**The Engineering Profession**

**Practice and Responsibilities**

**Lecturer 1**

**Introduction to the Engineering Profession**

**Practice and Responsibilities**

**Introduction:**

* Definition of "Engineering".
* History of Engineering.
* Responsibilities.
* The value of the engineering profession.
* The legal framework of the engineering profession.
* Engineering Majors.

**What is "Engineer"?**

* The world "**Engineer**" has its roots in the Latin word "**Ingeniator**" which means ingenious, to devise in the sense of the construct or craftsmanship.
* **National Academy of Engineers in the US** defines **Engineer 2020** as

"Understands the principles of inquiry-based scientific methods and engineering under constraint and be able to apply them in the technological society".

**History of Engineering:**

1. Pre-scientific revolution
2. Industrial revolution
3. Second industrial revolution
4. Information revolution

* **Pre-scientific revolution:**

The engineers, practical artists and craftsmen proceeded mainly by trial and error. Yet thinking combined with imagination produced many marvelous devices and monuments.

The ancient Egyptians temples and monuments such as the great Pyramids are examples of craftsmanship.

* **Industrial** **revolution:**
* From the eighteenth through nineteenth century, civil and mechanical engineers changed from practical artists to scientific professionals.
* This phase of engineering lasted through the First Industrial Revolution, when machines increasingly powered by steam engines started to replace muscles in most production. While pulling off the revolution, traditional artisans transformed themselves to modern professionals.
* **Second industrial** **revolution:**
* In the century before World War II, chemical, electrical and other science-based engineering branches developed electricity, cars, airplanes, telecommunications and mass production.
* The second industrial revolution, symbolized by the advent of electricity and mass production was driven by many branches of engineering.
* **Information** **revolution:**

As engineering science matured after the war, microelectronics, telecommunications and computers jointly produced information technology.

**Responsibilities:**

* Safety of the public.
* Welfare of the society.
* Environmental concerns.
* Abide by laws, regulations, standards and ethical code.
* Produced products/devices that have the following characteristics:
* Adequate performance.
* Cost-efficient.
* Low operating and maintenance cost.
* Longevity / durability.

**The value of the engineering profession:**

Engineers are responsible of development of civilizations. They provide:

* Shelters.
* Infrastructure.
* Communication to link people.
* Products to make our lives easier and more enjoyable.

**The legal framework of the engineering profession:**

* Codes and standards set minimum requirements to ensure **public safety and adequate performance**.
* Example of the fist structural design code:

The code of Hammurabi.

**Engineering Majors-Traditional:**

* Civil Engineering.
* Environmental Engineering.
* Mechanical Engineering.
* Electrical Engineering.
* Computer Engineering.
* Chemical Engineering.
* Architectural Engineering.
* Construction Engineering.

**Engineering Majors Non-Traditional:**

* Bioengineering.
* Building Engineering.
* Materials Engineering.
* Communication Systems Engineering.
* Manufacturing Engineering.
* Energy & Renewable Energy Engineering.
* Engineering Physics.
* Petroleum Engineering.
* Genetic Engineering.