



ECE 481

**Ethics in
Electrical and Computer Engineering**

**Lecture #3: Moral Frameworks for
Engineering Ethics**

Prof. K.M. Passino

Ohio State University

Department of Electrical and Computer Engineering

Why a moral framework?

- Illuminates connections between engineering codes of ethics and everyday morality
- Helps make moral choices, resolve moral dilemmas
- **Utilitarianism:**
 - “Produce the most good for the most people, giving equal consideration to everyone affected”
 - What is “good”? Consider “acts” or “rules”?
 - From codes: “Engineers shall hold paramount the safety, health, and welfare of the public in the performance of their professional duties.”
 - “Welfare” is a type of “utility” (so are safety, health)





- Engineering cost-benefit analysis:
 - The same as utilitarianism? No.
 - **Typical** cost-benefit analysis identifies good and bad consequences of actions/policies in terms of **dollars**
 - **Why are dollars the correct utility?** How to include costs of lives, injuries?
 - **Usually**, focus on profits to corporation
 - **Example:** Cost of safe designs vs. warranty vs. loss of lives/legal issues (e.g., Ford Pinto)



Rights Ethics, Duty Ethics

- Rights ethics: Human rights is the moral “bottom-line” (and human dignity and respect are fundamental)
 - Liberty rights: Rights to exercise one’s liberty that lead to duties of others not to interfere with one’s freedoms
 - Welfare rights: Rights to benefits needed for decent human life
- Codes? “Engineers shall hold paramount the safety, health, and welfare of the public in the performance of their professional duties.” (refers to each individual)
- Public has rights (life/no injuries from bad products, privacy, to get benefits through fair/honest exchange in a free market), *what are their duties in these respects?*
- Duty ethics: Right actions are those required by duties to respect the liberty or autonomy of individuals. Codes?



Virtue Ethics

- Virtue ethics emphasizes character (virtues/vices) more than rights and rules.
- Virtues: competence, honesty, courage, fairness, loyalty, and humility (vices opposites)
- **Relevance to codes? IEEE:**
 - “... be honest... in stating claims...”
 - “...improve our technical competence...”
 - “...treat fairly all persons...”



Virtues in engineering

- Public-spirited virtues:
 - Focus on good of clients (“client-focused”)
 - Focus on good of public
 - Generosity - going beyond minimum requirements in helping: “engineers who voluntarily give their time, talent, and money to their professional societies and local communities”



- Proficiency virtues:
 - Mastery/competence
 - Diligence (e.g., software engineering case study example)
 - Creativity (to keep up with technology)
- Teamwork virtues:
 - Working together effectively (not a loner)
 - Collegiality, cooperation, loyalty, respect for authority



Self-Realization Ethics and Self-Interest

- Ethical egoism: promote only your own self-interest (extreme view!)
- Predominant egoism: strongest desire for most people most of the time is self-seeking (“mixed motives,” reasonable!)
- **Engineers:**
 - Proficiency motives: Challenge self, serve public
 - Compensation motives: Make money for self/family, but helps community
 - Moral motives: Desire to do right (“give back”), integrity, feels good and positively impacts community
- **Engineering companies:**
 - Safety/profit motives! Company competence, education
 - Professional climate, compensation



Self-Realization Ethics and Personal Commitments

- Community-oriented version of self-realization ethics
- Pursue self-realization, but enrich community
- Personal commitments form the core of a person's character and motivate, guide, and give meaning to the work of engineers
 - Must all engineers have *outside* humanitarian, environmental, etc., commitments? No!
 - Could be directed only *within* the profession, company, or clients (professional behavior in the organization)
 - Outside commitments should not adversely affect your job responsibilities!



- Personal commitments - professional life
 - Create meaning: “enliven ones daily work and life”; “work is worthwhile”; “life is worth living”
 - Motivate professionalism throughout long careers (deep commitments persist; they are a part of you)
 - Religious beliefs often supportive
- Engineering:
 - Meaning can come from technical challenges, relationships with co-workers... other sources?
 - Engineering makes life better for others? Helps others?
 - Alleviates suffering?
 - Eliminates difficult, dangerous, or tedious toil?
 - Makes people healthier/happier?
 - Aesthetically or intellectually enriches people?



Pro Bono Engineering Work?

- Should engineering professions do more to encourage engineers to apply skills in offering voluntary service to others? **Yes.**
- Pro bono (or reduced rate) work is encouraged in law, medicine. Sometimes/often in engineering. Would it raise the stature of the profession by making it a “direct contact” profession?
- Engineers do a lot of volunteer work now!
- What does engineering education do to support such professionalism? *The “service-learning” initiative is happening...*



Engineers for Community Service (ECOS)

- OSU College of Engineering student organization
- Grew out of this class!
- Connected to self-realization ethics
- Service-learning approach...
- More on ECOS...



Attendance Question

- **Do you know of professional engineers that apply their talents in community service? Explain what they do, especially focusing on how it exploits their engineering skills, and how it benefits the community.**

Please: Put your name on the sheet of paper and turn it in...