

# CIVIL ENGINEERING, BS

for the degree of Bachelor of Science in Civil Engineering

Civil and environmental engineers apply basic principles of science, supported by mathematical and computational tools, to address the biggest challenges facing society: ensuring clean air, safe drinking water and sanitation; addressing our changing environment; protecting the population from natural and man-made hazards; designing a sustainable infrastructure that serves everyone; re-imagining human and commodity traffic for an automated future; and of course designing and constructing the world's tallest buildings and most iconic bridges.

The civil engineering program comprises seven focus areas (construction engineering and management, construction materials, environmental engineering and science, geotechnical engineering, water resources engineering and science, structural engineering, and transportation engineering) and three interdisciplinary programs (sustainable and resilient infrastructure systems; energy-water-environment sustainability; and societal risk and hazard mitigation). Although each area and program has its own special body of knowledge and engineering tools, civil and environmental engineering projects often use knowledge and data from many of these topical areas together in order to address societal challenges.

CEE's Program Education Objectives are to educate CEE students to:

1. Successfully enter the civil and environmental engineering profession as practicing engineers and consultants with prominent companies and organizations in diverse topic areas it comprises;
2. Pursue graduate education and research at major research universities and national laboratories;
3. Pursue professional licensure;
4. Advance to leadership positions in the profession;
5. Engage in continued learning through professional development;
6. Participate in and contribute to professional societies and community services.

## Program Review and Approval

To qualify for the degree of Bachelor of Science in Civil Engineering, each student's academic program plan must be reviewed by a standing committee of the faculty (the Program Review Committee) and approved by the Associate Head of Civil and Environmental Engineering in charge of undergraduate programs. This review and approval process ensures that individual programs satisfy the educational objectives and all of the requirements of the civil and environmental engineering program, that those programs do not abuse the substantial degree of flexibility that is present in the curriculum, and that the career interests of each student are cultivated and served.

## Current Program Educational Objectives

for the degree of Bachelor of Science in Civil Engineering

## Graduation Requirements

**Minimum Overall GPA: 2.0**

**Minimum hours required for graduation: 128 hours**

**General education: Students must complete the Campus General Education (<https://courses.illinois.edu/gened/DEFAULT/DEFAULT/>) requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). CEE 300 will satisfy a Civil Engineering core course requirement and the Campus General Education Advanced Composition requirement.**

## Orientation and Professional Development

Code	Title	Hours
CEE 190	Project-Based Introduction to CEE	4
CEE 495	Professional Practice	0
ENG 100	Grainger Engineering Orientation Seminar (External transfer students take ENG 300.)	1
<b>Total Hours</b>		<b>5</b>

## Foundational Mathematics and Science

Code	Title	Hours
CHEM 102	General Chemistry I	3
CHEM 103	General Chemistry Lab I	1
CHEM 104	General Chemistry II	3
CHEM 105	General Chemistry Lab II	1
MATH 221	Calculus I (MATH 220 may be substituted. MATH 220 is appropriate for students with no background in calculus. 4 of 5 credit hours count towards degree.)	4
MATH 231	Calculus II	3
MATH 241	Calculus III	4
MATH 257	Linear Algebra with Computational Applications (MATH 225 or MATH 415 may be substituted.)	3
MATH 285	Intro Differential Equations (MATH 284 or MATH 286 may be substituted. Extra hour counts towards free electives.)	3
PHYS 211	University Physics: Mechanics	4
PHYS 212	University Physics: Elec & Mag	4
PHYS 213	Univ Physics: Thermal Physics	2
<b>Total Hours</b>		<b>35</b>

## Civil Engineering Technical Core

Code	Title	Hours
CEE 201	Systems Engrg & Economics	3
CEE 202	Engineering Risk & Uncertainty	3
CS 101	Intro Computing: Engrg & Sci	3
SE 101	Engineering Graphics & Design	3
TAM 211	Statics	3
TAM 212	Introductory Dynamics	3
TAM 251	Introductory Solid Mechanics	3
TAM 335 or CEE 331	Introductory Fluid Mechanics Fluid Dynamics in the Natural and Built Environment	4
<b>Total Hours</b>		<b>25</b>

