# ethics

# Engineering ethics education finally reaches 'critical mass'

BY JOSEPH R. HERKERT
Past president, IEEE Society
on Social Implications of Technology

**A**lthough the importance of engineering education in promoting ethics and professionalism has long been appreciated, it is only in recent years that various factors have coalesced to form a critical mass of activity in the area of engineering ethics education.

These factors include growing cooperation between philosophy and engineering faculty in research and teaching, a proliferation of conferences and educational materials, and the emergence of the World Wide Web as a means of disseminating information on engineering ethics.

Perhaps the most important factor in the renewed vitality in engineering ethics education is the "outcomes" approach contained in the Engineering Criteria 2000 proposed by the Accreditation Board for Engineering and Technology (ABET). Under the ABET Criteria 2000, engineering programs must demonstrate that their graduates have, among other abilities, "an understanding of professional and ethical responsibility."

**ATTRACTING ATTENTION.** Over the past two decades several philosophers in the field of applied ethics have turned their attention in research and teaching toward engineering ethics and ethical issues in other professional fields. An increasing number of engineering educators are also engaged in teaching and research related to engineering ethics. Since the late 1970s, encouraged by funding from the National Science Foundation and private foundations, there has been continuing collaboration between engineers and philosophers, resulting in a synergistic melding of expertise in applied ethics and engineering theory and practice.

This growing cooperation was evident this past year at a number of successful interdisciplinary conferences and conference sessions that focused on various aspects of engineering ethics, including: a mini-conference on practice and teaching ethics in engineering and computing, sponsored by the Association for Practical and Professional Ethics; a conference on ethics for science- and engineering-based international industries sponsored by the Engineering Foundation; and a well-attended session on professional and ethical responsibility sponsored by the Liberal Education Division at the 1997 Annual Meeting of the American Society for Engineering Education.

**RESOURCES AVAILABLE.** Resource materials on engineering ethics have proliferated in the past decade, including a number of successful textbooks, newsletters, a new scholarly journal, "Science and Engineering Ethics," and a growing presence of engineering ethics material on the WWW. The most extensive Web sites are the Ethics Center for Engineering & Science at Case Western Reserve University and the engineering ethics Web page at Texas A&M University, both of which contain case study materials and other educational resources. The Texas A&M site also includes numerical cases specifically designed for utilization in required engineering courses. (URLs for these and other sites can be found in a comprehensive Web index on engineering and computing ethics at "www4.ncsu.edu/unity/users/j/jherkert/ethicind.html").
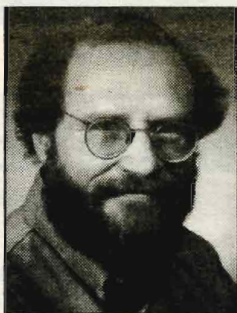


*Joseph R. Herkert*

While there are few required courses in engineering ethics, stand-alone elective courses have been taught for many years at a number of universities and colleges. There is also a growing interest in infusing engineering ethics concepts and cases in mainstream engineering courses, particularly in response to the proposed ABET Criteria 2000. In addition to traditional concerns, such as protection of the public health, safety and welfare, the rapid change occurring in the engineering workplace environment is challenging engineering educators to introduce students to the ethical implications of such issues as sustainable development, globalization, the rapid growth of information technology, and team-oriented engineering practice. It is thus becoming incumbent upon all engineering educators to share responsibility for teaching their students about the societal and ethical aspects of engineering.

**CRITICAL ROLE.** Professional societies like the IEEE, in providing a vital link between academia and engineering practice, play a critical role in engineering ethics education. In addition to promulgating codes of ethics and supporting informational and educational activities, the professional societies have an obligation to exemplify for engineering students and young engineers ethical practices in the engineering profession. Long a leader in the development of technology, the IEEE has an opportunity to advance engineering ethics education by also becoming a leader in the responsible use of technology, through setting and supporting strong standards of ethical conduct by engineering professionals.

> *Send suggestions or comments for the IEEE Ethics Committee to Cathy Downer, IEEE Ethics Committee, 445 Hoes Lane, Piscataway, NJ, USA 08855-1331; e-mail "ethics@ieee.org"; telephone 1-732-562-3929; fax 1-732-562-9515.*
>
> *The Ethics Committee also maintains a Web home page at "www.ieee.org/committee/ethics".*