

# Introduction to Mechanical Engineering

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- What is engineering?
- What do mechanical engineers do?
- The basic engineering process

# What is an Engineer?

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- Engineering is the profession in which 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 mankind.

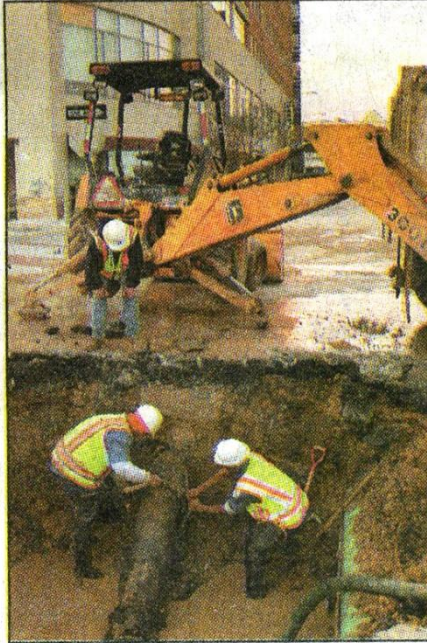
[ABET]

# What Engineers Do ?

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- Build a Bridge?
- Make a Robot?
- Work on a Computer?
- Drive a Train?
- Repair Car Engines?

# Is This Guy an Engineer ?



Jay Janner AMERICAN-STATESMAN

## Hole floods near Whole Foods

A water main break at Fifth and Bowie streets caused the Whole Foods at 525 N. Lamar Blvd. to close for the day. Jeffrey Romero, left, and Rafael Bio work on the pipeline as engineer Robert Lamb watches. **Story, B12.**



# Engineering Job Descriptions

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- Analytical engineer
- Design engineer
- Test engineer
- Manufacturing engineer
- Development engineer
- Research engineer
- Sales engineer
- Engineering manager
- Consulting engineer

# Why Be An Engineer?

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- Money ??
- Fame ??
- Fortune ??

# Why might YOU want to be an Engineer?

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- You have high goals in life and want to get a strong college education!
- You like math and sciences, and would like to apply them to real world problems!
- You enjoy hands-on work and tinkering with things!
- You were told that engineers make a lot of money!
- You were told that you can get a good job with an engineering degree!
- You want to help humanity!

# Did We Mention Money ?

## WHAT'S A DEGREE WORTH?

Here are some average starting salaries for the class of 2006:

MAJOR		vs. 2005
Chemical engineering	\$55,900	+4.2%
Electrical engineering	\$52,899	+3.5%
Mechanical engineering	\$50,672	-0.3%
Computer science	\$50,046	-2.0%
Accounting	\$45,723	+6.2%
Economics/Finance	\$45,191	+11.0%
Civil engineering	\$44,999	+4.3%
Business administration	\$39,850	+3.9%
Marketing	\$36,260	-3.4%
Liberal arts majors	\$30,828	+6.1%



SOURCE: NATIONAL ASSOCIATION OF COLLEGES AND EMPLOYERS



# Who's Looking to Hire an Engineer ?

## WANTED: RISK CONTROL ASSOCIATE

This person will assist with trading desk functions such as tracking and analyzing financing/securities lending opportunities, and analyzing current and future trade possibilities. The risk control group is the talent pipeline that could lead to a future trading position at Q.

### Characteristics of a promising candidate:

- Proficient in the use of MS Excel and databases.
- 3.5+ GPA.
- May 2007 graduate.
- Undergraduate degree in finance, statistics, mathematics, **engineering**, management information systems.

# What They Say They Want ?

**HI, MY NAME IS ADAM, AND I'LL BE  
YOUR MECHANICAL ENGINEER.**

- Communication skills (4.7 average)
- Honesty/integrity (4.7)
- Interpersonal skills (4.5)
- Strong work ethic (4.5)
- Teamwork skills (4.5)
- Analytic skills (4.4)

Employers  
responding to NACE's  
Job Outlook 2005  
survey rated these job  
candidate **qualities**  
(a five-point scale)  
in order of  
importance

## A Quote !

There is a high economic return for an engineering degree even if a graduate works in a non-engineering field. From Neeta P. Fogg, Paul E. Harrington and Thomas F. Harrington, *College Majors Handbook with Real Career Paths and Payoffs: The Actual Jobs, Earnings, and Trends for Graduates of Sixty College Majors*, 2nd ed. (Indianapolis: JIST Publishing, 2004).

