

# Engineering Ethics: The Basics

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# Engineering Ethics

- *“Among the universal ethical values are honesty, integrity, promise-keeping, fidelity, fairness, respect for others, responsible citizenship, pursuit of excellence and accountability.”*
  - Michael Josephson

# Engineering Ethics

- **Black and White Areas – Easy**
  - Right vs. Wrong
- **Gray Areas – Tougher**
  - Right vs. Right
  - Lesser of the Evils/Dilemma
- **Other Factors**
  - Time/Money
  - Family
  - Career
  - Reputation

# Engineering Ethics

- Professional Maturity
- Learning to Be Comfortable with Ambiguity
- More than One Answer to the Same Question
- Sometimes One Answer is Not Entirely Correct

# Engineering Ethics

- Emotional Intelligence
  - Self-awareness (e.g., handling stress)
  - Self-regulation (e.g., the words you use)
  - Empathy (e.g., feeling other's pain)
  - Social Skills (verbal, non-verbal skills)

# Engineering Ethics

- **“Novice”** – Complies with strict rules based on context free features of the task environment.
- **“Advanced Beginner”** – Recognizes the situational aspects of the task environment and follows maxims to adjust his or her actions accordingly.

# Engineering Ethics

- **“Competent Performer”** – Does not try to account for all discrete elements of the task environment; instead, he or she selects a plan, goal or perspective to establish which elements are relevant and which may be safely ignored;
- **“Proficient Performer”** – No longer reflects on the task environment as a detached observer; without having to evaluate multiple options, he or she simply sees what needs to be done and then chooses how to go about doing it.

# Engineering Ethics

- **“Expert”** – Intuitively perceives both what needs to be done and how to do it, making extremely subtle and refined discriminations in a variety of task environments that are sufficiently similar to those previously encountered.



# Engineering Ethics

- Data
- Information
- Facts
- Knowledge
- Expertise
- Wisdom

# Engineering Ethics

- **Confucianism...**”What you yourself do not want, do not do to another person...”
- **Islam...**”None of you is a believer as long as he does not wish his brother what he wishes himself...”
- **Buddhism....**”A state which is not pleasant or enjoyable for me, will also not be so for him, and how can I impose on another a state which is not pleasant or enjoyable to me...”

# Engineering Ethics

- **Hinduism...** "One should not behave towards others in a way which is unpleasant for oneself: that is the essence of morality..."
- **Jainism...** "Human beings should be indifferent to worldly things and treat all creatures in the world as they would want to be treated themselves..."
- **Christianity...** "Whatever you want people to do to you, do also to them..."
- **Judaism...** "Do not do to others what you would not want them to do to you..."

# Engineering Ethics

- **Utilitarianism** – What is ethical is that which produces the greatest good for the greatest number.
- **Duty Ethics** – What is ethical is to perform duties regardless of whether they lead to “good” outcomes.
- **Rights Ethics** – Mirror of Duty Ethics; People have rights that cannot be violated.
- **Virtue Ethics** – Actions reflecting good character traits are good; vices are bad; outcome of action is not relevant.

# Engineering Ethics

- **Why Study Engineering Ethics?**
  - To Understand the Standards Governing What is Acceptable Behavior in the Practice of Engineering
- **Why Practice Engineering Ethically?**
  - Personal Injury/Property Damage
  - Disciplinary Action
  - Impact on Reputation, Employer, Clients, Profession
  - Possible Loss of Job, Business, etc.

# Engineering Ethics

- *“All products of technology present some potential dangers, and thus engineering is an inherently risky activity...Engineering should be viewed as an experimental process. It is not, of course, an experiment conducted solely in a laboratory under controlled conditions. Rather, it is an experiment on a social scale involving human subjects”*
  - Martin and Schinziger, Ethics in Engineering

# Engineering Ethics

- **Engineering Ethics:**
  - Among the Most Important Issues Facing the U.S. Engineering Profession - NAE
  - Public Perceptions
  - Recent Honesty and Ethics Poll – Good News !!!
    - Engineers considered among the most ethical professionals after nurses (82%), pharmacists (66%), and physicians (65%)
    - 62% believe engineers very high or high honesty and ethical standards.



# Engineering Ethics

## ■ Professional Codes of Ethics

- A code of professional ethics results when a field organizes itself into a profession. The resulting code is central to advising those professionals how to conduct themselves, to judge their conduct and to understand the profession.
- Engineering Professional and Technical Societies
  - NSPE, ASCE, ASME, IEEE, AIChE, etc.



