And other things that you should be asking yourself about now
The Engineering Profession

• What is engineering?
• What is an engineer?
• What are the functions of engineering?
• What are the engineering disciplines?
• Where does the engineer fit into the technical spectrum?
• How are engineers educated?
• What is meant by professionalism and engineering ethics?
The Technology Team

• Technology has become so advanced and sophisticated that one person cannot possibly be aware of all the intricacies of a single device or process.

• Technology spectrum: The functions of the team.

• Technology team: Scientists, engineers, technologists, technicians, and craftspersons.

• Project or design team: In addition to technology team members, managers, sales representatives and purchase personnel.
Scientist

• Prime objective: increase knowledge of nature.
  – Development of their ideas into new and useful creations.

• Scientific method:
  – Formulate a hypothesis to explain a natural phenomenon.
  – Execute experiments to test the hyp.
  – Analyze test results.
  – Generalize hyp into the form of a theory.
  – Publish the new knowledge.
The profession of engineering takes the knowledge of math and natural sciences gained through study, experience, and practice and applies this knowledge with judgment to develop ways to utilize the materials and forces of nature for the benefit of human kind.

An engineer is a person who possesses this knowledge of math and natural sciences, and through the principles of analysis and design, applies this knowledge to the solution of problems and the development of devices, processes, structures, and systems for the benefit of human kind.
Engineer

• Scientist vs engineer:
  – Scientists seeks to understand more about natural phenomena, whereas the engineers primarily engages in applying new knowledge.

• Design- The end result of an engineering effort is a device, system, structure, or process which satisfies a need.

• Design process- A successful design is achieved when a logical procedure is followed to meet a specific need.
Technologists and Technicians

- Obtain a basic knowledge of engineering and scientific principles in a specific field and develop certain mutual skills that enable them to communicate technically with all members of the team.
- Technologists: Bachelor degree
- Technicians: Associate degree
- Common tasks: drafting, estimating, model building, data recording, reduction, troubleshooting, servicing, and specification.
Skilled trades/Craftpersons

- Not need to have in-depth knowledge of the principles of science and engineering.
- Trained on the job
- Common tasks: welder, machinist, electrician, carpenter, plumber, and mason.
The Functions of the Engineer

- Research
- Development
- Design
- Production and Testing
- Construction
- Operations
- Sales
- Management
- Consulting
- Teaching
Varied Opportunities

• If you are imaginative and creative, design engineering may be for you.
• If you like working in laboratories and conducting experiments, you might consider test engineering.
• If you like to organize and expedite projects, look into becoming a development engineer.
• If you are persuasive and like working with people, sales or field service engineering may be for you.
Engineering Discipline

• Over 20 discipline of engineering.
• Pursued for bachelor degree
• Primarily as 4-year programs
• Combined dept or specialty within another dept.
The Engineering Disciplines

- Aerospace
- Chemical
- Civil
- Electrical/Computer
- Environmental
- Industrial
- Mechanical
Education of the Engineer

• Over 340 colleges and universities offers programs in engineering that are accredited by ABET or CEAB.
Participating Bodies in the Accrediation Activity

- Quality control of engineering and technology programs offered in US and Canada.
- Develop standards and criteria for the education of engineers entering the profession.

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<tr>
<th>Organization</th>
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<tbody>
<tr>
<td>American Academy of Environmental Engineers</td>
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<td>American Congress on Surveying and Mapping</td>
<td>ACSM</td>
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<td>American Institute of Aeronautics and Astronautics, Inc.</td>
<td>AIAA</td>
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<td>American Institute of Chemical Engineers</td>
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<td>American Nuclear Society</td>
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<td>American Society for Engineering Education</td>
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<td>American Society of Agricultural Engineers</td>
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<td>American Society of Civil Engineers</td>
<td>ASCE</td>
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<td>American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.</td>
<td>ASHRAE</td>
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<tr>
<td>The American Society of Mechanical Engineers</td>
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<td>The Institute of Electrical and Electronics Engineers, Inc.</td>
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<td>Institute of Industrial Engineers, Inc.</td>
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<td>International Society for Measurement and Control</td>
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<td>The Minerals, Metals &amp; Materials Society</td>
<td>TMS</td>
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<td>National Council of Examiners for Engineering and Surveying</td>
<td>NCEES</td>
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<td>National Institute of Ceramic Engineers</td>
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<td>National Society of Professional Engineers</td>
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<td>Society for Mining, Metallurgy, and Exploration, Inc.</td>
<td>SME-AIME</td>
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<td>Society of Automotive Engineers</td>
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<td>Society of Manufacturing Engineers</td>
<td>SME</td>
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<tr>
<td>Society of Naval Architects and Marine Engineers</td>
<td>SNAME</td>
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<tr>
<td>Society of Petroleum Engineers</td>
<td>SPE</td>
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Do Engineers Design Alone?

No!!!!!

Team Work

Good engineers must be able to work on teams well.

Engineering today is broadly interdisciplinary; solving today's challenges requires engineers from many disciplines working together with experts in such fields as business, biology, medicine, public policy, and economics.
How does one work with others?
How does one inform others of their work?

Good engineers must be able to communicate effectively.

Defining your audience and aims; organizing and drafting documents; revising for organization and style; developing graphics; conducting meetings; memos, letters, and e-mail; proposals; progress reports; reports and journal articles; instructional materials; electronic texts; oral presentations.
How Do You Get From here to Being an Excellent Engineer?

Understand the fundamental principles that support learning

classroom
Chinese philosopher Kuan Tzu said, “If you give a man a fish, he will have a single meal; if you teach him how to fish, he will eat for the rest of his life.”

**Taking responsibility for governing yourself:** If you learn the principles of survival, you will be able to feed yourself for a lifetime.
Being a lifelong learner

Those employees who seek training in current techniques will be able to keep their jobs for as long as those technologies remain important.

Seek training in the art of fishing — and you can feed yourself as long as there are fish in the sea.

Gaining the freedom of self-reliant learning: When you evaluate the results of your experiences, you will be able to learn from them.
What we will learn in Eng 102

• **Presentations:**
  – Working on Teams
  – Learning how to learn
  – Communication
  – Responsibility to Society
  – Management
  – The Art & Science of Creativity
  – Preparing Technical Reports
  – Codes of Ethics

• **Individual design projects**
  – Design of a personal education/career plan

• **Launching the Career**
  – Resume
  – Cover letter

• **Team design projects**
  • Catapult- statistical Analysis
  • Tractor- principles of Mechanics
  • Windmill- Modeling (Airscrew)

• **Computer Skills**
  – Word Processing, Spreadsheet Skills, Introduction to MATLAB, PowerPoint Presentations
America's engineers in the 21st century

Self-reliant, Resourceful, and Adaptable