## Civil Engineering Primary and Secondary Fields

**Code**                      **Title**    **Hours**

Students choose a primary and a secondary field of study, of which there are seven traditional areas of study and three interdisciplinary programs to choose from. The particular primary and secondary field selections shape the selection of science electives, civil engineering core courses and advanced technical electives. The specific choices of courses in this category are made through the submission of a Plan of Study, which is subject to approval by the faculty Program Review Committee. Instead of choosing separate primary and secondary field options as listed below, students could select to pursue the General Civil Engineering Option. The General Civil Engineering Option offers a broader coverage of Civil Engineering topical areas. This option can be found below the Secondary Field list.

**Primary Field. Students choose 1 primary field, in which they must take 1 science elective course (3-4 hours), 15-16 hours of 300 level Civil Engineering Core Courses from departmentally approved list, and 12-13 hours of 400 level Advanced Technical Electives from departmentally approved list.**                      **31**

### Construction Engineering and Management Primary

#### Science Electives - Select 1 course from list below:

ATMS 120	Severe and Hazardous Weather	3
ATMS 303	Synoptic-Dynamic Wea Analysis	4
ECE 205	Electrical and Electronic Circuits	3
FIN 221	Corporate Finance	3
GEOL 107	Physical Geology	4
GEOL 118	Natural Disasters	3
GEOL 333	Earth Materials and the Env	4
GEOL 380	Environmental Geology	4
ME 200	Thermodynamics	3
NPRE 201	Energy Systems	3
SE 400	Engineering Law	3 or 4
STAT 420	Methods of Applied Statistics	3 or 4
UP 205	Ecology & Environmental Sustainability	3

### Civil Engineering Core Courses

#### Required courses:

CEE 300	Behavior of Materials	4
CEE 320	Construction Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

#### Select 1 course from list below:

CEE 310	Transportation Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3

### Advanced Technical Courses

#### Required courses:

CEE 420	Construction Productivity	3 or 4
CEE 421	Construction Planning (Required Integrated Design Course)	3 or 4
CEE 422	Construction Cost Analysis	3 or 4

#### Select remaining courses to fulfill this requirement from the list below:

CEE 401	Concrete Materials	4
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CEE 461	Reinforced Concrete I	3
CEE 498	Special Topics (As approved)	4
CEE 498	Special Topics (Construction Equipment Methods)	3

### Construction Materials Engineering Primary

#### Science Electives - Select 1 course from list below:

GEOL 107	Physical Geology	4
MSE 201	Phases and Phase Relations	3

### Civil Engineering Core Courses

#### Required courses:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 360	Structural Engineering	3

#### Select 2 courses from list below:

CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 380	Geotechnical Engineering	3

### Advanced Technical Courses

#### Required courses:

CEE 401	Concrete Materials (Required Integrated Design Course)	4
CEE 405	Asphalt Materials I	3 or 4

#### Select remaining courses to fulfill this requirement from the list below:

CEE 406	Pavement Design I	3 or 4
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 469	Wood Structures	3 or 4
CEE 483	Soil Mechanics and Behavior	4
ME 430	Failure of Engrg Materials	3 or 4
MSE 401	Thermodynamics of Materials	3
MSE 402	Kinetic Processes in Materials	3
MSE 406	Thermal-Mech Behavior of Matls	3
MSE 450	Polymer Science & Engineering	3 or 4
TAM 428	Mechanics of Composites	3

### Environmental Engineering Primary

#### Science Electives - Select 1 course from list below:

CHEM 232	Elementary Organic Chemistry I	3 or 4
CS 357	Numerical Methods I	3
GEOL 107	Physical Geology	4
MCB 300	Microbiology	3
ME 200	Thermodynamics	3
MSE 401	Thermodynamics of Materials	3
STAT 420	Methods of Applied Statistics	3 or 4

### Civil Engineering Core Courses

#### Required course:

CEE 330	Environmental Engineering	3
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#### Select 4 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3

CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

**Advanced Technical Courses**

Select 1 course from list below:

CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 441	Air Pollution Sources, Transport and Control	4

Select remaining courses to fulfill this requirement from the list below:

CEE 430	Ecological Quality Engineering	2
CEE 434	Environmental Systems I	3
CEE 435	Public Health Engineering	3 or 4
CEE 438	Science & Environmental Policy	3
CEE 442	Environmental Engineering Principles, Physical	4
CEE 443	Env Eng Principles, Chemical	4
CEE 444	Env Eng Principles, Biological	4
CEE 447	Atmospheric Chemistry	4
CEE 449	Environmental Engineering Lab (Required Integrated Design Course)	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 493	Sustainable Design Eng Tech	4

**Geotechnical Engineering Primary****Science Elective required course:**

GEOL 107	Physical Geology	4
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**Civil Engineering Core Courses**

Required courses:

CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Select 3 courses from the list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3

**Advanced Technical Courses**

Required courses:

CEE 483	Soil Mechanics and Behavior	4
CEE 484	Applied Soil Mechanics (Required Integrated Design Course)	4

Select remaining courses to fulfill this requirement from the list below:

CEE 457	Groundwater	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 463	Reinforced Concrete II	3 or 4
CEE 498	Special Topics (As approved)	3-4

**Structural Engineering Primary****Science Electives - Select 1 course from list below:**

CS 357	Numerical Methods I	3
ECE 205	Electrical and Electronic Circuits	3
GEOL 107	Physical Geology	4
GEOL 118	Natural Disasters	3
ME 200	Thermodynamics	3

**Civil Engineering Core Courses**

Required courses:

CEE 300	Behavior of Materials	4
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

Select 2 courses from list below:

CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3

**Advanced Technical Courses**

Required courses:

CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 465	Design of Structural Systems (Required Integrated Design Course)	3
CEE 470	Structural Analysis	4

**Transportation Engineering Primary****Science Electives - Select 1 course from list below:**

CS 357	Numerical Methods I	3
ECE 205	Electrical and Electronic Circuits	3
GEOL 107	Physical Geology	4
ME 200	Thermodynamics	3
ME 340	Dynamics of Mechanical Systems	3.5
MSE 401	Thermodynamics of Materials	3
SE 320	Control Systems	4
STAT 420	Methods of Applied Statistics	3 or 4

**Civil Engineering Core Courses**

Required courses:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3

Select 3 courses from the list below:

CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

**Advanced Technical Courses - Select 1 course from each of the 3 Areas below and 1 course from the recommended list:****Area 1 - Facilities:**

CEE 405	Asphalt Materials I	3 or 4
CEE 406	Pavement Design I	3 or 4
CEE 407	Airport Design	3 or 4

<b>Area 2 - Systems:</b>		
CEE 407	Airport Design	3 or 4
CEE 415	Geometric Design of Roads (Required Integrated Design Course)	4
CEE 416	Traffic Capacity Analysis	3 or 4
CEE 418	Public Transportation Systems	3 or 4

<b>Area 3 - Railroad:</b>		
CEE 408	Railroad Transportation Engrg	3 or 4
CEE 409	Railroad Track Engineering	3 or 4
CEE 410	Railway Signaling & Control	3 or 4
CEE 411	RR Project Design & Constr	3 or 4

<b>Advanced Technical Courses Recommended:</b>		
CEE 401	Concrete Materials	4
CEE 405	Asphalt Materials I	3 or 4
CEE 406	Pavement Design I	3 or 4
CEE 407	Airport Design	3 or 4
CEE 408	Railroad Transportation Engrg	3 or 4
CEE 409	Railroad Track Engineering	3 or 4
CEE 410	Railway Signaling & Control	3 or 4
CEE 411	RR Project Design & Constr	3 or 4
CEE 412	High-Speed Rail Engineering	3 or 4
CEE 415	Geometric Design of Roads (Required Integrated Design Course)	4
CEE 416	Traffic Capacity Analysis	3 or 4
CEE 417	Urban Transportation Planning	4
CEE 418	Public Transportation Systems	3 or 4

**Water Resources Engineering and Science Primary**

<b>Science Electives - Select 1 course from list below:</b>		
CS 357	Numerical Methods I	3
GEOL 107	Physical Geology	4
ME 200	Thermodynamics	3

<b>Civil Engineering Core Courses</b>		
Required course:		
CEE 350	Water Resources Engineering	3