# What is Mechanical Engineering?

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- Mechanical engineering is the second largest and one of the oldest disciplines; broadest of all engineering disciplines.
- Mechanical engineers apply the principles of mechanics and energy to the design of machines and devices:

**ENERGY** and **MOTION**

# What will you study as an ME student?

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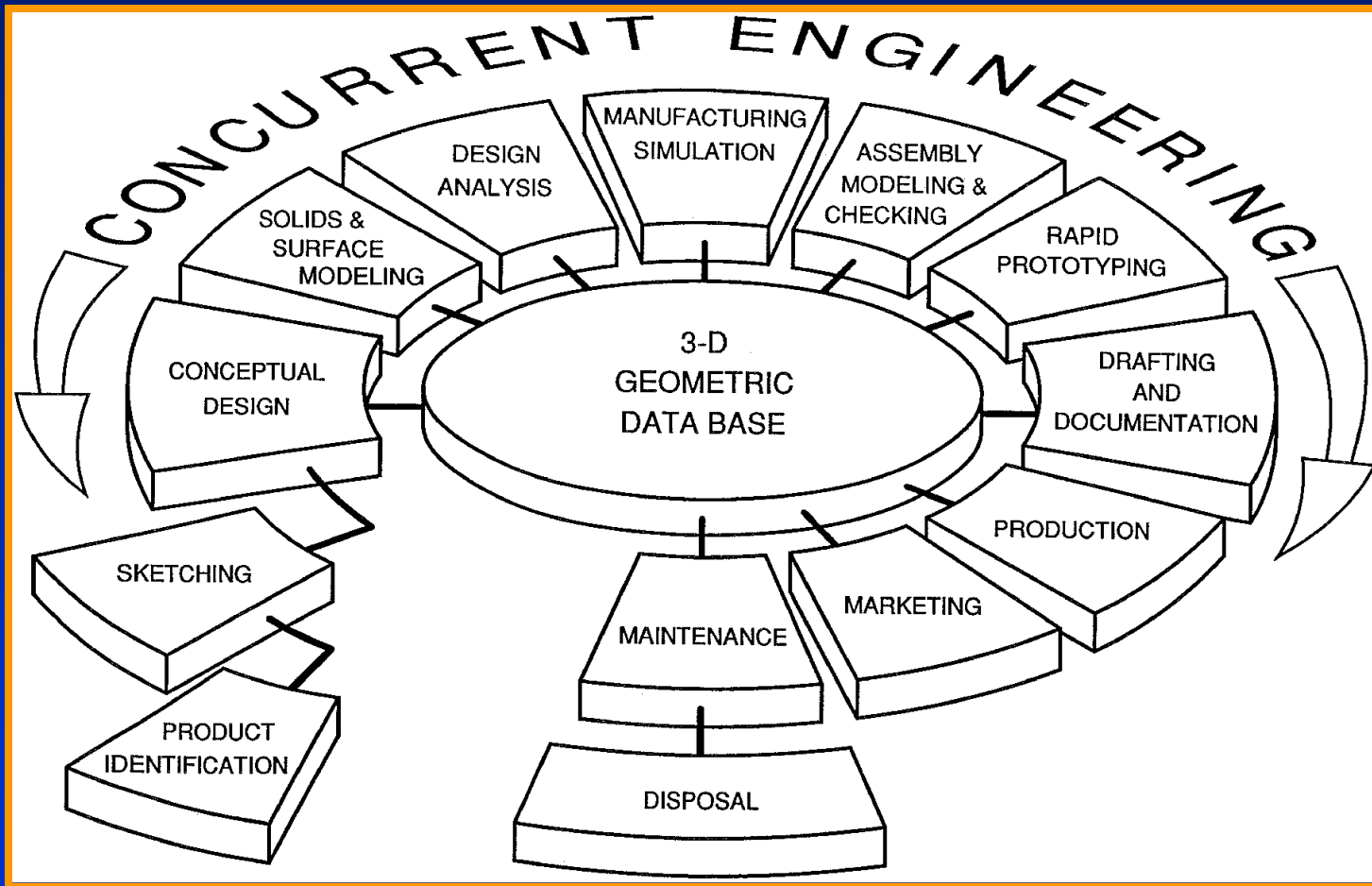
- Forces, motion, structures: statics, dynamics, kinematics, mechanics of solids and fluids.
- Energy: thermodynamics, heat transfer
- Materials: materials engineering & processing, manufacturing.
- Machines: graphics, design, machine elements, controls.
- Economics: engineering economic analysis, cost engineering.
- Human and Social Studies: arts, humanities, social sciences, history, government, ethics, law.
- Overall foundation: math, physics, chemistry, biology, analysis skills, communication skills, computation skills.

