



Center for Sustainable Engineering

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Carnegie Mellon University, the University of Texas at Austin, and Arizona State University are pleased to announce the establishment of the Center for Sustainable Engineering, supported by the National Science Foundation and the Environmental Protection Agency. Sustainable Engineering may be defined as engineering for human development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Commission, 1987). Examples of Sustainable Engineering include:

- Using methods that minimize environmental damage to provide sufficient food, water, shelter, and mobility for a growing world population
- Designing products and processes so that wastes from one are used as inputs to another
- Incorporating environmental and social constraints as well as economic considerations into engineering decisions

As the global population grows and standards of living improve, there will be increasing stress on the world's limited resources. Thus engineers of the future will be asked to use the earth's resources more efficiently and produce less waste, while at the same time satisfying an ever-increasing demand for goods and services. To prepare for such challenges, engineers will need to understand the impact of their decisions on built and natural systems, and must be adept at

working closely with planners, decision makers, and the general public. Sustainable Engineering emphasizes these and related issues.

The goal of the Center is to develop and implement activities to enhance education in Sustainable Engineering at colleges and universities around the U.S. and around the world. A number of specific activities are planned:

1. Workshops (2.5 days each) will be organized to assist faculty who wish to add Sustainable Engineering to their courses. The workshops will also help these faculty improve their teaching, evaluate their courses, obtain funding for educational innovations, and become part of a growing network of educators in Sustainable Engineering.
2. A website will be established with peer-reviewed educational materials on Sustainable Engineering. The site will be set up in cooperation with a commercial publisher, and is expected to be self-supporting within a few years.
3. A benchmark assessment of Sustainable Engineering programs and courses around the U.S. will be conducted to determine the status of education in this emerging discipline. Measures of quality in these programs will be explored and used to initiate an award program for excellence in Sustainable Engineering Education.

Workshops

The first two workshops will be held on July 17-19 and July 19-21, 2006 at CMU. Subsequent workshops will be held in summer 2007 (two at UT Austin) and January 2008 (two at Arizona State U). Each workshop will accommodate 30 participants; all tenure track faculty members from engineering departments at four-year colleges and universities in the U.S. are eligible to apply. Participants will be chosen based on a competitive application process. Criteria for selection include a demonstrated interest in Sustainable Engineering, leadership in outstanding research, evidence of excellence in teaching undergraduate and/or graduate engineering courses, written agreement that the individual will contribute at least one set of educational materials to the CSE website within a year of the workshop date, evidence of a process by which information learned at the workshop can be effectively communicated to other faculty members at the individual's home institution, and likelihood that the workshop will result in substantial changes to courses at the home institution. Priority will be given to untenured faculty members. Participants are expected to pay their own travel costs to the workshop and attend all activities of the workshop for the 2.5 day period. NSF will cover the expenses of participants at the workshop, including food, lodging, and workshop materials. Participants successfully completing the workshop will receive certificates designating them as NSF Sustainable Engineering Education Scholars.

Application forms for the July 2006 workshops will be available on the CSE website in November 2005. The applications will be due February 14, 2006, and applicants will be notified of the success of their application by February 28, 2006.

Website

The website will be established in cooperation with a major commercial publisher, and will be hosted by the publisher. The main feature of this site will be a database where individuals can submit educational materials to the Editor-in-Chief for peer review. If accepted, contributed materials will be placed on the website as part of the permanent collection available for others to access. Some of the materials will be free to users, while others will have a modest charge. Contributors will receive fees that increase with greater use of their materials. Users will be able to select from the available materials and will have the option of downloading individual modules or designing custom textbooks for their courses. The materials will be indexed by subject matter, author, source, applicable industrial sector, and other categories.

Benchmark Assessment

To determine the status of sustainable engineering education at four-year colleges and universities in the U.S., the Center will collect information on courses and curricula, sustainability centers and institutes, conferences related to sustainability, and other activities related to Sustainable Engineering. To the extent possible, all 1500 accredited engineering programs and departments in the U.S. will be assessed. Detailed information about the content of courses will be obtained, such as the key concepts, types of educational activities, and written materials. In addition, a number of practicing engineers in the U.S. will be contacted to help identify sustainable engineering skills needed by graduates as they begin to practice their profession. A committee will be organized to assess the quality of existing Sustainable Engineering programs, identify best practices, and establish awards for outstanding programs. Based on all of the information collected, the Center will develop a roadmap for achieving excellence in Sustainable Engineering education, and will summarize the data and the roadmap in journal articles and on the Center website.

For more information on the Center for Sustainable Engineering, please visit our website at www.csengin.org or contact Ms. Nichole Dwyer at ndwyer@andrew.cmu.edu.