Who Can Apply?

Undergraduate students with a BS degree in engineering, engineering science, engineering physics, or applied mathematics can apply to the program.

Undergraduate Prerequisites

Students who do not have a Bachelor of Science degree in Civil Engineering (CE) are required to complete the following undergraduate courses before being admitted into the program:

- Calculus, Linear Algebra, and Differential Equations (four semesters); equivalents of APPM 1350, APPM 1360, APPM 2350, and APPM 2360
- Physics (two semesters, calculus-based, with a lab); equivalents of PHYS 1110 and PHYS 1120/1140 (laboratory)
- Analytical Mechanics or "Statics" (one semester); equivalent of CVEN 2121
- Fluid Mechanics (one semester); equivalent of CVEN 3313
- Mechanics of Materials (one semester); equivalent of CVEN 3161

In addition, in order to get the most out of the Civil Systems Engineering graduate curriculum, non CE students need to take two of the following junior level proficiency CE courses. They include:

- Introduction to Construction (one semester); equivalent of CVEN 3246
- Hydraulic Engineering (one semester); equivalent of CVEN 3323
- Structural Analysis (one semester); equivalent of CVEN 3525
- Fundamentals of Environmental Engineering (one semester); equivalent of CVEN 3414
- Geotechnical Engineering (one semester); equivalent of CVEN 3708

All prerequisite coursework can be taken at CU Boulder or elsewhere provided it meets the engineering transfer (equivalency) requirements. Students who are accepted into the program with outstanding pre-requisites will be required to complete those courses within the first two semesters after enrollment. Alternatively, students might consider earning a BS degree in Civil Engineering prior to embarking on the MS degree within Civil Systems via a BS/MS concurrent degree option.

Master of Science Degree in Civil Engineering

Within the Civil Systems area, the M.S. degree with a Graduate Certificate in Engineering for Developing Communities may be obtained under one of three plans.

Degree Plans

<table>
<thead>
<tr>
<th>Core coursework</th>
<th>Plan I: Thesis</th>
<th>Plan IIa: Report</th>
<th>Plan IIb: Coursework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective coursework</td>
<td>12 hours</td>
<td>12+3 hours (1 elective)</td>
<td>12 hours</td>
</tr>
<tr>
<td>Thesis or alternative</td>
<td>12 hours</td>
<td>3 hours plus a public presentation highlighting field experience</td>
<td>12+6 hours (2 electives)</td>
</tr>
<tr>
<td>Total</td>
<td>30 hours</td>
<td>30 hours</td>
<td>30 hours</td>
</tr>
</tbody>
</table>

August 14, 2015
Course Offerings

Required Core Courses (12 credit hours)

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Term</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 5147</td>
<td>Fall</td>
<td>Civil Engineering Systems and Planning</td>
</tr>
<tr>
<td>CVEN 5454</td>
<td>Fall</td>
<td>Statistical Methods for Natural and Engineered Systems (or equivalent*)</td>
</tr>
<tr>
<td>CVEN 5565</td>
<td>Spring</td>
<td>Life-cycle Engineering of Civil Infrastructure Systems</td>
</tr>
<tr>
<td>CVEN XXXX</td>
<td>Fall/Spring</td>
<td>Course emphasizing techniques or social implications of Civil Systems</td>
</tr>
</tbody>
</table>

*Other options: EMEN 5005 Introduction to Applied Statistical Methods, EDUC 8250/8260 Qualitative Methods I and II; or EDUC 8230/8240 Quantitative Methods I and II.

Courses Required for EDC Graduate Certificate (12 credit hours)

<table>
<thead>
<tr>
<th>Course ID</th>
<th>Term</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVEN 5919</td>
<td>Fall</td>
<td>Sustainable Community Development 1</td>
</tr>
<tr>
<td>CVEN 5929</td>
<td>Spring</td>
<td>Sustainable Community Development 2</td>
</tr>
<tr>
<td>CVEN 5939</td>
<td>Summer/Fall</td>
<td>Sustainable Community Development Field Practicum</td>
</tr>
<tr>
<td>ATLS 5250</td>
<td>Spring</td>
<td>Fieldwork Methods for ICTD Practitioners</td>
</tr>
</tbody>
</table>

Notes:

(i) All students with an EDC emphasis must complete a project or work in a developing community. This obligation is typically met by completing the CVEN 5939 field practicum and reporting requirements. Those with extensive prior field experience should contact the MCEDC Practicum Coordinator to discuss a possible alternative.

