

COURSE TITTLE: ENGINEER IN SOCEITY

COURSE CODE: CVE 101

COURSE OUTLINE

- Philosophy of Engineering
- History of Engineering and Technology
- Branches of Engineering
- Safety in Engineering
- Introduction to risk analysis
- Roles of Engineer in Nation Build

Philosophy of Engineering

The philosophy of Engineering is concerned with all the assumptions, foundations, methods, implications of Engineering, and with the use and merit of scientific principle to design, or develop structures, machine, apparatus. Philosophy of engineering is an emerging discipline that considers what engineering is, Why we do engineering, What engineers do and how their work affect the society. In the end, engineering philosophy must help to advance engineering practice, including the process of engineering design.

Basic Philosophic Ideologies of Engineering

- **Demarcating Engineering**

Engineering involves creativity, imagination, logical thoughts, and vision. It requires the ability to predict performances or outcomes and the cost of new devices.

Engineering applies scientific knowledge, but despite the widespread assumption to the contrary, engineering is not simply applied science. Moreover, the aims of engineering are different; while science aims for knowledge, engineering aims for useful change. Science is a continuous activity and attempt by man to organise his experiences about nature and the environment in to a meaningful system of explanation and facts that result in a testable and verifiable body of knowledge. It has the ability to explain that which has been observed and predict that which has not been observed.

By contrast, engineering is characterized by contingency, probability, particularity, and concreteness. Engineers rely on subjective knowledge-how and opinions that are derived from personal and historical experience, with the goal of wilful action and use.

Engineering Education

Another distinction is manifest in how engineers are educated (note that engineering education has changed noticeably over the past century).

Prior to World War II, engineering still exhibited much of its origins from the trades. Engineering students had shop classes and had to do a significant amount of drafting. Engineering science was secondary to art and practice. That was beginning to change even in the early 20th century, and the process accelerated after World War II. By 1965, most engineering programs had moved away from the art and practice of engineering

and made engineering science the primary basis of engineering education.

Engineering education integrates engineering research and education to accelerate technological and educational innovation and improve the quality and diversity of engineering graduates entering the technical workforce.

Educational studies of engineering has prepare the graduates to practice engineering with competent technical know- how and soft skills at the professional level.

Models

Arguably, we cannot access reality directly or even “mirror” it in an exact way. Instead, both philosophically and cognitively, our interaction with reality is always mediated by models. • The form of a model may be conceptual, mathematical, computational, or physical, and all of these forms are used in engineering (Alvi 2013a).

Some key goals of modelling in engineering include:

- Explaining, predicting, and controlling the behavior of engineered systems,
- Developing intuition and associated engineering judgment; instructing in both academic and practice settings
- Designing and evaluating engineered systems; and providing a context for experimenting and collecting data in order to develop models further.

Competence and Expertise

Two-thirds of the knowledge used by engineers on a daily basis is "practice-generated," rather than "historically established"; i.e., gained by means of experience instead of formal education or reference materials. They produced a plausible model of skill acquisition that includes five distinct stages: novice, advanced beginner, competent, proficient, and expert. The higher levels can only be attained through extensive experience and are characterized by less rational deliberation and greater emotional involvement.

Quality

When engineers develop options for consideration or make a decision based on a certain amount of information, how do they choose the best option and make the best decision?. Considerations such as durability, constructability, and other constraints

could be added as well. One other term that is often used is quality, which depending on one's viewpoint – may comprise all or some subset of these criteria.

HISTORY OF ENGINEERING AND TECHNOLOGY

Man is constantly moulding his natural environment to ensure his survival and reduce dependence on it. This led man into the art of fashioning of tools and building of structures, devices and systems to enable him control and adapt nature to meet his needs. Man tries to influence the nature around him by applying his ingenuity to fashion the tools but soon discovered that art are affected by the society around him. Therefore, man combined social relations, politics and economic base to achieve this target.

Man basic needs consisted of food, clothing, shelter and defence. These needs propelled man to continue to invent tools and techniques that make the exploitation of his environment easier and more efficient. This drive has been the basis for technological advancements and improvements.

Engineering and technological developments came as a result of:

- 1) Independent inventions: Indigenous innovative inventions in any country,
- 2) The necessity of competition: war and adverse conditions provoke technological inventions and advancement.
- 3) Directly purchased: This might be through formal training or via business deals involving technological transfer.
- 4) The need for defence and dominance: Every society will always take measures to ensure protection against external aggression. This led to technological advancement.

Technology has affected society and its surroundings in a number of ways. In many societies, technology has helped developed more advanced economy (including today's global economy) and has allow the rise of leisure class. Many technological processes produce unwanted by products, known as pollution and deplete natural resources, to the detriment of Earth environment. Various implementations of technology influence the values of a society and new technology often raises new ethical questions. Example include the rise of notion of efficiency in term of human productivity, a term originally applied only to machines, and the challenge of traditional norms.

Indeed until recently, it was believed that the development of technology was restricted only to human being, but recent scientific studies indicate that other primates and certain dolphin communities have developed simple tools and learn to pass their knowledge to other generations.

ENGINEERING AND TECHNOLOGY THROUGH THE AGES

The early man was both a hunter and a wanderer (nomadic stage) and he made use of stones, bones and clubs (Stone Age). Later came the Bronze Age, the Iron and Steel age. All these developmental stages were aimed at harnessing different sources of energy like wood, wind, sun, falling water, coal, gas, electricity, petroleum and nuclear fission to enhance living.

Stone-Age

Stone age came between 4000-5000 B.C. Scientists believe this is the earliest time of technology where man used stone as a hard and sharp object or tool for cutting, defence, digging, construction and so on. Stone served the purposes of axe, saw, knife, scrapers, and so on.

Bronze Age: Following development in science, man improves his technology by graduating to the use of bronze which is a kind of alloy of some metals (copper, tin and minute quantity of aluminium, manganese, nickel or zinc). Bronze Age happened between 2000 - 4000 B.C. In this age, blends of metals were used for weapons, tools, buildings and wears. It can be inferred that man's technical skills have greatly improved in this age. Owing to the ease of melting these metals, great achievements were made in making them into different shapes and constructions. This age led to the introduction of tongs for handling small pieces of hot metals, the development of wax process for castings, the introduction of bellows for metallurgical processes. Items made in the period include axes, chisels, gongs, drills, knives, saw nails, clamps, needles, razors were made.

Iron Age

Iron Age was a great leap in the advancement of science, engineering and technology for man. This description is even obvious when viewed with the fact that the use of iron

has grown into the modern time. The Iron Age began around 1300 BC. The Iron Age led to our present age of high-tech.

The pace at which transformation occurred from the crude age to bronze, iron and steel age: from wind power to electrical power and consequently the industrialisation in the present age varies from society to society.