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 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.

Graduation Requirements

Minimum Overall GPA: 2.0
Minimum hours required for graduation: 128 hours
General education: Students must complete the Campus General Education requirements including the campus general education language requirement. One of the SBS courses must be an introductory economics course (ECON 102 or ECON 103). Specific Advanced Composition course required for this degree is listed below.

Orientation and Professional Development

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 190</td>
<td>Project-Based Introduction to CEE</td>
<td>4</td>
</tr>
<tr>
<td>CEE 495</td>
<td>Professional Practice</td>
<td>0</td>
</tr>
<tr>
<td>ENG 100</td>
<td>Engineering Orientation</td>
<td>0</td>
</tr>
<tr>
<td>Total Hours</td>
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</table>

Foundational Mathematics and Science

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 102</td>
<td>General Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 103</td>
<td>General Chemistry Lab I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 104</td>
<td>General Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 105</td>
<td>General Chemistry Lab II</td>
<td>1</td>
</tr>
<tr>
<td>MATH 221</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 225</td>
<td>Introductory Matrix Theory</td>
<td>2</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 241</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 285</td>
<td>Intro Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 211</td>
<td>University Physics: Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 212</td>
<td>University Physics: Elec &amp; Mag</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 213</td>
<td>Univ Physics: Thermal Physics</td>
<td>2</td>
</tr>
<tr>
<td>Total Hours</td>
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<td>34</td>
</tr>
</tbody>
</table>

Civil Engineering Technical Core

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEE 201</td>
<td>Systems Engrg &amp; Economics</td>
<td>3</td>
</tr>
<tr>
<td>CEE 202</td>
<td>Engineering Risk &amp; Uncertainty</td>
<td>3</td>
</tr>
<tr>
<td>CS 101</td>
<td>Intro Computing: Engrg &amp; Sci</td>
<td>3</td>
</tr>
<tr>
<td>SE 101</td>
<td>Engineering Graphics &amp; Design</td>
<td>3</td>
</tr>
<tr>
<td>TAM 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 212</td>
<td>Introductory Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 251</td>
<td>Introductory Solid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>TAM 335</td>
<td>Introductory Fluid Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>Total Hours</td>
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</tbody>
</table>

Science Elective

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science elective, selected in accord with recommendations for the chosen primary field in civil engineering.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ATMS 120</td>
<td>Severe and Hazardous Weather</td>
<td>3</td>
</tr>
</tbody>
</table>

Information listed in this catalog is current as of 02/2022.
Civil Engineering Technical Electives

Students choose primary and secondary fields, of which there are seven traditional areas of study and three interdisciplinary programs. 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.

