ENGR 1322/1332
Engineering Design with CAD

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THE ENGINEERING PROFESSION

Engineering

ABET* Definition of Engineering:
The profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgement to develop ways to utilize, economically, the materials and forces of nature for the benefit of [humans].

**Accreditation Board for Engineering and Technology (ABET)*

Ultimate Goal: SOLVE PROBLEMS!

Engineering encompasses design, and much more!

- Implementing design solutions
- Sustaining solutions across their life cycle
- Disposing of resulting systems

What do Engineers Design?

Engineering Achievements – 20th Century

1. Electrification
2. Automobile
3. Airplane
4. Water Supply and Distribution
5. Electronics
6. Radio and TV
7. Agricultural Mechanization
8. Computers
9. Telephone
10. Air Conditioning
11. Highways
12. Spacecraft
13. Internet
14. Imaging
15. Household Appliances
16. Health Technologies
17. Petroleum Technology
18. Laser and Fiber Optics
19. Nuclear Tech
20. Materials

21st Century Achievements?

Cited from: http://www.pbs.org/fmc/timeline/dmortality.htm

14 Grand Challenges for Engineering

Make solar energy economical

Provide energy from fusion

Develop carbon sequestration methods

Manage the nitrogen cycle

Provide access to clean water

Restore and improve urban infrastructure

Advance health informatics

Engineer better medicines

Reverse-engineer the brain

Prevent nuclear terror

Secure cyberspace

Enhance virtual reality

Advance personalized learning

Engineer the tools of scientific discovery

These 14 goals were identified by the National Academy of Engineering (NAE) as the game-changing goals for improving life on the planet in the 21st century.

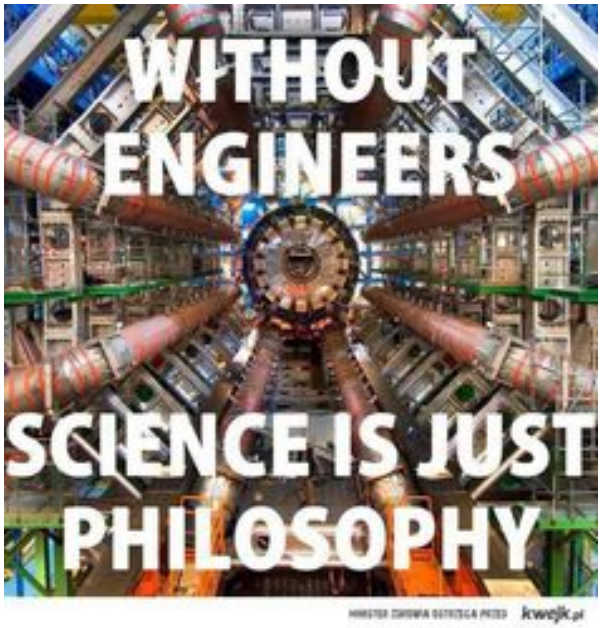
Scientists & Engineers

Scientist

- Seeks to expand knowledge
- Draws general conclusions
- Produces knowledge
- DISCOVERY

Engineer

- Seeks to apply knowledge
- Translates general knowledge to specific solutions
- Produces devices to meet human needs and solve problems
- APPLICATION



Engineering Disciplines

Aeronautical

Agricultural

Architectural

Biomedical

Chemical

Civil

Computer

Electrical

Environmental

Food

Industrial

Materials

Mechanical

Naval

Nuclear

Ocean

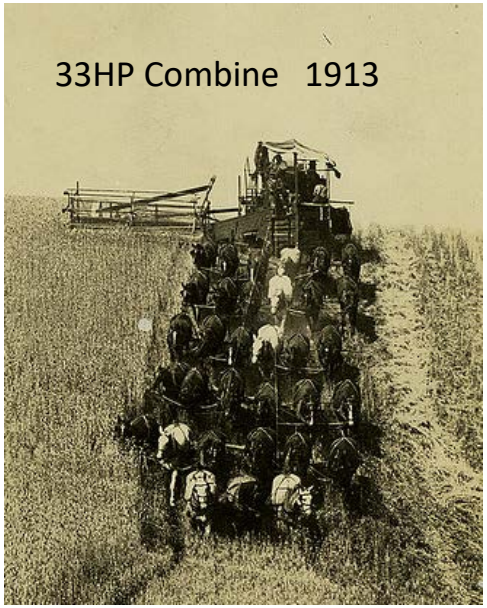
Petroleum

Systems

Detail of OSU Disciplines

Bio-systems and Agriculture

- Design Agricultural Machinery
- Soil Engineering
- Research Crop Improvements.
  - Turf Grass science
  - Wheat Research



