CIVIL ENGINEERING, BS

Introduction
Please click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-engineering-design-computing/civil-engineering) to see Civil Engineering department information.

The objectives of the bachelor of science in civil engineering program are to produce graduates who:

- are able to perform the technical analyses and design tasks of entry-level civil engineers
- can successfully work toward professional engineering licensure
- communicate effectively, both orally and in writing
- understand the importance of leadership skills, team building and ethical practice
- value lifelong learning and improvement through graduate degrees or professional study
- appreciate the importance of community involvement and social contribution civil engineers are dedicated to improving our living environment

Civil engineering offers an interesting and challenging career in the design, construction, and maintenance of buildings and urban infrastructure; in transportation systems, including highways, airports, rapid transit lines, railroads, and harbor facilities; in the development of water resources, including reservoirs for storage, canals for irrigation, dams for power generation, stormwater management for drainage, groundwater recharge for contamination prevention, wastewater treatment for environmental protection, and water purification for drinking purposes; in the construction industry; including foundations, bridges, concrete and steel structures, in problems concerned with environmental preservation; and in the sustainable development of cities. In preparing for work in such a broad field, the civil engineering student studies mathematics, basic science, communication, social science and humanities, engineering science and civil engineering design. CU Denver's civil engineering graduates usually find their first professional employment with consulting engineering firms, government agencies and various industries.

Program Delivery
- This is an on-campus program.

Declaring This Major
- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/records-registration/registration/declare-change-major-minor/) to go to information about declaring a major.

General Requirements
To earn a degree, students must satisfy all requirements in each of the areas below, in addition to their individual major requirements.

- CU Denver General Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation/general-graduation-requirements/)
- CU Denver Core Curriculum (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation-undergraduate-core-requirements/)
- College of Engineering, Design and Computing Graduation Requirements (http://catalog.ucdenver.edu/cu-denver/undergraduate/schools-colleges-departments/college-engineering-design-computing/#graduationrequirementstext)
- Click here (http://catalog.ucdenver.edu/cu-denver/undergraduate/academic-policies-procedures/) for information about Academic Policies

Program Requirements
1. Students must maintain a minimum 2.0 GPA in all courses applying to major requirements.
2. Students must maintain a minimum 2.0 GPA in all CVEN and CEMT courses attempted.
3. Complete a minimum of 32 semester hours in math, chemistry, and physics
4. Complete a minimum of 18 semester hours of design courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>CVEN 1025</td>
<td>Civil Engineering Graphics and Computer Aided Design</td>
<td>3</td>
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<tr>
<td>CVEN 1067</td>
<td>Introduction to Civil Engineering</td>
<td>1</td>
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<tr>
<td>ENGR 1100</td>
<td>Fundamentals of Computational Innovation</td>
<td>3</td>
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<tr>
<td>or IWKS 2300</td>
<td>Fundamentals of Computational Innovation</td>
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<tr>
<td>CEMT 2100</td>
<td>Construction Management Fundamentals</td>
<td>3</td>
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<tr>
<td>CVEN 2121</td>
<td>Analytical Mechanics I</td>
<td>3</td>
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<tr>
<td>CVEN 2214</td>
<td>Surveying for Engineering</td>
<td>1-2</td>
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<tr>
<td>or CVEN 2212</td>
<td>Surveying for Construction and Engineering</td>
<td></td>
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<tr>
<td>CVEN 3111</td>
<td>Analytical Mechanics II</td>
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<tr>
<td>CVEN 3121</td>
<td>Mechanics of Materials</td>
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<td>CVEN 3141</td>
<td>Introduction to Structural Materials</td>
<td>2</td>
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<tr>
<td>CVEN 3200</td>
<td>Computational Methods for Civil Engineers</td>
<td>3</td>
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<tr>
<td>CVEN 3313</td>
<td>Fluid Mechanics</td>
<td>3</td>
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<tr>
<td>CVEN 3323</td>
<td>Hydrosystems Engineering</td>
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<tr>
<td>CVEN 3401</td>
<td>Introduction to Environmental Engineering</td>
<td>3</td>
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<td>CVEN 3505</td>
<td>Structural Analysis</td>
<td>3</td>
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<td>CVEN 3602</td>
<td>Transportation Engineering</td>
<td>3</td>
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<tr>
<td>CVEN 3718</td>
<td>Geotechnical Engineering I</td>
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<tr>
<td>CVEN 4000</td>
<td>Senior Seminar</td>
<td>0</td>
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</table>

