

Integrating Ethics into Science and Engineering Education

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Ethical Issues in Science and Engineering

- Issues associated w/ practice and application, e.g.,
 - ◆ conduct and reporting of research
 - ◆ engineering practice
- Issues that arise in the application of technology and scientific findings

Students and Trainees Need to Understand

- Engineering and research communities are part of society
- Science and technology are not value free
- Potential dual use of technologies and research findings
- Knowing and conforming to the standards and values of the profession is expected

Role Responsibilities

The 'Paramountcy' Provision –

“Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.”

- National Society of Professional Engineers (NSPE)

Features of Effective Programs

- Required
- Interactive
- Relevant topics
- Program starts early & continues
- Message is reinforced
- Broad-based faculty involvement

Role of Faculty

- Faculty and senior members of the community play a critical role.
 - ◆ Experts regarding their own expectations
 - ◆ Set the standards of the community directly and indirectly
 - ◆ Serve as role models
 - ◆ Share their experience and expertise
 - ◆ Make explicit what is implicit

Goals

- Increase awareness and knowledge of professional standards
 - ◆ Range of acceptable practices
 - ◆ Identify and examine underlying assumptions and potential ambiguities
 - ◆ Assess immediate and long-term implications
- Increase awareness of ethical dimensions of science and engineering

Goals - Cont

- Provide experience in thinking through and defending decisions about ethical problems
- Develop approaches and identify resources for making decisions about ethical problems
- Promote a sense of professional responsibility to be proactive in recognizing and addressing ethical issues

Possible Formats

- Courses
- Integrate into core courses
- Lab or team meetings
- Departmental seminars
- Journal club
- Informal discussion w/ advisors
- Component of a project
- Research and Engineering Practice Workshops

Key Issues in Case Discussion

- There is usually more than one solution
- Adopt the perspective of the agent
 - ◆ Identify problem(s) and stakeholders
 - ◆ Identify ambiguities and their implications
 - ◆ Identify resources
 - ◆ Develop courses of action
 - ◆ Be explicit about ethical implications

Conclusions

- Issues must be discussed explicitly. - Good role models are necessary but not sufficient.
- Faculty and senior professionals play a critical role.