### Code   Title   Hours

<table>
<thead>
<tr>
<th>Civil Engineering Core Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>The courses that are required and recommended for the primary and secondary fields are listed below. Select at least five courses from the following list:</td>
</tr>
<tr>
<td>CEE 300  Behavior of Materials 6</td>
</tr>
<tr>
<td>CEE 310  Transportation Engineering</td>
</tr>
<tr>
<td>CEE 320  Construction Engineering</td>
</tr>
<tr>
<td>CEE 330  Environmental Engineering</td>
</tr>
<tr>
<td>CEE 340  Energy and Global Environment</td>
</tr>
<tr>
<td>CEE 350  Water Resources Engineering</td>
</tr>
<tr>
<td>CEE 360  Structural Engineering</td>
</tr>
<tr>
<td>CEE 380  Geotechnical Engineering</td>
</tr>
<tr>
<td><strong>Primary Field Advanced Technical Electives. Select courses from approved lists for appropriate programs of study within the seven areas or three interdisciplinary programs of civil engineering. Design experience is distributed in 200-level, 300-level, and 400-level CEE courses including integrated design courses. See list below:</strong></td>
</tr>
<tr>
<td>CEE 300  Behavior of Materials</td>
</tr>
<tr>
<td>CEE 310  Transportation Engineering</td>
</tr>
<tr>
<td>MSE 201  Phases and Phase Relations</td>
</tr>
<tr>
<td>TAM 428  Mechanics of Composites</td>
</tr>
<tr>
<td>CEE 300  Behavior of Materials</td>
</tr>
<tr>
<td>CEE 310  Transportation Engineering</td>
</tr>
<tr>
<td>CEE 330  Environmental Engineering</td>
</tr>
<tr>
<td>CEE 340  Energy and Global Environment</td>
</tr>
<tr>
<td>CEE 350  Water Resources Engineering</td>
</tr>
<tr>
<td>CEE 360  Structural Engineering</td>
</tr>
<tr>
<td>CEE 380  Geotechnical Engineering</td>
</tr>
<tr>
<td><strong>Advanced Technical Courses Required:</strong></td>
</tr>
<tr>
<td>CEE 305  Asphalt Materials I</td>
</tr>
<tr>
<td>CEE 405  Concrete Materials (Required Integrated Design Course)</td>
</tr>
<tr>
<td>CEE 406  Pavement Design I</td>
</tr>
<tr>
<td>CEE 407  Reinforced Concrete</td>
</tr>
<tr>
<td>CEE 409  Steel Structures I</td>
</tr>
<tr>
<td>CEE 410  Wood Structures</td>
</tr>
<tr>
<td>CEE 483  Soil Mechanics and Behavior</td>
</tr>
<tr>
<td>MSE 401  Thermodynamics of Materials</td>
</tr>
<tr>
<td>MSE 402  Kinetic Processes in Materials</td>
</tr>
<tr>
<td>MSE 406  Thermal-Mech Behavior of Matls</td>
</tr>
<tr>
<td>MSE 420  Ceramic Materials &amp; Properties</td>
</tr>
<tr>
<td>MSE 450  Polymer Science &amp; Engineering</td>
</tr>
<tr>
<td><strong>Environmental Engineering</strong></td>
</tr>
<tr>
<td>CEE 200  Thermodynamics</td>
</tr>
<tr>
<td>CEE 232  Elementary Organic Chemistry I</td>
</tr>
<tr>
<td>CS 357  Numerical Methods I</td>
</tr>
<tr>
<td>MCB 300  Microbiology</td>
</tr>
<tr>
<td>ME 200  Thermodynamics</td>
</tr>
</tbody>
</table>

*Information listed in this catalog is current as of 02/2022*
MSE 401 Thermodynamics of Materials 3
STAT 420 Methods of Applied Statistics 3 or 4

Civil Engineering Core Courses Required:
CEE 330 Environmental Engineering 3

Civil Engineering Core Courses Recommended:
CEE 350 Water Resources Engineering 3
CEE 380 Geotechnical Engineering 3

Advanced Technical Courses Required - At least one of:
CEE 437 3
CEE 440 Fate Cleanup Environ Pollutant 4
CEE 445

CEE 446 Air Quality Engineering 4

Advanced Technical Course Recommended:
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 445

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

Geotechnical Engineering
Science Electives Required:
GEOL 107 Physical Geology 4
Science Electives Recommended:
GEOL 333 Earth Materials and the Env 4
GEOL 380 Environmental Geology 4
GEOL 401 Geomorphology 4
GEOL 411 Structural Geol and Tectonics 4
GEOL 440 Sedimentology and Stratigraphy 4
GEOL 470 Introduction to Hydrogeology 4

Civil Engineering Core Courses Required:
CEE 360 Structural Engineering 3
CEE 380 Geotechnical Engineering 3

Civil Engineering Core Courses Recommended:
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

Advanced Technical Courses Required:
CEE 483 Soil Mechanics and Behavior 4
CEE 484 Applied Soil Mechanics (Required Integrated Design Course) 3 or 4

Advanced Technical Courses Recommended:
CEE 457 Groundwater 3

CEE 460 Steel Structures I 3
CEE 461 Reinforced Concrete I 3
CEE 463 Reinforced Concrete II 3 or 4