# The Engineering Design Process:

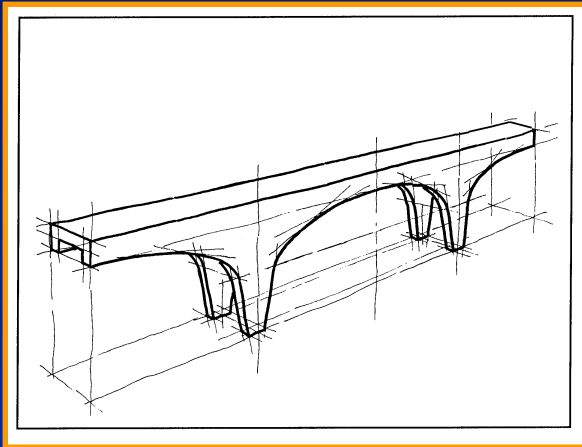
## (Core of Engineering)

- **Problem Identification:** Get with Customer.
- **Conceptual Design:** Ideas, Sketches and Solution Lists.
- **Refinement:** Computer Modeling, Data Base Development.
- **Testing:** Analysis and Simulation of All Design Aspects.
- **Prototyping:** Visualizing and Improving the Design.
- **Communication:** Engineering Drawings, Specifications.
- **Production:** Final Design, Manufacturing, Distribution.

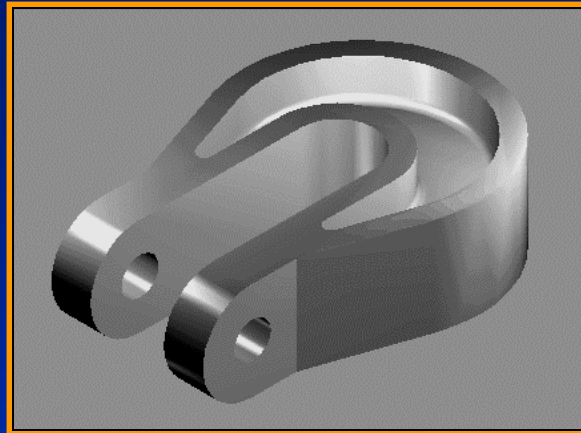
# Concurrent Engineering



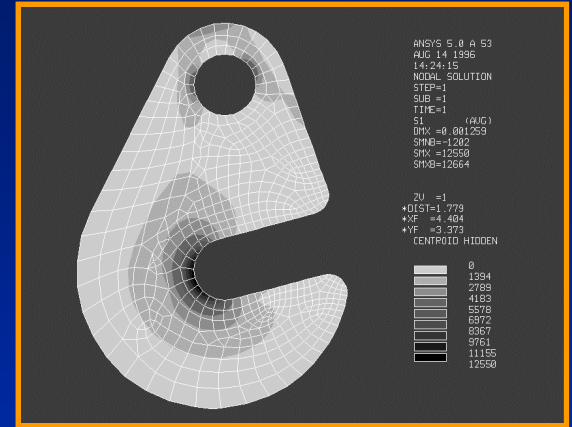
# Design Graphics



Sketching



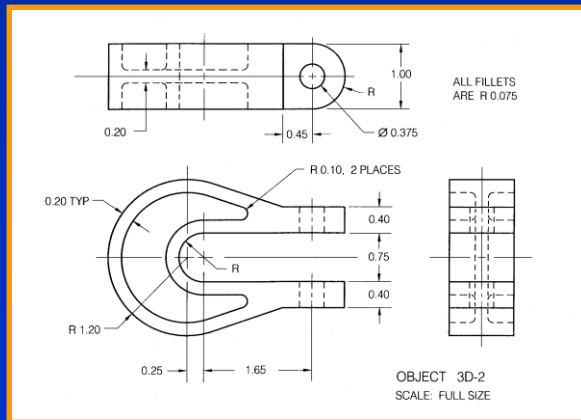
3-D Modeling



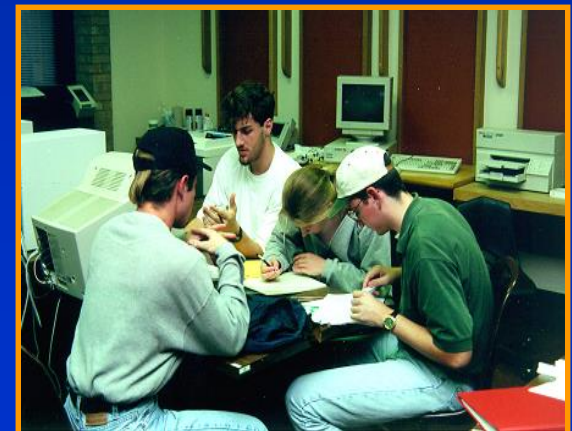
Analysis



Prototyping



2-D Drawing



Team Work