Select 4 courses from the list below:		
CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

<b>Advanced Technical Courses</b>		
Required courses - Select 1 from list below:		
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics (Required Integrated Design Course)	4

Select remaining courses to fulfill this requirement from the list below:		
CEE 432	Stream Ecology	3 or 4
CEE 433	Water Technology and Policy	3 or 4
CEE 434	Environmental Systems I	3
CEE 437	Water Quality Engineering	3

CEE 450	Surface Hydrology	3
CEE 451	Environmental Fluid Mechanics	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 458	Water Resources Field Methods	4
CEE 459	Ecohydraulics	4

<b>Energy-Water-Environment Sustainability Primary</b>		
<b>Science Electives - Select 1 course from list below:</b>		
ME 200	Thermodynamics	3
CHBE 321	Thermodynamics	4

<b>Civil Engineering Core Courses</b>		
Required course:		
CEE 340	Energy and Global Environment	3

Select 4 courses from the list below:		
CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

<b>Advanced Technical Courses</b>		
Required course:		
CEE 493	Sustainable Design Eng Tech	4
Select remaining courses to fulfill this requirement from the list below:		

ABE 436	Renewable Energy Systems	3 or 4
CEE 433	Water Technology and Policy	3 or 4
CEE 435	Public Health Engineering	3 or 4
CEE 434	Environmental Systems I	3
CEE 437	Water Quality Engineering	3
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 449	Environmental Engineering Lab	3
CEE 450	Surface Hydrology	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 459	Ecohydraulics	4
CEE 473	Wind Effects on Structures	4
CEE 492	Data Science for Civil and Environmental Engineering	4
CEE 498	Special Topics (As approved)	4
ENG 471	Seminar Energy & Sustain Engrg	1
ME 400	Energy Conversion Systems	3 or 4
NPRE 402	Nuclear Power Engineering	3 or 4
NPRE 475	Wind Power Systems	3 or 4

<b>Societal Risk and Hazard Mitigation Primary</b>		
<b>Science Electives - Select 1 course from list below:</b>		
FIN 230	Introduction to Insurance	3
GEOL 118	Natural Disasters	3
LAW 301	Introduction to Law	3

NRES 287	Environment and Society	3
STAT 420	Methods of Applied Statistics	3 or 4

**Civil Engineering Core Courses**

Required course:

CEE 340	Energy and Global Environment	3
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Select 4 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

**Advanced Technical Courses**

Required course:

CEE 491	Decision and Risk Analysis	3 or 4
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Select remaining courses to fulfill this requirement from list below:

CEE 406	Pavement Design I	3 or 4
CEE 416	Traffic Capacity Analysis	3 or 4
CEE 417	Urban Transportation Planning	4
CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 449	Environmental Engineering Lab	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 465	Design of Structural Systems	3
CEE 472	Structural Dynamics I	3 or 4
CEE 473	Wind Effects on Structures	4
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4
NPRE 442	Radioactive Waste Management	3
SE 450	Decision Analysis I	3 or 4
STAT 425	Statistical Modeling I	3 or 4
STAT 429	Time Series Analysis	3 or 4
STAT 430	Topics in Applied Statistics	3 or 4
UP 438	Disasters and Urban Planning	4

**Sustainable and Resilient Infrastructure Systems Primary****Science Electives - Select 1 course from list below:**

ATMS 120	Severe and Hazardous Weather	3
CS 357	Numerical Methods I	3
ENSU 300	Environmental Sustainability	3
ESE 140	Climate and Global Change	3
ESE 320	Water Planet, Water Crisis	3
ESE 482	Challenges of Sustainability	3
FIN 221	Corporate Finance	3
GGIS 103	Earth's Physical Systems	4
NPRE 201	Energy Systems	3
NRES 439	Env and Sustainable Dev	3
SE 320	Control Systems	4
STAT 420	Methods of Applied Statistics	3 or 4
UP 406	Urban Ecology	4

**Civil Engineering Core Courses**

Required course:

CEE 340	Energy and Global Environment	3
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Select 4 courses from list below:

CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

**Advanced Technical Courses**

Required course:

CEE 491	Decision and Risk Analysis	3 or 4
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Select remaining courses to fulfill this requirement from list below:

ABE 436	Renewable Energy Systems	3 or 4
CEE 401	Concrete Materials	4
CEE 406	Pavement Design I	3 or 4
CEE 408	Railroad Transportation Engrg	3 or 4
CEE 409	Railroad Track Engineering	3 or 4
CEE 416	Traffic Capacity Analysis	3 or 4
CEE 417	Urban Transportation Planning	4
CEE 418	Public Transportation Systems	3 or 4
CEE 421	Construction Planning	3 or 4
CEE 424	Sustainable Const Methods	4
CEE 434	Environmental Systems I	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 458	Water Resources Field Methods	4
CEE 465	Design of Structural Systems	3
CEE 493	Sustainable Design Eng Tech	4
CEE 498	Special Topics (As approved)	3-4
MSE 489	Matl Select for Sustainability	3 or 4
UP 466	Energy & the Built Environment	4
UP 480	Sustainable Design Principles	2

**Secondary Field. Students choose 1 secondary field that is different from but complements and adds breadth to their primary field selection. This should be done in consultation with academic advisor. See list of classes for each area of study below.**

**Construction Engineering and Management Secondary**

Students must have taken CEE 320 to pursue this Secondary Field.

**Advanced Technical Courses**

Required course:

CEE 421	Construction Planning	3
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Select 1 course from list below:

CEE 420	Construction Productivity	3
CEE 422	Construction Cost Analysis	3

**Construction Materials Engineering Secondary**

Students must have taken CEE 300 to pursue this Secondary Field.

**Advanced Technical Courses**



Select 2 courses from list below:		
CEE 401	Concrete Materials	4
CEE 405	Asphalt Materials I	3
CEE 406	Pavement Design I	3

**Environmental Engineering Secondary**

Students must have taken CEE 330 to pursue this Secondary Field.

**Advanced Technical Courses**

Select at least 2 courses from list below, a minimum of 6 credit hours required.

CEE 430	Ecological Quality Engineering	2
CEE 434	Environmental Systems I	3
CEE 435	Public Health Engineering	3
CEE 437	Water Quality Engineering	3
CEE 438	Science & Environmental Policy	3
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 442	Environmental Engineering Principles, Physical	4
CEE 443	Env Eng Principles, Chemical	4
CEE 444	Env Eng Principles, Biological	4
CEE 447	Atmospheric Chemistry	4
CEE 449	Environmental Engineering Lab	3

**Geotechnical Engineering Secondary**

Students must have taken CEE 380 to pursue this Secondary Field.

**Advanced Technical Courses**

Required course:

CEE 484	Applied Soil Mechanics	3
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Select 1 course from list below:

CEE 483	Soil Mechanics and Behavior	4
CEE 498	Special Topics (As approved)	3-4

**Structural Engineering Secondary**

Students must have taken CEE 360 to pursue this Secondary Field.

**Advanced Technical Courses**

Required courses:

CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3

**Transportation Engineering Secondary**

Students must have taken CEE 310 to pursue this Secondary Field.

**Advanced Technical Courses**

Select 2 courses, each from a different Area listed below:

**Area 1 - Facilities:**

CEE 405	Asphalt Materials I	3
CEE 406	Pavement Design I	3
CEE 407	Airport Design	3

**Area 2 - Systems:**

CEE 407	Airport Design	3
CEE 415	Geometric Design of Roads	4
CEE 416	Traffic Capacity Analysis	3
CEE 418	Public Transportation Systems	3

**Area 3 - Railroad:**

CEE 408	Railroad Transportation Engrg	3
CEE 409	Railroad Track Engineering	3
CEE 410	Railway Signaling & Control	3
CEE 411	RR Project Design & Constr	3
CEE 412	High-Speed Rail Engineering	3

**Water Resources Engineering and Science Secondary**

Students must have taken CEE 350 to pursue this Secondary Field.

**Advanced Technical Courses**

Select 2 courses from list below:

CEE 432	Stream Ecology	3
CEE 433	Water Technology and Policy	3
CEE 450	Surface Hydrology	3
CEE 451	Environmental Fluid Mechanics	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 458	Water Resources Field Methods	4
CEE 459	Ecohydraulics	4

**Energy-Water-Environment Sustainability Secondary**

Students must have taken CEE 340 to pursue this Secondary Field.