Design Courses 18

Required:
- CVEN 4067 Senior Design Projects

Select five of the following:
- ENGR 1200 Fundamentals of Engineering Design Innovation
- CVEN 4426 Pipe Network and Sewer Design
- CVEN 4427 Storm Water System Design
- CVEN 4565 Timber Structure Design
- CVEN 4575 Structural Steel Design
- CVEN 4585 Reinforced Concrete Design
- CVEN 4590 Design of Prestressed Concrete
- CVEN 4591 Design of Composite Structures
- CVEN 4602 Advanced Highway Design
- CVEN 4650 Urban Street Design
- CVEN 4738 Intermediate Foundation Engineering
- CVEN 5426 Pipe Network and Sewer Design
- CVEN 5427 Storm Water System Design
CVEN 5540  Masonry Design
CVEN 5550  Highway Bridge Design
CVEN 5565  Advanced Timber Structure Design
CVEN 5575  Advanced Topics in Structural Steel Design
CVEN 5585  Advanced Topics in Reinforced Concrete
CVEN 5582  Pavement Design
CVEN 5590  Design of Prestressed Concrete
CVEN 5602  Advanced Highway Design
CVEN 5650  Urban Street Design

Mathematics
MATH 1401  Calculus I  4
MATH 2411  Calculus II  4
MATH 2421  Calculus III  4
MATH 3191  Applied Linear Algebra  4-6
& MATH 3200 and Elementary Differential Equations
or MATH 3195

CVEN 3611  Engineering Statistics  3
or MATH 3800  Probability and Statistics for Engineers  3

Chemistry
CHEM 2031  General Chemistry I  5
& CHEM 2038  General Chemistry Laboratory I
or ENGR 1130  Chemistry for Engineers  1

Physics
PHYS 2311  General Physics I: Calculus-Based  4
PHYS 2321  Intro Experimental Phys Lab I  1
PHYS 2331  General Physics II: Calculus-Based  4

Other Courses
Select one of the following:  3
CVEN 4025  Autocad Civil 3d & Advanced Civil Engineering Graphics
CVEN 4077  Engineering Economy
CVEN 4087  Engineering Contracts

Electives
Select three elective courses. Some examples are listed below.  2
CEMT 4231  Construction Materials and Methods
CEMT 4232  Construction Planning and Control
CEMT 4233  Construction Cost Estimating
CEMT 4234  Sustainable Construction
CEMT 4236  Project Management Systems
CEMT 4240  Building Information Modeling (BIM)
CEMT 4242  Construction Safety
CVEN 4025  Autocad Civil 3d & Advanced Civil Engineering Graphics
CVEN 4077  Engineering Economy
CVEN 4087  Engineering Contracts
CVEN 4612  Traffic Impact Assessment
CVEN 4621  Highway Capacity Analysis
CVEN 4800  Special Topics
CVEN 5111  Structural Dynamics
CVEN 5333  Surface Water Hydrology
CVEN 5381  Introduction to Geographic Information Systems

Electives from outside of Civil Engineering
BIOE 1020  Bioengineering Design and Prototyping II

BIOL 2010  Organisms to Ecosystems (Gen Bio)  3
CHEM 2061  General Chemistry II  3
CSCI 1510  Logic Design  3
CSCI 2132  Circuits and Electronics  3
ELEC 1510  Digital Logic  3
ELEC 2132  Circuit Analysis I  3
ENVS 3082  Energy and the Environment
ENVS 4740  Soil Science and Geography
GEOL 1073  Physical Geology: Surface Processes  3
IWKS 3100  3D Design, Computation and Prototyping
MATH 4820  Introduction to Mathematical Statistics
MECH 3012  Thermodynamics
PHYS 2711  Vibrations and Waves  3
PHYS 2811  Modern Physics I  3
URPL 3000  Planning the Built Environment
URPL 4000  Sustainable Urban Planning

CU Denver Core Curriculum
Select 24 Credits (http://catalog.ucdenver.edu/cu-denver/undergraduate/graduation-undergraduate-core-requirements/cu-denver-core-curriculum/)  24

Total Hours  130-133

1 Students who take CHEM 2031 & CHEM 2038 to fulfill the chemistry requirement will need an additional semester hour to reach the 130 semester hours required for the degree.
2 Any 4000-level or higher CVEN or CEMT courses. Other math, science or engineering courses may be allowed with advisor approval.
3 A maximum of one lower-division course (level 1000-2999) may be applied to electives.

Note
Up to two 5000-level CVEN courses taken at CU Denver for the bachelor of science in civil engineering can be applied to a CU Denver civil engineering master’s degree if relevant to the student’s master’s degree emphasis as determined by the students master’s degree advisor.

To review the Degree Map for this program, please visit our website (https://www.ucdenver.edu/student/advising/undergraduate/degree-maps/cedc/).