The Mortenson Center in Engineering for Developing Communities (MCEDC) offers a graduate certificate in Engineering for Developing Communities to graduate-level engineering students (including BS/MS students in their final year, MS, or PhD students enrolled in a department within the College of Engineering and Applied Science). It is designed for graduate students who plan to work in the field of international development or humanitarian engineering. Students earn the EDC Certificate by satisfactorily completing the four required courses, with a grade of B- or higher in each course:

- CVEN 5919: Sustainable Community Development I
- CVEN 5929: Sustainable Community Development II
- CVEN 5939: Sustainable Community Development Field Practicum
- CVEN 5565: Life-Cycle Engineering of Civil Infrastructure Systems

The EDC Graduate Certificate requirements are in addition to the graduate degree requirements established by each engineering track/department participating in the EDC program. Therefore, graduate students interested in completing the EDC Graduate Certificate need to contact their respective academic/research advisors to determine how the certificate courses will fit into their overall degree program. MS and PhD research requirements remain the exclusive responsibility of the students’ home department/program and advisor.

![Sustainable Community Development I and Sustainable Community Development II](image)

**Figure A: The ADIME-E Framework Showing Phases Covered in SCD I and SCD II**

- **CVEN 5919: Sustainable Community Development I (SCD I, Fall only, 3 credits)**
  - CVEN 5929: Sustainable Community Development II (SCD II, Spring only, 3 credits)
This course sequence is designed for graduate engineering students and others who plan to work on small scale human development projects in developing countries. It is an integral part of the EDC Graduate Certificate offered through the Mortenson Center in Engineering for Developing Communities (MCEDC)
at CU Boulder. The center promotes integrated and participatory solutions to humanitarian development by educating globally responsible engineering students and professionals to address the problems faced by developing communities worldwide.

**SCD 1 and 2** represent a two-semester course sequence on development engineering. **SCD 1**, a pre-requisite for SCD 2, focuses on the fundamental tools necessary to address sustainable community development projects in developing communities. During the first part of the semester, the focus is on human and sustainable development issues. This is followed by the presentation of an integrative and participatory framework for development projects in communities described as being of high-medium risk and low capacity. The framework consists of a combination of development and engineering project management tools and is summarized in *Figure A* above. Use of the framework is illustrated through case studies and student driven team projects.

**SCD 2** covers the principles, practices and strategies of appropriate technology as part of an integrated and systems approach to community-based development. Course content areas include technical issues in development, environmental health and communicable disease, appropriate and sustainable technologies with hands-on workshops, and global cooperation in development. Use of the framework is illustrated through case studies and student driven team projects.

- **CVEN 5939: Sustainable Community Development Field Practicum (SCD III, 3 credits)**
  This intensive program provides an opportunity for students to gain insight into the field of international development, experience the reality of working in developing communities, and apply theoretical foundations of SCD classes to real world experiences. Field-based experiences are an important component of the EDC program. A true understanding of humanitarian engineering requires students to actively engage in a significant field-based experience in a developing community. SCD III encompasses humanitarian engineering field work and analytical reporting.

- **CVEN 5565: Life-Cycle Engineering of Civil Infrastructure Systems (Spring only, 3 credits)**
  This course addresses the philosophical and analytical issues for lifetime design and operation of civil systems, optimization tradeoffs of construction, management, and sustainability, utility of operation and service, including present-value economic analysis. Students will learn about decision-making alternatives of safety and performance. Recommended prerequisites include design experience and a course in Probability and Statistics (CVEN 3227 Probability & Statistics or equivalent).