Structural Engineering
Science Electives Required - None
Science Electives Recommended:
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:
CEE 300 Behavior of Materials 4
CEE 360 Structural Engineering 3
CEE 380 Geotechnical Engineering 3

Civil Engineering Core Courses Recommended:
CEE 320 Construction Engineering 3

Advanced Technical Courses Required:
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

Advanced Technical Courses Recommended - None

Transportation Engineering
Science Electives Required - None
Science Electives Recommended:
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:
CEE 300 Behavior of Materials 4
CEE 310 Transportation Engineering 3

Civil Engineering Core Courses Recommended:
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: You must select one course from each of the three Areas below and one 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

Area 2 - Systems:
CEE 407 Airport Design 3 or 4

Information listed in this catalog is current as of 02/2022
CEE 457
CEE 453
CEE 452
CEE 451
CEE 450
CEE 437
CEE 434
CEE 433
CEE 432

Advanced Technical Courses Recommended:
CEE 453
CEE 452

Advanced Technical Courses Required (Choose one):
CEE 380
CEE 360
CEE 330
CEE 320
CEE 310

Civil Engineering Core Courses Required:
ME 200
GEOL 107
CS 357

Science Electives Recommended:
ME 200
CHBE 321

Science Electives Required - None

Area 3 - Railroad:
CEE 408
CEE 409
CEE 410
CEE 411
CEE 412

Recommended:
CEE 401
CEE 405
CEE 406
CEE 407
CEE 408

Water Resources Engineering and Science
Science Electives Required - None
Science Electives Recommended:
CS 357
GEOL 107
ME 200
Civil Engineering Core Courses Required:
CEE 350
Civil Engineering Core Courses Recommended:
CEE 300
CEE 320
CEE 330
CEE 360
CEE 380

Advanced Technical Courses Required (Choose one):
CEE 452
CEE 453

Advanced Technical Courses Recommended:
CEE 458
CEE 498

Energy-Water-Environment Sustainability
Science Electives Required:
ME 200

Science Electives Recommended - None
Civil Engineering Core Courses Required:
CEE 340

Civil Engineering Core Courses Recommended:
CEE 330
CEE 350

Advanced Technical Courses Required:
CEE 493

Advanced Technical Courses Recommended:
ABE 436
ARCH 441
CEE 424
CEE 433
CEE 434

CEE 437
CEE 446
CEE 449
CEE 450

CEE 452
CEE 453

CEE 457
CEE 498

CEE 499

Societal Risk and Hazard Mitigation
Science Electives Required - None
Science Electives Recommended:
FIN 230
GEOL 118
LAW 301
NRES 287
STAT 420

Civil Engineering Core Courses Required:
CEE 340

Civil Engineering Core Courses Recommended:
CEE 300
CEE 310
CEE 320
CEE 330
CEE 350
CEE 360
CEE 380

Information listed in this catalog is current as of 02/2022
Advanced Technical Courses Recommended:
CEE 491  Decision and Risk Analysis (and select 3 from the recommended list below)  3 or 4

Advanced Technical Courses Required:
CEE 406  Pavement Design I  3 or 4
CEE 416  Traffic Capacity Analysis  3 or 4
CEE 417  Urban Transportation Planning  4
CEE 437  3  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

Science Electives Required - None

Science Electives Recommended:
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
GEOG 103  Earth's Physical Systems  4
NPRE 201  Energy Systems  2 or 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:
CEE 340  Energy and Global Environment  3

Civil Engineering Core Courses Recommended:
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:
CEE 491  Decision and Risk Analysis (And select 3 courses from the recommended list below)  3 or 4

Advanced Technical Courses Recommended:
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 (Section PS)  1 to 4
MSE 489  Matl Select for Sustainability  3 or 4
UP 466  Energy & the Built Environment  4
UP 480  Sustainable Design Principles  2

General Civil Engineering

Science Electives Required - Choose one course from recommended list below:

Science Electives Recommended:
GEOL 107  Physical Geology  4
CHEM 222  Quantitative Analysis Lecture  2
CHEM 232  Elementary Organic Chemistry I  3 or 4
ME 200  Thermodynamics  3
STAT 400  Statistics and Probability I  4

Civil Engineering Core Courses Required - Should take 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 Required - Option I: Pick no more than one course from each area below such that the sum of the core and advanced courses is at least 34 credit hours.