# Engineering Ethics

- Hierarchy of Ethical Obligations
- Primary: Ethical Obligations to the Public
- Secondary: Ethical Obligations to Employer or Client
- Tertiary: Ethical Obligations to Other Professionals and Other Parties

# Engineering Ethics

- Three Basic Ethical Obligations – (1) Public, (2) Employer/Client and (3) Other Professionals...
  - Never Mutually Exclusive - Reciprocal
  - Not A “Zero Sum Game”
  - All Need To Be Considered At All Times
  - Should Be Complementary to be Integrated With One Another To The Fullest Extent Possible
  - Ethical Integration = Professional Integrity

# Engineering Ethics

- Seven Principles Impacting Each Obligation
  1. Protecting The Public Health, Safety and Welfare
  2. Demonstrating Professional Competence
  3. Maintaining Objectivity/Truthfulness
  4. Addressing Conflict of Interest
  5. Preserving Confidentiality
  6. Receiving and Providing Valuable Consideration
  7. Emerging Areas/Emerging Challenges

# Engineering Ethics

## 1. Protecting The Public Health, Safety and Welfare

- Conformance with Applicable Standards
- Approval/Signing and Sealing of Engineering Drawings
- Responsible Charge/Responsible Control
- Judgment Overruled
- Awareness of Safety Violations
- Awareness of Illegal Practice

# Engineering Ethics

## 2. Demonstrating Professional Competence

- Education, Experience, Qualifications
- Acceptance of Assignment
- Signing and Sealing of Work
- Coordination of Work
- Scope of Practice

# Engineering Ethics

## 3. Maintaining Objectivity/Truthfulness/Non-Deception

- Inclusion of All Relevant Information
- Issuance of Public Statements
- Disclosure to Interested Parties
- Expression of Technical Opinions
- Reviewing Work of Another
- Sales and Marketing Practice

# Engineering Ethics

## 4. Addressing Conflicts of Interest

- Faithful Agent and Trustee
- Avoid vs. Disclosure
- “Appearances”
- Acceptance of Compensation from More Than One Party
- Serving on Public Bodies
- Accepting Contracts from Government Bodies
- Part-Time Engineering Work
- Contingent Fee Arrangements
- Representing Adversary Interests
- Consent

# Engineering Ethics

## 5. Preserving Confidentiality

- Business or Technical Affairs of Employers/Clients
- Proprietary Information/Files
- Arranging for New Employment or Business Opportunities
- Consent



# Engineering Ethics

## 6. Receiving and Providing Gifts and Other Valuable Consideration

- Accepting Consideration from Suppliers for Specifying Product
- Accepting Commissions/Allowances Directly from Contractors
- Political Contributions
- Bribery

# Engineering Ethics

## 7. Emerging Areas/Emerging Challenges

- Technology
  - Use of Internet and Electronic Practice
- Sustainable Design/Development
  - Environmental Considerations
- Alternative Project Delivery
  - Integrated Project Delivery
  - Building Information Modeling
  - Design/Build

# Engineering Ethics

- A Word About Fraud
  - Fraud is...
    - A deceitful practice
    - Results in an injury
    - It is always intentional
    - It always includes a lie

# Engineering Ethics

- Fraud and Other Financial Risks
  - According to National Inspector General Organizations, there are three elements often present:
    - “Opportunity” - Accessibility
    - “Motive” - Easy Money
    - “Justification” – “I am entitled”

**= MISCONDUCT**

# Engineering Ethics

## ISO 26000

### Social Responsibility

- In 2010 the International Standards Organization published “**Guidance for Social Responsibility**”
- This document is not a “standard, but a voluntary framework to aid organizations in moving closer to socially responsible behavior

# Engineering Ethics

## ISO 26000

### Social Responsibility

- Seven Principles of Social Responsibility
  - (1) Accountability, (2) Transparency, (3) Ethical Behavior, (4) Respect for Law, (5) Respect for Stakeholder's Interests, (6) Respect for Human Rights and (7) Respect for International Norms of Behavior

# Engineering Ethics

## ISO 26000

### Social Responsibility

- Seven Core Subjects of Social Responsibility
  - (1) Labor Practices, (2) Human Rights, (3) Organizational Governance, (4) Fair Operating Practices (5) Consumer Issues, (6) The Environment and (7) Community Involvement and Development

# Engineering Ethics

- *“The social responsibility of business is to increase profit within the bounds of the law which is to say, engage in open and free competition, without deception or fraud...”*  
– **Milton Friedman**



# Engineering Ethics

- “I am the captain of my fate...I am the master of my soul.....”  
– **Nelson Mandela**

# Engineering Ethics

- “To be persuasive, we must be believable; to be believable, we must be credible; to be credible, we must be truthful...”
  - **Edward R. Murrow**

# Engineering Ethics

- “Be sure you put your feet in the right place, then stand firm.....”
  - **Abraham Lincoln**

# Engineering Ethics

- *“The reputation of a thousand years may be determined by the conduct of one hour”*  
– **Japanese proverb**

# Engineering Ethics

- *“Good people do not need laws to tell them to act responsibly, while bad people will find a way around the laws...”*  
– **Plato**

# Engineering Ethics

- *“Always do the right thing –this will gratify some and astonish the rest...”*  
– **Mark Twain**

# Engineering Ethics

- *“A long habit of not thinking a thing wrong gives it a superficial appearance of being right...”*  
– **Thomas Paine**

# Engineering Ethics

- *“The things that matter most must never be at the mercy of things that matter least...”*

– **Johann Wolfgang von Goethe**



# Engineering Ethics

- *“Life is about not knowing...delicious ambiguity...”*

**Gilda Radner**

# Engineering Ethics

*“In so many aspects of life, you need to be a long-term optimist, but a short term realist. You need to know what you know and what you don’t know... We need to try to do the right thing every time because we never know what moment in our lives we will be judged on...”*

**- Captain Chesley “Sully” Sullenburger**

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## Questions & Answers

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