ENGINEERING

ETHICS

Fundamental assumption:

> All members of a profession, such as engineers, physicians, and lawyers, simply by being members of a profession, have duties, rights and obligations that do not apply to those who are not
>
> members of that profession.

If this assumption is rejected, no special status may be claimed, neither theoretically nor practically, by professional ethics. And, professionals will have no special obligation to act in any specific manner.

Evolution

- Engineering practice has evolved – its scope has broadened.

- Engineers can be proud of their profession. Engineering is responsible for advances in the human condition and quality of life via technological innovation and application.

- Society has often expressed concern for the balance between benefit & risk.

- Engineers now need to exhibit social responsibility and accountability.

- Engineers must consider sociological, economic, legal, and political factors, in context, to formulate design tradeoffs.

- All engineered artifacts are designed, ultimately, for the service of mankind and civilization.

Understanding Technological Realities

$\exists$ 3 primary realities:

1. Technology is more than the practice of engineering and a collection of engineered artifacts – it is more than HW & SW. Rather, it is a social process integrating many classes of specialized knowledge & resources in the service of human needs, values, desires, and aspirations.

2. Every technology has side effects [implications]:

   - only some anticipated
   - some beneficial
   - some inconsequential

- some malignant
- which of the above 3 categories applicable can differ by context
- side effects impose new modes and scales of risk on life and the environment.
- $\exists$ indirect [second order] effects on civilization and its societies and cultures

3. $\exists$ the responsibility to assist the nontechnical laity to comprehend technological implications – to educate regarding all facets of risk.

Ethical Dilemmas

- Managing Risk
  - social rather and more than technical question.
  - statement of risk by engineer often differs from perception by laity
  - when engineers adopt margins of safety, they assume responsibility for human lives and welfare.
  - 2 types of analysis:
    * probabilities of threat occurrence or failure and the severity of harm.
    * valuation of human life, property, and the environment

- higher civilization $\Rightarrow$ higher societal expectation of safety

- Managing Institutions
  - those exposed to risk $\neq$to those generating it
  - institutions often exploit technology to increase wealth and or power.
  - employees usually adopt the internal culture and values of their employers
  - personal ethics $\neq$corporate ethics
  - e.g. Challenger, Bhopal, & Chernobyl
  - case studies illuminate examples of failure & conflict
  - $\exists$ evidence of coercion by employers

- Managing the Future
  - systematically anticipating implication of new technologies.
    - social effects
    - economic effects
    - environmental effects
  - often at the governmental agency level

- Engineer as public counselor
  - enhance public perceptions of risk
  - improve quality of technologically intensive public policy choices
  - direct involvement in the political process

Online Resources for engineering ethics

- The Online Ethics Center for Engineering & Science
  - http://onlineethics.org/
  - Codes of Ethics and Conduct
    - http://onlineethics.org/codes/index.html?t
    - National Society of Professional Engineers Code of Ethics
      - http://onlineethics.org/codes/NSPEcode
- National Institute for Engineering Ethics Online
  - http://www.niee.org/
- Engineering Ethics

  - http://ethics.tamu.edu/

- Applied Ethics in Professional Practice Case of the Month Club

  - http://www.engr.washington.edu/~uw-epp/P