Option I: Pick 2 courses from one area and no more than one from the core and advanced courses is at least 34 credit hours.
CEE 420  Construction Productivity  3 or 4
CEE 421  Construction Planning  3 or 4
CEE 422  Construction Cost Analysis  3 or 4

Environmental:
CEE 437  3
CEE 440  Fate Cleanup Environ Pollutant  4
CEE 446  Air Quality Engineering  4

Geotechnical:
CEE 438  Science & Environmental Policy  3
CEE 445  
CEE 442  Environmental Engineering Principles, Physical  4
CEE 443  Env Eng Principles, Chemical  4
CEE 444  Env Eng Principles, Biological  4
CEE 446  Air Quality Engineering  4
CEE 447  Atmospheric Chemistry  4
CEE 449  Environmental Engineering Lab  3

Geotechnical Engineering
CEE 380  Geotechnical Engineering  3
Advanced Technical Courses Required:
CEE 483  Soil Mechanics and Behavior  4
CEE 484  Applied Soil Mechanics  3 or 4
Advanced Technical Courses Recommended - NONE

Structural Engineering
CEE 360  Structural Engineering  3
Advanced Technical Courses Required:
CEE 460  Steel Structures I  3
CEE 461  Reinforced Concrete I  3

Transportation Engineering
CEE 310  Transportation Engineering  3
Advanced Technical Courses Required: Select 2 courses, each from a different Area

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

Area 2 - Systems:
CEE 407  Airport Design  3 or 4
CEE 415  Geometric Design of Roads  4
CEE 416  Traffic Capacity Analysis  3 or 4
CEE 418  Public Transportation Systems  3 or 4

Area 3 - Railroad:
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

Water Resources Engineering and Science
CEE 350  Water Resources Engineering  3
Advanced Technical Courses Required: 2 courses from the recommended list below:

CEE 432  Stream Ecology  3 or 4
CEE 433  Water Technology and Policy  3 or 4
CEE 450  Surface Hydrology  3
CEE 451  Environmental Fluid Mechanics  3
CEE 452  Hydraulic Analysis and Design  3
Information listed in this catalog is current as of 02/2022

**CEE 453** Urban Hydrology and Hydraulics  4
**CEE 457** Groundwater  3
**CEE 458** Water Resources Field Methods  4
**CEE 498** Special Topics (Section EH)  1 to 4

### Energy-Water-Environment Sustainability

Civil Engineering Core Courses Required:
**CEE 340** Energy and Global Environment  3

Advanced Technical Courses Required:
**CEE 493** Sustainable Design Eng Tech (and select one course from the recommended list below)  4

Advanced Technical Courses Recommended:
**ABE 436** Renewable Energy Systems  3 or 4
**ARCH 441** Heat and Moisture in Buildings  3
**CEE 424** Sustainable Const Methods  4
**CEE 433** Water Technology and Policy  3 or 4
**CEE 434** Environmental Systems I  3
**CEE 437** 3  3
**CEE 446** Air Quality Engineering  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 498** Special Topics (Section EH)  1 to 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

### Societal Risk and Hazard Mitigation

Civil Engineering Core Courses Recommended - None

Advanced Technical Courses Required:
**CEE 491** Decision and Risk Analysis (and select one from the recommended list below)  3 or 4

Advanced Technical Courses Recommended:
**CEE 406** Pavement Design I  3 or 4
**CEE 417** Urban Transportation Planning  4
**CEE 437** 3  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

Civil Engineering Core Courses Required:
**CEE 340** Energy and Global Environment  3

Civil Engineering Core Courses Recommended:
**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 380** Geotechnical Engineering  3

