Introduction to Engineering SEEDS workshop 2017

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Electrical Engineering

FAQs

- What is engineering?
- What is the difference between
- engineering, science and technology?
- What are the career areas in
- engineering?
- What does the future hold for engineers?
- How do I know if engineering is for me?

What is an engineer?

- Discuss with a neighbor or two
- 3-5 minutes

From the National Academy of Engineering website:www.nae.edu

"What is engineering and what do engineers do?
posted on July 29, 2010

Answer:

Engineering has been defined in many ways. It is often referred to as the "application of science" because engineers take abstract ideas and build tangible products from them. Another definition is "design under constraint," because to "engineer" a product means to construct it in such a way that it will do exactly what you want it to, without any unexpected consequences.

Engineers are men and women who create new products. It is estimated that there are over 2 million practicing engineers in the United States. They work in fields such as biomedicine, energy, automotive, aerospace, computers, and many others that require people to create products that didn't exist before."

Skill	Technologist	Engineer
Type of Work	Application	Design
Training Required	2-4 years	4-7 years Or even longer
Salary	OK	Very good
Background	Skill-based	Knowledge and Creativity
		Critical Thinking

Types of engineers

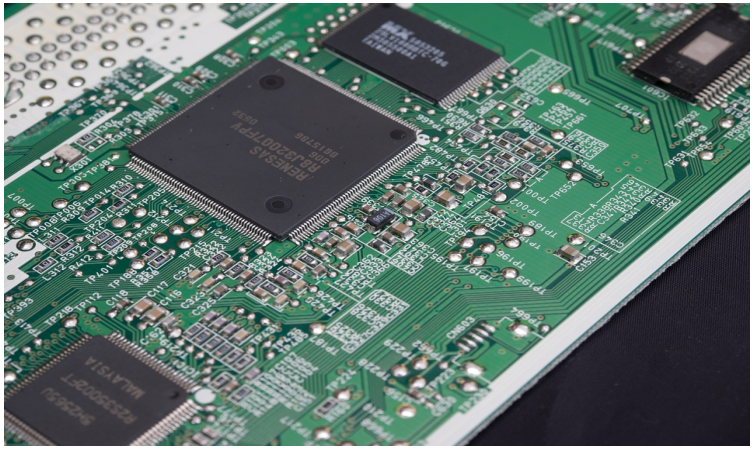
- Aerospace
- Agricultural
- Architectural
- Biomedical
- Ceramic
- Computer
- Constructioin
- What else?

Some data

- **How many and where?**
  - –https://www.bls.gov/oes/current/oes172199.htm
- **Types of engineers**
  - –https://www.bls.gov/ooh/architecture-and-engineering/home.htm
- **What else?**

Things engineers make

Things engineers make



- **Grand Challenges**
  - –http://www.engineeringchallenges.org/challenges.aspx
- **What else?**

Engineering as a Career

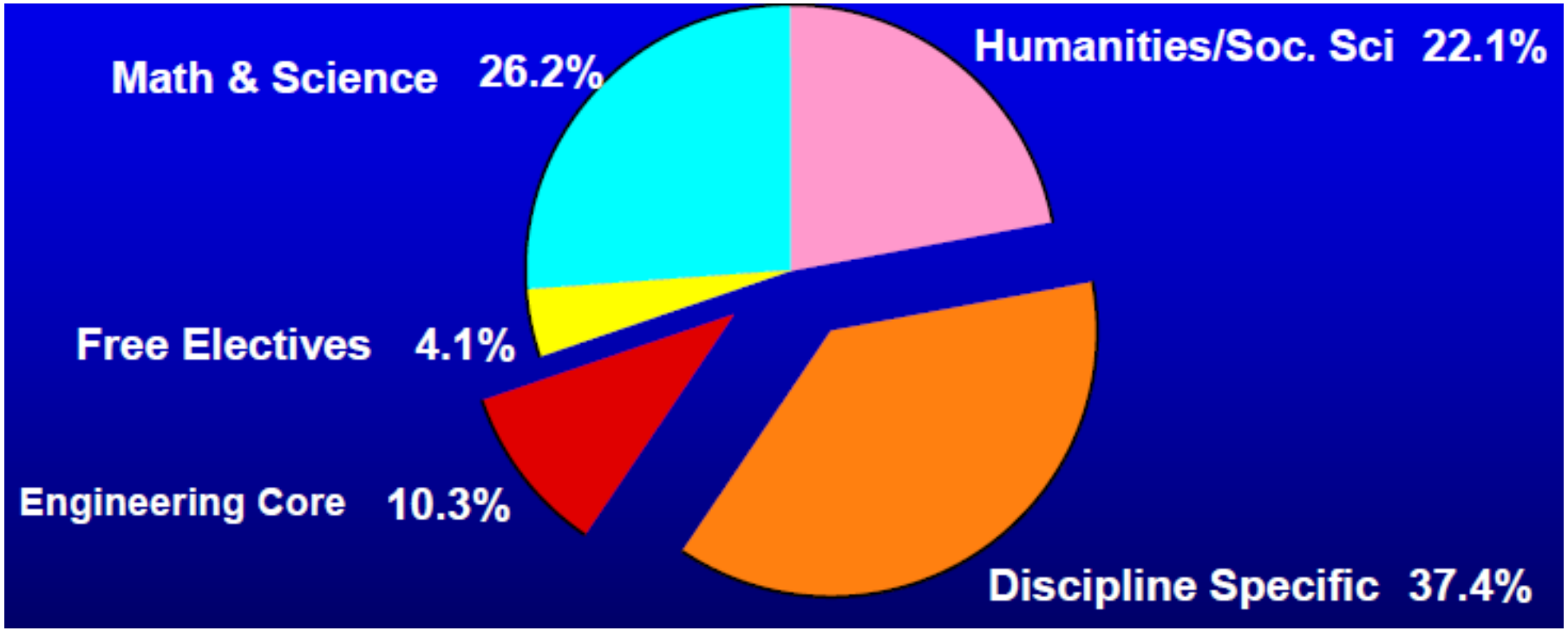
How do you know if Engineering is for you?

