

UNIVERSITY OF COLORADO
College of Engineering
Department of Civil, Environmental, and Architectural Engineering

COURSE SYLLABUS

- COURSE:** CVEN 4838-001: Engineering for the Developing World
- SEMESTER:** Fall 2005
- INSTRUCTOR:** Bernard Amadei, Professor of Civil Engineering, ECOT 546
E-mail: amadei@colorado.edu; Tel: 303-492-7734
Office Hours: Open
- WEB SITE:** www.edc-cu.org/CVEN4838.htm
- LECTURES:** Wednesday: 2-4:50 p.m.

"Engineering design is the process of devising a system, component or process to meet desired needs. It is a decision-making process (often iterative), in which the basic sciences, mathematics, and engineering sciences are applied to convert resources optimally to meet a stated objective. Among fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation." (ABET definition of design).

COURSE DESCRIPTION

This course is a two-semester, six-credit senior design experience with significant research and design in appropriate and sustainable technology and small-scale community planning and development. The course cuts across many engineering disciplines. The course objectives can best be described as follows:

- Introduce students to open ended problems at the community level
- Help students develop the skills to solve those problems and provide holistic engineering solutions that are sustainable and appropriate to the community being served
- Help students develop cultural and social awareness
- Help students work in interdisciplinary teams
- Give students the opportunity to reflect on the importance of their community service
- Give students a professional work ethic
- Help students gain a better understanding of the importance of engineering in society and in developing community development.

This course is offered as part of the Engineering for Developing Communities program at CU Boulder. The program's mission is to educate a new generation of globally responsible engineering students and professionals who can offer sustainable and appropriate solutions to the endemic problems faced by developing communities worldwide.

This course has been designed around the recommendations for general engineering education suggested in the *ASCE Body of Knowledge for the 21st Century* (www.asce.org/raisethebar) and by ABET (criteria 3 and 4). More specifically, students taking this class will:

1. Learn the different aspects and phases of engineering projects (conceptual phase, design, construction, implementation, and monitoring) over a period of two semesters by working on real developing community open ended small-scale projects.
2. Learn about the interaction of the built environment with natural systems, and the interplay between technical and non-technical issues shaping engineering decisions in the world today.
3. Acquire an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. Develop their ability to work in multidisciplinary teams.
5. Develop and improve their communication skills.
6. Acquire a broader education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
7. Gain insight into what represents poverty and how to contribute to its eradication.

COURSE FORMAT

Students in this course will be divided into multidisciplinary teams. Each team will be assigned a small-scale community project. Faculty and professional engineers will mentor students throughout the project and will be responsible for quality control reviews of all designed solutions. Each student team will be assigned an advisory team. In academic year 2005-2006, only one team will be created.

COURSE GRADING

Student grades will be based on class participation, home work assignments, and successful project management and implementation. More specifically, expectations of students include:

Reading: Students are expected to read the texts and articles as assigned in class. All reading assignments will be discussed in class and will require participation.

Writing: Students are expected to contribute various papers and studies on topics of interest.

Attendance: Attendance is critical to a sufficient understanding and working knowledge of course material. Students should discuss any absences in advance, whenever possible.

Class Participation: Class participation is essential. Class participation is defined as intelligent, thoughtful articulation of ideas in discussion; respectful listening to other's point of view; asking relevant questions; neither being too dominant nor too passive in the discussions; and wholehearted participation in presentations and exercises. Students will also be asked to moderate discussions on various topics.

Projects: Students will be associated with all aspects of project planning, management and execution. Project deliverables include: (i) monthly progress reports; (ii) reports that contain an overview of the discussions leading to the chosen design; (iii) engineering plans and drawings; (iv) user's guides for community residents to insure project sustainability; and (iv) reflective journals demonstrating student's progress throughout the fall and spring semesters.

Travel: Students are expected to conduct and organize two trips for each project. The first trip (fall) will focus on data gathering, including a site survey and a meeting with community partners to ensure that the students are aware of the needs/desires of the community. The second trip (spring) will include implementation of the collaboratively designed solution.

COURSE CONTENT: To be decided by students and faculty.