Advanced Technical Courses Required:
**CEE 491** Decision and Risk Analysis (And select one course from the recommended list below)  3 or 4

Advanced Technical Courses Recommended:
**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 (Section PS)  1 to 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

Science Electives Recommended:
**CPSC 116** The Global Food Production Web  3
**ESE 140** Climate and Global Change  3
**ESE 320** Water Planet, Water Crisis  3
**ESE 482** Challenges of Sustainability  3

Civil Engineering Core Courses Recommended:
**CEE 330** Environmental Engineering  3
or **CEE 350** Water Resources Engineering

**CEE 340** Energy and Global Environment  3

Advanced Technical Courses Recommended: Must take at least 3 credit hours in each of the 2 areas below:

- **Knowledge and Skills Needed to Effectively Address Global Issues:**
  - **ACE 451** Agriculture in Intl Dev  3 to 4
  - **ATMS 421** Earth Systems Modeling  4
  - **CEE 438** Science & Environmental Policy  3
  - **CEE 445**
  - **CEE 447** Atmospheric Chemistry  4

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Information listed in this catalog is current as of 02/2022
**Civil Engineering, BS**

**Global CEE Design:**
- CEE 408: Railroad Transportation Engng
- CEE 417: Urban Transportation Planning
- CEE 437: 3
- CEE 449: Environmental Engineering Lab
- CEE 465: Design of Structural Systems

**CEE Multidisciplinary**
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 work with CEE Academic Advisors.

**Atmospheric Science (Primary Field: Environmental Engineering)**
- CEE 330: Environmental Engineering
- Advanced Technical Courses Recommended:
  - ATMS 302: Atmospheric Dynamics I
  - ATMS 410: Radar Remote Sensing
  - ATMS 411: Satellite Remote Sensing
  - ATMS 421: Earth Systems Modeling
  - CEE 445
- CEE 447: Atmospheric Chemistry

**Chemistry (Primary Field: Environmental Engineering)**
- CEE 330: Environmental Engineering
- Advanced Technical Courses Recommended:
  - CHEM 232: Elementary Organic Chemistry I
  - CHEM 315: Instrumental Chem Systems Lab
  - CHEM 332: Elementary Organic Chem II
  - CHEM 420: Instrumental Characterization
  - CHEM 440: Physical Chemistry Principles

**Chemical Engineering (Primary Field: Environmental Engineering)**
- CEE 330: Environmental Engineering
  - Advanced Technical Courses Recommended:
    - CHBE 321: Thermodynamics
    - CHBE 421: Momentum and Heat Transfer
    - CHBE 422: Mass Transfer Operations
    - CHBE 424: Chemical Reaction Engineering

**Microbiology (Primary Field: Environmental Engineering)**
- CEE 330: Environmental Engineering
- Advanced Technical Courses Recommended:
  - MCB 301: Experimental Microbiology
  - MCB 431: Microbial Physiology
  - MCB 450: Introductory Biochemistry

**CEE 444**
- Env Eng Principles, Biological

**Toxicology (Primary Field: Environmental Engineering)**
Civil Engineering Core Courses Required:
- CEE 330: Environmental Engineering
- Advanced Technical Courses Recommended:
  - CHEM 332: Elementary Organic Chem II
  - ENVS 431: Environ Toxicology & Health
  - ENVS 480: Basic Toxicology
  - MCB 450: Introductory Biochemistry

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tr>
<td></td>
<td>Free electives. Additional unrestricted course work, subject to certain exceptions as noted by the College, so that there are at least 128 credit hours earned toward the degree.</td>
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</table>

**Total Hours of Curriculum to Graduate** 128

1. CEE 190 is offered in the fall semester.
2. CEE 495 is offered in the fall and spring semesters.
3. External transfer students take ENG 300.
4. MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.
5. Math 284 or Math 286 (4 hours) are acceptable substitutes for MATH 285 (3 hours).
6. CEE 300 satisfies the General Education Advanced Composition requirement.
7. The Grainger College of Engineering approved liberal education course list can be found here ([https://go.grainger.illinois.edu/LiberalEducation/](https://go.grainger.illinois.edu/LiberalEducation/)). Note that these credit hours could carry the required cultural studies designation required for campus general education requirements.
8. The Grainger College of Engineering restrictions to free electives can be found here ([https://go.grainger.illinois.edu/FreeElectives/](https://go.grainger.illinois.edu/FreeElectives/)).