**Advanced Technical Courses**

Required course:

CEE 493	Sustainable Design Eng Tech	4
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Select 1 course from list below:

ABE 436	Renewable Energy Systems	3 or 4
CEE 433	Water Technology and Policy	3
CEE 434	Environmental Systems I	3
CEE 435	Public Health Engineering	3
CEE 437	Water Quality Engineering	3
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 449	Environmental Engineering Lab	3
CEE 450	Surface Hydrology	3
CEE 452	Hydraulic Analysis and Design	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 457	Groundwater	3
CEE 459	Ecohydraulics	4
CEE 473	Wind Effects on Structures	4
CEE 492	Data Science for Civil and Environmental Engineering	4
CEE 498	Special Topics (As approved)	3-4
ME 400	Energy Conversion Systems	3 or 4
NPRE 402	Nuclear Power Engineering	3 or 4
NPRE 475	Wind Power Systems	3 or 4

**Societal Risk and Hazard Mitigation Secondary****Advanced Technical Courses**

Required course:

CEE 491	Decision and Risk Analysis	3
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Select 1 course from the list below:

CEE 406	Pavement Design I	3
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CEE 416	Traffic Capacity Analysis	3
CEE 417	Urban Transportation Planning	4
CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 449	Environmental Engineering Lab	3
CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3
CEE 465	Design of Structural Systems	3
CEE 472	Structural Dynamics I	3
CEE 473	Wind Effects on Structures	4
IE 410	Advanced Topics in Stochastic Processes & Applications	3 or 4
NPRE 442	Radioactive Waste Management	3
SE 450	Decision Analysis I	3 or 4
STAT 425	Statistical Modeling I	3 or 4
STAT 429	Time Series Analysis	3 or 4
STAT 430	Topics in Applied Statistics	3 or 4
UP 438	Disasters and Urban Planning	4

**Sustainable and Resilient Infrastructure Systems Secondary**  
Students must have taken CEE 340 to pursue this Secondary Field.

**Advanced Technical Courses**  
Required course:

CEE 491	Decision and Risk Analysis	3
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Select 1 course from the list below:

ABE 436	Renewable Energy Systems	3 or 4
CEE 401	Concrete Materials	4
CEE 406	Pavement Design I	3
CEE 408	Railroad Transportation Engrg	3
CEE 409	Railroad Track Engineering	3
CEE 416	Traffic Capacity Analysis	3
CEE 417	Urban Transportation Planning	4
CEE 418	Public Transportation Systems	3
CEE 421	Construction Planning	3
CEE 424	Sustainable Const Methods	4
CEE 434	Environmental Systems I	3
CEE 453	Urban Hydrology and Hydraulics	4
CEE 458	Water Resources Field Methods	4
CEE 465	Design of Structural Systems	3
CEE 493	Sustainable Design Eng Tech	4
CEE 498	Special Topics (As approved)	3-4
MSE 489	Matl Select for Sustainability	3 or 4
UP 466	Energy & the Built Environment	4
UP 480	Sustainable Design Principles	2

**Global Context Secondary**  
Students must have taken CEE 340 and either CEE 330 or CEE 350 to pursue this Secondary Field.

**Advanced Technical Courses**  
Select 1 course from the Global Issues list below:

ACE 451	Agriculture in Intl Dev	3 or 4
ATMS 421	Earth Systems Modeling	4
CEE 438	Science & Environmental Policy	3

CEE 441	Air Pollution Sources, Transport and Control	4
CEE 447	Atmospheric Chemistry	4
CEE 450	Surface Hydrology	3
ECON 420	International Economics	3 to 4

Select 1 course from the CEE Global Design list below:

CEE 408	Railroad Transportation Engrg	3
CEE 417	Urban Transportation Planning	4
CEE 437	Water Quality Engineering	3
CEE 449	Environmental Engineering Lab	3
CEE 465	Design of Structural Systems	3

**CEE Multidisciplinary Secondary**  
Science Electives Recommended: Any recommended science electives from existing CEE Primary and Secondary listed above.

