Water Resources and Environmental Engineering (4)</td>
<td></td>
</tr>
<tr>
<td>CE 576 Municipal Water Supply and Wastewater Treatment (KU Core AE 6)</td>
<td>4</td>
</tr>
<tr>
<td>or CE 552 Water Resources Engineering Design</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective Courses (6)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select two of the following:</td>
<td>6</td>
</tr>
<tr>
<td>CMGT 500 Construction Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 582 Highway Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 588 Foundation Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 576 Municipal Water Supply and Wastewater Treatment (if not taken as Water Resources and Environmental Elective)</td>
<td></td>
</tr>
<tr>
<td>CE 552 Water Resources Engineering Design (if not taken as Water Resources and Environmental Elective)</td>
<td></td>
</tr>
</tbody>
</table>

Environmental Engineering Concentration (20 hours)

<table>
<thead>
<tr>
<th>Water Resources and Environmental Engineering (8)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 552 Water Resources Engineering Design</td>
<td>4</td>
</tr>
<tr>
<td>CE 576 Municipal Water Supply and Wastewater Treatment</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structural Design Elective (3)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 562 Design of Steel Structures (KU Core AE 6)</td>
<td>3</td>
</tr>
<tr>
<td>or CE 563 Design of Reinforced Concrete Structures</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Civil Engineering Design Elective (3)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>CMGT 500 Construction Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 582 Highway Engineering</td>
<td></td>
</tr>
<tr>
<td>CE 588 Foundation Engineering</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Engineering Principles Elective (3)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>CE 570 Concepts of Environmental Chemistry &amp; CE 571 Environmental Chemical Analysis</td>
<td></td>
</tr>
<tr>
<td>CE 573 Biological Principles of Environmental Engineering</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Design Elective (3)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Select one of the following:</td>
<td>3</td>
</tr>
<tr>
<td>CE 574 Design of Air Pollution Control Systems</td>
<td></td>
</tr>
<tr>
<td>CE 755 Free Surface Flow I</td>
<td></td>
</tr>
<tr>
<td>CE 757 Pipe-Flow Systems</td>
<td></td>
</tr>
<tr>
<td>CE 791 Waste Facility Siting and Design</td>
<td></td>
</tr>
</tbody>
</table>

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 125-126 hours in the general civil concentration and 126-127 hours in the environmental concentration (depending on the ECON choice). Both concentrations require a total of 132 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.

Suggested Electives (5)

<table>
<thead>
<tr>
<th>General Education Courses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 191 Introduction to Civil Engineering</td>
<td>2</td>
</tr>
<tr>
<td>ENGL 362 Foundations of Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

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.