(ii) Students may transfer 9 units of post-graduate work to the MS degree.

Doctor of Philosophy Degree in Civil Engineering

The PhD degree requires completion of 30 semester credit hours in addition to a doctoral dissertation (30 thesis credits). Students may transfer 15 units of post-graduate work to a PhD degree. With prior approval, online courses through the University of Colorado Be Boulder Anywhere (http://beboulderanywhere.colorado.edu/) or other approved universities can be applied to the degree course requirements.

For specific academic advising, please contact your assigned faculty advisor. Students need to speak with their faculty advisor to determine the best course sequence on a case-by-case basis.

For Information specifically about the EDC Emphasis in Civil Systems, please contact:

Professor Bernard Amadei, Co-Director, Mortenson Center in Engineering for Developing Communities, Mortenson Chair in Global Engineering (303-492-7734, amadei@colorado.edu)
Robyn Sandekian, Managing Director, Mortenson Center in Engineering for Developing Communities (303-735-6708, sandekian@colorado.edu)

MCEDC website: http://mcedc.colorado.edu/

For departmental information please contact:

Pamela Williamson (pamela.williamson@colorado.edu)
Graduate Coordinator
Department of Civil, Environmental and Architectural Engineering
University of Colorado, Boulder, CO 80309-0428
Telephone: 303-492-7316, Fax: 303-492-7317
Department website: http://ceae.colorado.edu
Potential Electives for EDC Students (this list is not to be considered exhaustive)

These electives can be taken by students under plans IIa and IIb.

Up to 6 credit hours of 4000-level coursework taken outside the department can be applied to the MS degree. Note that some of these courses may have prerequisites (as indicated with an †) and in those cases, enrollment will require instructor permission. All courses are not taught every semester, so students are encouraged to plan ahead.

ANTH 5780: Core Course in Cultural Anthropology
ANTH 5020: Explorations in Anthropology (topics differ by section & semester)
ANTH 4/5500: Cross-Cultural Aspects of Socioeconomic Development
ATLS 4/5519: Adv. Special Topics in Technology, Arts, and Media (topics differ by section & semester)
CVEN 5276: Engineering Risk & Decision Analysis
CVEN 5323: Applied Stream Ecology
CVEN 5393: Water Resources System and Management
CVEN 5474: Hazardous & Industrial Waste Management
CVEN 5484: Introduction to Environmental Microbiology
CVEN 5514: Bioremediation
CVEN 5524: Drinking Water Treatment
CVEN 5534: Wastewater Treatment
CVEN 5594: Water Reuse and Reclamation
CVEN 5822: Geographical Information Systems for Civil and Environmental Systems
CVEN 5836: Construction Engineering and Management Fundamentals
ECON 4535: Natural Resource Economics
ECON 4545: Environmental Economics
ECON 4774: Topics in Economic Development, History, and Political Economy
ECON 4774: Economic Reform in Developing Countries
ECON 8774: Economic Development: Seminar in Transition Economies†
ECON 8784: Economic Development†
EBIO 4030/5030: Limnology
EBIO/GEOL/ENVS 4160: Introduction to Biogeochemistry
EMEN 5051: Tech Ventures and Leadership
ENVS 5100: seek approval of topic from EDC/faculty advisor prior to enrollment
ENVS 5810: Water Resources and Environmental Sustainability
ENVS 5820: Renewable Energy Policy
GEOG 4/5292: Migration, Immigrant Adaptation, and Development
GEOG 4/5682: Development Geography
GEOG 4/5732: Population Geography
GEOG 4/5852: Health and Medical Geography
GEOG 5100: seek approval of topic from EDC/faculty advisor prior to enrollment
GEOG 5782: Sustainable Development: Critique
GEOG 6402: Seminar: Political Ecology
GEOL 4716: Environmental Field Geochemistry (2 credits)
JOUR 6211: Communication and International Development
MBAX 6140: Social Entrepreneurship in Emerging Markets (formerly MBAX 6845)
MGMT/CESR 4130: Sustainable Operations (was MGMT 4080)

For those students who are interested in studying the concept of development in more depth than what can be integrated into the graduate programs in Civil Engineering, the Geography Department offers a 12-credit hour Certificate in Development Studies. That certificate provides interdisciplinary training in development studies to graduate students with coursework on issues such as agrarian change, labor migration, new social movements, industrial growth, urban planning, and natural resource use. Students For details, see the Graduate Certificate in Development Studies website at http://geography.colorado.edu/grad_program/certificates.