+100 Years of Engineering

No-one Progresses Alone

2013 John Deere

Detail of OSU Disciplines

Chemical Engineering

- Reaction system design
- Most Often Employed in large scale process control
- Food Processing, Petroleum, Environmental, etc.

Okstate Chem-E-Car

Detail of OSU Disciplines

Civil and Environmental Engineering

- Structural Engineering
- Transportation
- Resource Delivery
- Recycling & Waste Disposal
- Earthquake / Geotechnical

CCTV Building (China)

Detail of OSU Disciplines

Industrial

- Process Optimization
- Ergonomics
- Automation
- Robotics

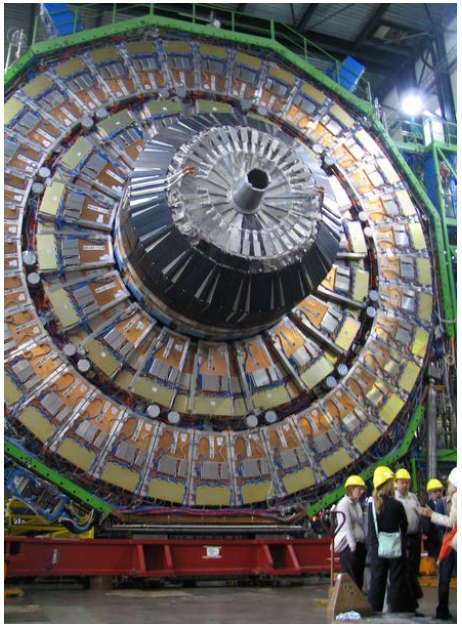
iPhone Production

Dangerous Work Environments

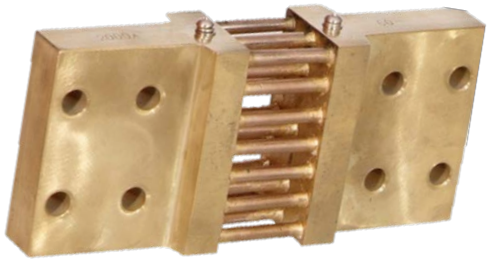
Mclaren Production Centre

Detail of OSU Disciplines

Electrical and Computer
- Microelectronics
- High Power Systems
- Wireless Communication
- Part of Literally Everything



Arduino
Raspberry Pi
Oculus Rift

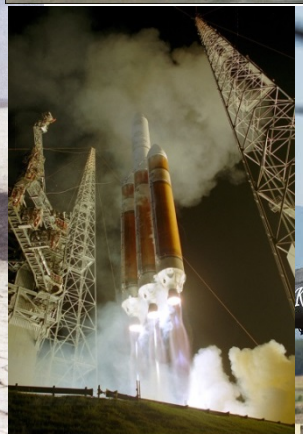


5000 Amp Fuse

Detail of OSU Disciplines

Mechanical and Aerospace

- Planes, Trains and Automobiles
- Mechanical system synthesis
- Optimization of Performance



Starting Salary Comparison

Average projected salaries by discipline for bachelor's degrees in 2018:

- Engineering: $66,521
- Computer science: $66,005
- Math and sciences: $61,867
- Business: $56,720
- Social sciences: $56,689
- Humanities: $56,688
- Ag & natural resources: $53,565
- Communications: $51,448

www.staffingindustry.com accessed June 2018

If you are looking for perfect safety you will do well to sit on a fence and watch the birds; but if you really wish to learn you must mount a machine and become acquainted with its tricks by actual trial.
Wilbur Wright