Civil Engineering Core Courses Recommended: Core courses relevant to the student's interests.

Advanced Technical Courses: Students must work with CEE Academic Advisors to select courses.

**Atmospheric Science Secondary**  
Students must have taken CEE 330 to pursue this Secondary Field.

**Advanced Technical Courses**  
Select 2 courses from list below:

ATMS 302	Atmospheric Dynamics I	3
ATMS 410	Radar Remote Sensing	4
ATMS 411	Satellite Remote Sensing	4
ATMS 421	Earth Systems Modeling	4
CEE 441	Air Pollution Sources, Transport and Control	4
CEE 447	Atmospheric Chemistry	4

**Chemical Engineering Secondary**  
Students must have taken CEE 330 and CEE 350 to pursue this Secondary Field.

**Advanced Technical Courses**  
Select 2 courses from list below:

CHBE 321	Thermodynamics	4
CHBE 421	Momentum and Heat Transfer	4
CHBE 422	Mass Transfer Operations	4
CHBE 424	Chemical Reaction Engineering	3

**Chemistry Secondary**  
Students must have taken CEE 330 to pursue this Secondary Field.

**Advanced Technical Courses**  
Select at least 2 courses from list below, a minimum of 6 credit hours required.

CHEM 232	Elementary Organic Chemistry I	3 or 4
CHEM 315	Instrumental Chem Systems Lab	2
CHEM 332	Elementary Organic Chem II	4
CHEM 420	Instrumental Characterization	2
CHEM 440	Physical Chemistry Principles	4

**Microbiology Secondary**  
Students must have taken CEE 330 to pursue this Secondary Field.

**Advanced Technical Courses**

Select 2 courses from list below:		
CEE 444	Env Eng Principles, Biological	4
MCB 301	Experimental Microbiology	3
MCB 431	Microbial Physiology	3
MCB 450	Introductory Biochemistry	3

**Toxicology Secondary**

Students must have taken CEE 330 to pursue this Secondary Field.

**Advanced Technical Courses**

Select 2 courses from list below:		
CHEM 332	Elementary Organic Chem II	4
ENVS 431		
ENVS 480	Basic Toxicology	3
MCB 450	Introductory Biochemistry	3

**The General Civil Engineering Option 37****Science Electives - Select 1 course from list below:**

GEOL 107	Physical Geology	4
CHEM 232	Elementary Organic Chemistry I	3 or 4
ME 200	Thermodynamics	3
STAT 420	Methods of Applied Statistics	4

**Civil Engineering Core Courses**

Select 7 courses from list below:		
CEE 300	Behavior of Materials	4
CEE 310	Transportation Engineering	3
CEE 320	Construction Engineering	3
CEE 330	Environmental Engineering	3
CEE 340	Energy and Global Environment	3
CEE 350	Water Resources Engineering	3
CEE 360	Structural Engineering	3
CEE 380	Geotechnical Engineering	3

**Advanced Technical Courses**

Select 4 courses from Areas below, following either of these two options: Option I: Pick no more than 1 course from each area below. Option II: Pick 2 courses from 1 area and no more than 1 course from each of the remaining areas.

**Construction**

CEE 420	Construction Productivity	3
CEE 421	Construction Planning	3
CEE 422	Construction Cost Analysis	3

**Environmental**

CEE 437	Water Quality Engineering	3
CEE 440	Fate Cleanup Environ Pollutant	4
CEE 441	Air Pollution Sources, Transport and Control	4

**Geotechnical**

CEE 483	Soil Mechanics and Behavior	4
CEE 484	Applied Soil Mechanics	3 or 4

**Materials**

CEE 401	Concrete Materials	4
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**Structures**

CEE 460	Steel Structures I	3
CEE 461	Reinforced Concrete I	3

**Transportation**

CEE 405	Asphalt Materials I	3
CEE 406	Pavement Design I	3
CEE 407	Airport Design	3
CEE 408	Railroad Transportation Engrg	3
CEE 409	Railroad Track Engineering	3
CEE 410	Railway Signaling & Control	3
CEE 411	RR Project Design & Constr	3
CEE 412	High-Speed Rail Engineering	3
CEE 415	Geometric Design of Roads	4
CEE 416	Traffic Capacity Analysis	3
CEE 417	Urban Transportation Planning	4
CEE 418	Public Transportation Systems	3
<b>Water Resources</b>		
CEE 451	Environmental Fluid Mechanics	3
CEE 453	Urban Hydrology and Hydraulics	4

