



ECE 481

**Ethics in
Electrical and Computer Engineering**

Lecture #1: Introduction

Prof. K.M. Passino

Ohio State University

Department of Electrical and Computer Engineering



Electrical and Computer Engineering...

- What are you becoming when you become an ECE?
- Since 1884, when Electrical Engineering was first formed, what have ECEs done?
- How will you fit into the flow of ECE history? Read the history!
- What will *you* contribute?



ECE Impact



- **Direct impact:**

- Electric power generation and distribution
- Electric motors - consumer applications (washer, dryer)
- Radio, TV, stereos, CDs/DVDs, video games
- Telegraph, telephone, cellular
- Computers, microprocessor, software
- Cable car, automotive systems, electric car, aircraft avionics
- Medical monitoring devices, surgical lasers
- Military weapons, nuclear, communications



- **Indirect impact** via other areas of engineering and science is significant!



What is the Role of an Electrical or Computer Engineer in Modern Society?

- **Role models?**



- Yes, I know some of the technicalities but what else is there to it?
- Is there anything beyond $V=IR$?
- If so, what is it?

Electrical and Computer Engineering are Professions

“Profession”



- Job experience? Gives ideas...
- What does it mean to join a “profession”?
- **Profession:** A calling requiring *specialized knowledge* and often long and *intensive preparation* including instruction in skills and methods as well as in the scientific, historical, or scholarly principles underlying such skills and methods, maintaining by force of *organization* or concerted opinion *high standards of achievement and conduct*, and committing its members to *continued study* and to *a kind of work which has for its prime purpose the rendering of a public service*.



A Profession is
“the pursuit of a learned art
in the spirit of public service”
(ASCE)



Engineers Council for Professional Development: What one who practices a profession must do:

1. They must have a service motive, *sharing their advances in knowledge*, guarding their professional integrity and ideals, and rendering gratuitous public service in addition to that engaged by clients.
2. They must recognize their obligations to society and to other practitioners by living up to established and accepted codes of conduct.
3. They must assume relations of confidence and accept individual responsibility.
4. They should be members of professional groups and *they should carry their part of the responsibility of advancing professional knowledge, ideals, and practice*



Perceptions/realities of professionalism

- How do engineers rank in the public's perception of professionalism?
- In other countries?
- Relative to medical doctors? Lawyers?
- Who cares?
- How is the perception impacted by...
 - High-profile cases?
 - Direct impact to humans?
 - “Pro bono” work?



What this course is about...

- You know *part* of the technical side...
- We will look at “conduct” and “public service” in the context of engineering
- A **required** part of your curriculum...

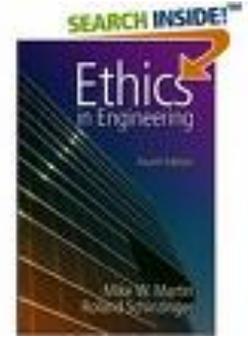
ABET: Engineers shall hold paramount the safety, health, and welfare of the public in performance of their professional duties.

Engineers shall seek to promote the “common good”

Engineering education development.... “service-learning” ... important/growing, and may change engineering education as it is changing many other areas in the university



Class textbook...



- Mike W. Martin and Roland Schinzinger, *Ethics in Engineering*, 4th Edition, McGraw-Hill, NY, 2005.
- Earlier editions cannot be used
- Buy it, keep it as part of your professional library
- **READ ALL OF IT *THIS QUARTER***
- **Please, take a professional attitude toward learning in this class (keep up on reading without being told)**
- Read Chapters 1-2 now



Themes of course...

1. **Design**, competence/excellence, safety/risk, global impacts, cautious optimism
2. **Moral autonomy**, responsibilities, rights, professional conduct, organizational impact
3. **Personal commitment and meaning**, moral leadership, gratuitous public service, promote common good



Study engineering ethics...

- To see **habits of professional behavior**
- **Moral autonomy:** moral... awareness, reasoning, coherence, imagination, communication, reasonableness, respect, tolerance, hope, integrity
- **Responsibility:** obligations, accountability, conscientious, blameworthy/praiseworthy



Study the “social responsibility movement,” relative to engineering professionalism

- Engineering companies strive to be “good neighbors” by supporting schools, cultural activities, civic groups, and charities
- Opposing/old? view: “The social responsibility of business is to increase its profits” (Friedman)
- Community-oriented view in engineering (Battelle, IEEE/UN HTC, OSU ECOS, etc.)
- Important part of engineering professionalism...
 - Use engineering skills? “Pro bono” services.
 - Time, *talent*, money...
 - “Service-learning” at OSU... It is fun!



Course syllabus, materials...

- Just outlined the syllabus (see the web for details of week-by-week breakdown)
- See web for all assignments/handouts:

<http://www.ece.osu.edu/~passino/ee481.html>

- **Course details:**
 - Teaching assistant (attendance, grading)
 - Homeworks (will *not* accept substandard work)
 - Final Project (teams of 2-4 persons required, assigned today-start now!, see web)



Role of Professionalism in ECE Education

- Education for a profession
 - Calculus, physics, chemistry, etc.
 - Circuits, signals and systems, electromagnetics, solid state, computers, control, signal processing, communications, etc.
- Junior/Senior year, 1 cr. S/U course on ethics and professionalism
 - “low priority course”?
 - “waste of time”?
 - “technical courses are much more important”?
 - “this is liberal arts type stuff so it is not important”?
- **Hopefully you will come to see its importance** (for some of you, well after graduation)... nontraditional students typically recognize/acknowledge the importance...

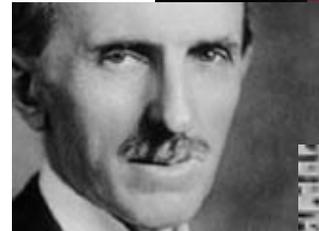
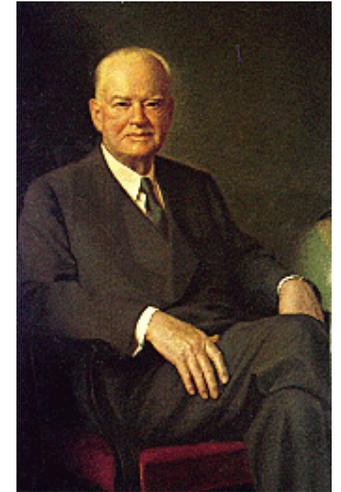


First Topic on Professionalism, Professional Behavior in Class...

- Think of this as being “on the job”
 - You like your job, you want to be promoted, you want a raise
 - You are concerned about how your colleagues view you
- View this as a **meeting** that you have to be at each week
 - Be on time, listen, do not do homework for other classes
 - Get involved !
- **DO NOT BE LATE.** It is quite unprofessional... do not sneak in!!! How would your colleagues view this? Your boss?
- **DO NOT CHEAT** on homeworks/project!!!
 - Homeworks: May discuss, but must turn in *all* your own work (no splitting of parts)
 - Project: Allowable teamwork will be defined

Attendance Question

- Name as many famous engineers as you can:
 - May or may not be alive today
 - Known by the *general public*
 - Can be fictitious



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