# Engineers & Society

## CHAPTER 1 (Part 3)
## INTRODUCTION

by

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Universiti Malaysia PAHANG
Engineering • Technology • Creativity

# Engineers
# and
# Engineers Image

# What it means to be an engineer?

* A vocation whose principal duty is to serve mankind.
* Applying knowledge to create practical devices, structures and processes.
* Changes the world with his machines
* In contrast: Scientist aims to seek knowledge.

# Engineers and Scientists

* Scientists seek technical answers to understand natural phenomenon
* Engineers study technical problems with a practical application always in mind
* For example
  * “Scientists study atomic structure to understand the nature of matter; engineers study atomic structure to make smaller and faster microchips”

Source: http://www.authorstream.com

# The Engineer and the Engineering Technologist

* Main difference between the two is:
  * Engineers design and manufacture machines and systems, while engineering technologists have the technical know-how to use and install the machines properly
* An example:
  * “The technologist identifies the equipment necessary to assemble a new CD player; the engineer designs said CD player”

# Famous Engineers

* Thomas Edison
* Jimmy Carter
* Neil Alden Armstrong
* Rowan Atkinson
* Leonid Brezhnev
* Boris Yeltsin
* Alfred Hitchcock
* Yasser Arafat
* etc.

# Famous Engineers

**Thomas Edison** - Edison patented 1,093 inventions in his lifetime, earning him the nickname the "Wizard of Menlo Park." The most famous of his inventions was an incandescent light bulb. Besides the light bulb, Edison developed the phonograph and the kinetoscope, a small box for viewing moving films. He also improved upon the original design of the stock ticker, the telegraph, and Alexander Graham Bell's telephone. Edison was quoted as saying, "Genius is 1 percent inspiration and 99 percent perspiration."

**Jimmy Carter -** 39th President of the United States. Attended Georgia Southwestern College and the Georgia Institute of Technology and received a B.S. degree from the United States Naval Academy in 1946. In the Navy he became a submariner, serving in both the Atlantic and Pacific fleets and rising to the rank of lieutenant. Chosen by Admiral Hyman Rickover for the nuclear submarine program, he was assigned to Schenectady, N.Y., where he took graduate work at Union College in reactor technology and nuclear physics and served as senior officer of the pre-commissioning crew of the Seawolf.

Source: http://www.intelliot.com/2005/04/famous-engineers/, http://www.nobelprize.org/nobel_prizes/peace/laureates/2002/carter-facts.html

# Famous Engineers

**Neil Alden Armstrong** - became the first man to walk on the moon on July 20, 1969, at 10:56 p.m. EDT. He and "Buzz" Aldrin spent about two and one-half hours walking on the moon, while pilot Michael Collins waited above in the Apollo 11 command module. Armstrong received his B.S. in aeronautical engineering from Purdue University and an M.S. in aerospace engineering from the University of Southern California.

**Rowan Atkinson** - A British comedian, best known for his starring roles in the television series *Blackadder* and *Mr. Bean*, and several films including Four *Weddings and a Funeral*. Atkinson attended first Manchester then Oxford University earning an electrical engineering degree.

Source: http://www.discovere.org/

**Are they Professional? …….**

# Functions of Engineers

* Engineers act as a leader to technicians, craftsmen and workers.
* Engineers should be familiar with the skills of his/her subordinates, and in addition to that, innovate, design, make decisions and, foresee, identify, assess, and solve problems.

# … in the following areas:

* R&D
* Design
* Construction
* Sales
* Production
* Operations
* Management
* In various fields of Engineering…..

# Public Perception

* Parents:
  * high esteem, good job opportunities, well paid, responsible positions
* Public:
  * poor communications, ‘square’, male, socially inept etc.

# Engineers
# At Public and
# Private Sectors

# Careers in Engineering:

***"The Possibilities are Endless"***

* The engineer-entrepreneur
  * Brunel, Edison
* The engineer-civil servant
  * Lely, Stevin
* The engineer-scientist
  * Chr. Huygens, Vannevar Bush
* The system engineer
  * Modern examples

Engineering schools have to choose a profile.
Borderless society implies cross fertilizaion.

# *How Do You Become An Engineer?*

* **After graduation**
  * Work under supervision as a junior engineer
  * After three years experience you can apply the professional engineer exam and can practice as a registered engineer
  * May take further training (master's degree in engineering or progress to another degree)
  * There will be lifelong learning
  * Many engineers go on to become project managers and business managers

Source: http://eir.ca/resources/presentations/EIR%20Career%20Presentation%20-%20By%20John%20Marcheggiani.ppt

# *How Does An Engineer Do Things*

* Client has a problem or sees an opportunity
* The engineer:
  * defines the problem and collect information and data about the problem
  * develops alternative designs or solutions (Usually more than one way to solve the problem)
  * identifies and compares the pros and cons of each solution

# *How Does An Engineer Do Things (continued)*

* helps the client determine the best choice for the best price
* designs and manufactures the selected product
* trains others to use and support the new product
* continues development and improvement of the product
* finds other uses for the product

# *What Types of Jobs Would a Junior Engineer Do?*

* Normally will be assigned as a member of a project team
* Research (analysing and solving problems using scientific skills and logic)
* Designing (need imagination and creativity)
* Testing (lab work, conducting experiments)
* Development (improvement or adapting existing products)

# *What Types of Jobs Would a Junior Engineer Do?*

* Sales (must have a very good knowledge of the product, because the marketing people may not be engineers)
* Management – organising and expediting projects
* Consulting
* Teaching

# *What can you expect from an engineering career?*

* Varied opportunities (opens the door to many areas)
* Challenging work (brain exercise)
* Social impact (improving our way of life)
* Prestige (engineering is a well respected profession)
* Lifelong education (always new things to learn about)
* How do they do that (curiosity)
* Creative thinking (dreaming)

# What Can I do with my Degree?

***a sample of the possibilities….***

* ***Biomedical Engineering***
  * R& D Engineer
  * Application Developer
  * Medical Doctor/Lawyer
* ***Chemical Engineering***
  * Materials Engineer
  * Process Engineer
  * Operations Mgmt Assistant
  * Analyst
* ***Civil/Environmental Engineering***
  * Project Engineer
  * Design Engineer
  * Field Engineer
  * Structural Engineer
  * Transportation Engineer
* ***Electrical & Computer Engineering***
  * Software Engineer
  * Systems Engineer
  * Test Engineer
* ***Industrial Engineering***
  * Manufacturing Engineer
  * Production Planner
  * Sales Engineer
  * Consultant
* ***Mechanical Engineering***
  * Applications Engineer
  * Project Engineer
  * Mechanical Design Engineer
  * Quality Engineer

# Which Agencies Recruit?

* Small & Large Companies
* Local, Regional, National & International Companies
* Employers from Consulting, Manufacturing, Healthcare, Government, etc.
* Non-profit organizations

# Which Agencies Recruit?

***to name a few….***

- JKR
- IPTAs
- SKMM
- MOSTI
- Mindef
- MIMOS
- MDC
- Proton
- Petronas
- TNB

- TM
- Maxis
- Nokia
- IBM
- Sapura
- Motorola
- Pernec
- Intel
- Motorola
- Siemens
- Avaya
- GEC
- MAS

# What can I do to guarantee that I am employed?

- Keep the GPA up! Many companies require above 3.0 GPA before they will even interview you!!
- Participate in a co-op or internship!
- Become involved in volunteer or leadership roles such as student organizations
- Network, network, network!
- Start your freshman year!

In addition, a good prospect for success would have…

- Good writing and verbal communications skills and, good computer skills!

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