

feature story

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Let's Not Overlook Standards

BY ALLISON ICKOWICZ

Engineers designing products know that they must comply with certain formal standards if the fruit of their labors are to be widely used, but few U.S. engineering students know much about them. The IEEE hopes to change that, thanks to educational materials about standards it put up on the Web this month. Its aim is to impart information about standards to university students, faculty members, and just about anyone else who might be interested.

The material was developed in response to criteria set by the Accreditation Board for Engineering and Technology (ABET), which accredits engineering programs at U.S. universities. Criterion 4 of the latest guidelines document, introduced in 2000 and known as ABET 2000, says that students must be prepared for "engineering practice" through a curriculum that culminates in a major design project "incorporating engineering standards and multiple realistic constraints." The IEEE is one of the engineering organizations that sits on the ABET board, and through its members helps evaluate the quality of university programs in engineering and engineering technology.

TASK FORCE To meet ABET's requirement, the IEEE in 2003 formed the Standards in Education Task Force, which has representatives from the institute's Educational Activities Board and Standards Association, and financial support from the IEEE Foundation.

"It is crucial that engineering students learn how to use standards in their classes and senior design projects, just as engineers working in industry use standards when they design products and services," says IEEE Life Fellow Ted Bickart, the cochair of the task force. "Standards are an essential element for engineering and engineering technology practice if we're going to create products and processes that will serve the world over." Bickart, a retired professor of electrical engineering, is from the IEEE Educational Activities Board.

Over the past two years, the task force has written a number of documents that include case studies and the first of several tutorials that together cover the history of standards and their effect on products, processes, and designs. The tutorials focus on particular technical areas. The first is about standards applicable to mobile telephony, and another on standards in power systems is to be completed in the next few months. Ultimately, Bickart would like to see a standards tutorial developed for each of the IEEE's technical fields of interest.

A glossary is also available that defines common standards terms and phrases found in the tutorials and case studies. And a reference guide lists standards-related terminology alphabetically, including acronyms and abbreviations, plus the names of standards-development organizations. These materials can all be accessed from a Web site called the Standards in Education Web Portal.

The U.S. National Science Foundation (NSF) awarded a US \$100 000 grant last May to the task force and to two universities to introduce the standards materials and the portal in their undergraduate electrical and computer engineering and engineering technology programs during the 2005, 2006, and 2007 academic years. The Colorado School of Mines, in Golden, and DeVry University, in North Brunswick, N.J., are the two schools chosen.

At Colorado, for example, seniors are going to the portal to get details on standards before they begin research for their senior projects, according to Doug Sutton, the school's industry liaison and a lecturer in the school of engineering, and Melvin Capehart, an instructor in electrical engineering. Instructors at DeVry have begun using the materials in sophomore and junior electronics and telecommunications classes, says Eric Addeo, a professor of electrical engineering and telecommunications.

The task force is also sending the materials to other universities, notes Bickart. His group is looking to partner with other engineering societies, especially those involved in accreditation activities, so they can develop similar teaching aids for other fields. If Colorado and DeVry provide good reviews, the standards task force will apply for another NSF grant to help it incorporate the materials first into instruction in other schools in the United States and Canada and eventually into university curricula worldwide.

The Standards in Education Web Portal is at www.ieee.org/standardseducation. The materials, useful to anyone interested in

learning about standards, are available at no charge. For more information about the portal or activities of the Standards in Education Task Force, contact Tara Gallus at t.gallus@ieee.org.