Session 2 - EVOLUTION OF ENGINEERING TO MECHANICAL ENGINEERING

WHAT IS ENGINEERING?

According to Webster's Dictionary:

Engineering: The application of math and science by which the properties of matter and the sources of energy in nature are made useful to people

Engineers apply math and science for the betterment of society through:

- Design
- Manufacturing
- Research & Development
- Management
- Continual Improvement
- Logistics

Above all, engineers are problem solvers who make things work better, more efficiently, quicker and cheaper.

Engineering is a HIGHLY regarded and relatively HIGHLY compensated career. Engineers make GREAT salaries relative to the amount of schooling required and the LIFESTYLE offered.

ENGINEERING DISCIPLINES

Major Disciplines

- Mechanical
- Electrical
- Chemical
- Civil
- Industrial

Other Disciplines

- Automotive
- Aerospace
- Agricultural
- Biomedical
- Computer
- Environmental
- Materials
- Nuclear
- Robotics

- Safety

Mechanical Engineering

- Concerned with design, manufacture & operation of a wide range of components, devices, or systems:

- microscopic parts (nanotechnology) to gigantic gears
- heating, ventilation, refrigeration
- manufacturing equipment (tanks, motors, pumps)
- laser technology
- biomedical applications
- automotive industry
- computer-aided design, automation, robotics

- **Broadest of all the engineering disciplines in its range of activities**

Chemical Engineering

- Gasoline
- Plastic
- Energy (natural gas, oil heating, coal)
- Adhesives
- Clothing
- Building Materials

- **Applying chemistry to the solution of practical problems**

Electrical Engineering

Play a role in almost everything we interact with on a daily basis. They design smaller, cheaper, and better:

- cell phones
- computers
- power systems
- appliances
- robots

- **Apply specialized skill to the design, manufacture, application, installation, and operation of electrical products and systems.**

Civil Engineering

- Create solutions to cope with:
  - air quality issues
  - decaying cities, roadways and bridges
  - clogged airports and highways
  - polluted streams, rivers and lakes

- **Design solutions to cope with many of our planet's most serious problems.**

Industrial Engineering

- Design data processing systems
- Integrate activities of finance, engineering and management
- Develop systems for planning, cost analysis, production and quality of products

- **Stresses design, improvement, and installation of integrated systems of people, material, and equipment for the effective production of goods or services in all types of industries**

Good Traits for Engineers

- Enjoy solving problems
- Like working with other people (strong teamwork skills)
- Interested in serving human needs
- Want to make things work better
- Strive for continual improvement
- Able to adapt to a changing environment
- Good communication skills
- Strong study skills
- Desire to constantly learn new things
- Data analysis skills
- Strong computer skills

College Advice

The next 2-3 years in high school and especially the following 4-8 years in college drastically impact the quality of your adult life!!!

- PLAY HARD in high school/college = short term gains.
  The rest of your financial life will suffer.
  Bad grades equals bad jobs.

- WORK HARD in high school/college = long term gains.
  Study/dedication to classes has long term financial gains.
  Good grades equals the best jobs.

- Challenge yourself in high school/college:
  + Study hard to make the best grades
  + Diversify your activities (sports, clubs, honor societies, social)
  + Volunteer, tutor younger students in your strongest subjects
  + GET INVOLVED
  + CO-OP

Cooperative Education

Typically a five year program with alternating periods of book learning (school) and application (work, typically in industry).

Year	Fall	Spring	Summer
1	School	School	School
2	Work	Work	Work
3	School	School	School
4	Work	Work	Work
5	School	School	School

Benefits of a Cooperative Education

- Pay for your college education ($36,000/YR or more)
- Gain valuable experience, real engineering work
- Increase your market value at graduation (considerably)
- Usually assures job offer from co-op company
- Offers well deserved and beneficial break from school!

Summary

- Engineers have been involved in almost everything you see, touch, or rely upon
- Engineering can be an exciting career full of opportunities
- Job market is generally good
- Pay and benefits are among the top for the level of education
- Opportunities for leadership, global travel, and benefiting humankind abound
- An engineering degree can open many doors to careers in other exciting areas such as medicine, law, business administration, PhD (research, teaching, etc.)