=Do you want to work in making processes and products that really help people?
=Do you enjoy mathematics and science?
=Are you curious about how things work?
=Do you like puzzles and problem solving?
=Are you willing to undertake a rigorous training in exchange for career rewards?

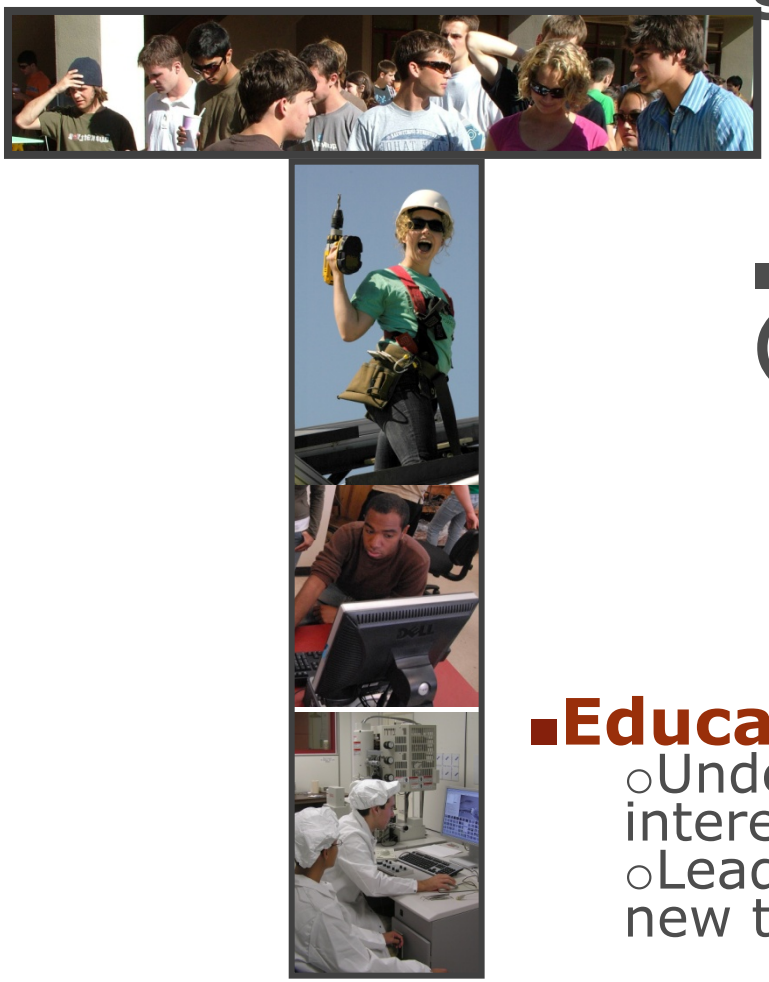
Engineer as a Professional

- **Six characteristics of a profession:**
  - Members are highly trained in a specific area
  - Members engage in continuing education
  - Members operate with standard of ethics
  - Members are responsible to serve the public
  - Members have professional organizations
  - Members are often registered or licensed
- **Engineer's creed:** As a professional engineer, I dedicate my professional knowledge and skill to the advancement and betterment of human welfare.

Undergraduate Engineering Program at SCU



T-Model of Engineering Education



- **Deep technical core (hard skills – left brain):**
  - Coursework: Math, Science, engineering
  - Project work: design, …
- **Broad range of soft skills (right brain)**
  - Communication
  - Ethics, Integrity
  - Entrepreneurial mindset
  - Creativity
  - Global view…
- **Educating engineers to:**
  - Understand difference between private interest and public good
  - Lead the world in introducing and applying new technology critical to improving life

https://www.census.gov/prod/2013pubs/acs-24.pdf

=**The changing face of the U.S. workforce:**

- 50% of the U.S. engineering workforce is more than 48 years old and thus will be replaced over the next 17 years
- 85% of new workers entering the California labor force in the next decade will be minority and/or female
- Expanding role for engineers in our tech world

Welcome to Santa Clara!
Time for a an exercise in communications engineering