**Suggested Sequence**
The curriculum sequence below is a suggested sequence, as all Grainger Engineering students work with a department academic advisor to achieve their educational goals, specific to their needs and preparation. Dynamic and Static curricular maps, which include prerequisite sequencing, can be found here ([https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/cee-map/](https://grainger.illinois.edu/academics/undergraduate/majors-and-minors/cee-map/)).

**First Year**

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<tr>
<th>First Semester</th>
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<td>CEE 190¹</td>
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¹ Project-Based Introduction to CEE
RHET 105 Writing and Research or SE 101

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<tr>
<td>MATH 231 Calculus II</td>
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<tr>
<td>CHEM 104 General Chemistry II</td>
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<tr>
<td>CHEM 105 General Chemistry Lab II</td>
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<td>PHYS 211 University Physics: Mechanics</td>
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<tr>
<td>CS 101 Intro Computing: Engrg Sci</td>
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<tr>
<td>SE 101 Engineering Graphics Design</td>
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<td>or RHET 105</td>
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<td>CEE 201 Systems Engrg Economics</td>
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<td>MATH 241 Calculus III</td>
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<td>PHYS 212 University Physics: Elec Mag</td>
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<td>TAM 211 Statics</td>
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<tr>
<td>CEE 202 Engineering Risk Uncertainty</td>
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<td>PHYS 213 Univ Physics: Thermal Physics</td>
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<td>TAM 212 Introductory Dynamics</td>
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<td>TAM 251 Introductory Solid Mechanics</td>
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<td>CEE 300 Behavior of Materials</td>
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<td>MATH 285 Intro Differential Equations</td>
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<td>CEE 495 Professional Practice</td>
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Free elective 3

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1. Offered in the fall semester, student should take in the first or second semester of enrollment in Civil Engineering.
2. MATH 220 may be substituted, with four of the five credit hours applying toward the degree. MATH 220 is appropriate for students with no background in calculus.
3. RHET 105 (or an alternative Composition I sequence) is taken either in the first or second semester of the first year, according to the student’s UIN (Spring if your UIN is Odd). SE 101 is taken the other semester. Composition I guidelines can be found at http://catalog.illinois.edu/general-information/degree-general-education-requirements/ under Written Communication Requirement.
4. Students must take 6 hours from the campus General Education Social and Behavioral Sciences list, 6 hours from campus General Education Humanities and the Arts list, and 6 hours from a liberal education list approved by the college or from the campus General Education lists for Social and Behavioral Sciences or Humanities and the Arts. ECON 102 or ECON 103 must be one of the Social and Behavioral Sciences courses. Students must also complete the campus cultural studies requirement by completing (i) one western/comparative culture(s) course, (ii) one non-western culture(s) course, and (iii) one U.S. Minority Culture(s) course from the General Education cultural studies lists. Most students select general education courses that simultaneously satisfy these cultural studies requirements.
5. Civil engineering technical courses are defined as core courses and advanced technical electives and must total 34 hours of credit. Five courses and a minimum of fifteen hours must be core courses as outlined in the Civil Engineering Undergraduate Handbook. Advanced technical electives are selected to correspond with chosen primary and secondary areas of emphasis in civil engineering as outlined in the Civil Engineering Undergraduate Handbook. A minimum of twelve and six hours must be taken for the primary and secondary areas, respectively.
6. The science elective is selected in accord with recommendations for the chosen primary area of emphasis in civil engineering as outlined in the Civil Engineering Undergraduate Handbook. CEE 300 satisfies the general education advanced composition requirement.