**Free Electives**

Code	Title	Hours
Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives, so that there are at least 128 credit hours earned toward the degree. ( <a href="https://go.grainger.illinois.edu/FreeElectives/">https://go.grainger.illinois.edu/FreeElectives/</a> )		10
<b>Total Hours of Curriculum to Graduate</b>		<b>128</b>

for the degree of Bachelor of Science in Civil Engineering

**Sample Sequence**

This sample sequence is intended to be used only as a guide for degree completion. All students should work individually with their academic advisors to decide the actual course selection and sequence that works best for them based on their academic preparation and goals. Enrichment programming such as study abroad, minors, internships, and so on may impact the structure of this four-year plan. Course availability is not guaranteed during the semester indicated in the sample sequence. The curriculum sequence can also be viewed via dynamic and static curricular maps (<https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/cee-map/>), which include prerequisite sequencing.

Students must fulfill their Language Other Than English requirement by successfully completing a third level of a language other than English. See the corresponding section on the Degree and General Education Requirements (<http://catalog.illinois.edu/general-information/degree-general-education-requirements/>). One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). CEE 300 will satisfy a Civil Engineering core course requirement and the Campus General Education Advanced Composition requirement.

Free Electives: Additional course work, subject to the Grainger College of Engineering restrictions to Free Electives (<https://go.grainger.illinois.edu/FreeElectives/>), so that there are at least 128 credit hours earned toward the degree.

**First Year**

First Semester	Hours	Second Semester	Hours
CEE 190		4 CS 101	3
ENG 100		1 PHYS 211	4



MATH 221 (MATH 220 may be substituted)	4	MATH 231	3
CHEM 102	3	CHEM 104	3
CHEM 103	1	CHEM 105	1
Composition I course or SE 101	4-3	SE 101 or Composition I course	3-4
<b>17</b>		<b>17</b>	

**Second Year**

First Semester	Hours	Second Semester	Hours
CEE 201		3 CEE 202	3
PHYS 212		4 PHYS 213	2
MATH 241		4 TAM 212	3
TAM 211		3 TAM 251	3
MATH 257		3 ECON 102 or ECON 103 (Counts as General Education course)	3
		Free elective course	3
<b>17</b>		<b>17</b>	

**Third Year**

First Semester	Hours	Second Semester	Hours
TAM 335 (or CEE 331)		4 CEE 300	4
Civil Engineering Core course		3 MATH 285	3
Civil Engineering Core course		3 Civil Engineering Core course	3
Science Elective course		3 Civil Engineering Core course	3
General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		3 General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)	3
<b>16</b>		<b>16</b>	

**Fourth Year**

First Semester	Hours	Second Semester	Hours
CEE 495		0 Civil Engineering Advanced Technical course (Primary Field)	3
Civil Engineering Advanced Technical course (Primary Field)		3 Civil Engineering Advanced Technical course (Primary Field)	3

Civil Engineering Advanced Technical course (Primary Field)	3	Civil Engineering Advanced Technical course (Secondary Field)	3
Civil Engineering Advanced Technical course (Secondary Field)		3 Language Other Than English (3rd level) course	4
General Education course (choose a Humanities or Social/Behavioral Science course with Cultural Studies designation)		Free elective course	3
<b>15</b>		<b>13</b>	

**Total Hours 128**

*for the degree of Bachelor of Science Major in Civil Engineering*

Student learning outcomes are based on learning outcomes in line with the ABET accreditation process.

Civil Engineering graduates will have:

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.

*for the degree of Bachelor of Science in Civil Engineering*

Civil & Environmental Engineering Website (<https://cee.illinois.edu/directory/faculty/>)

**Civil & Environmental Engineering Faculty**

The Grainger College of Engineering Admissions (<https://grainger.illinois.edu/admissions/>)

**The Grainger College of Engineering**