September 2019

Engineering education in India: an overview

chinna balu IIIT ongole, RGUKT-AP
cbalu19@yahoo.com

ENGINEERING EDUCATION IN INDIA: AN OVERVIEW

Dr.C.Chinna balu, Librarian(i/c), Dr.APJ Abdul Kalam IIIT Ongole, RGUKT-AP, R.K.Valley, Idupulapaya, Vempalli (M), Kadapa (Dist), A.P.
cbalu19@yahoo.com, Mobile: +91- 9949076015

Abstract
Engineering education now demands that we quip our students with key transferable skills that will enable them to meet the demands of rapidly changing technology and societal expectations of engineers. This paper investigates the role of improved leadership in learning and teaching, through the position of the Associate Dean Learning and Teaching (AD-LT), and faculty supported research in engineering education to ensure graduates are equipped with appropriate technical knowledge and key graduate attributes such as lifelong learning.

Introduction

The words 'engine' and 'ingenious' are derived from the same Latin root, ingenerate which means, 'to create'. The early English verb engine meant 'to contrive'. Thus the engines of war were devices such as catapults, flouting bridges and assault's towers. Their designer was the engineer or military engineer. The counterpart of the military engineer was the civil engineer, who applied essentially the same knowledge and skills to designing buildings, streets, water supplies, sewage systems, and other projects of benefit to civilians.

Engineering is an organized way of using men and material to satisfy human needs. It is very old and much older than science. While science was originally a mental exercise based on curiosity, engineering has always addressed itself to the needs of man. Engineering relied heavily on art and practice. Only in the last two centuries it began to depend extensively on science, which is an understanding of fundamentals of natural phenomena. But it always heavily relied on mathematics. Engineering appears to be originated first in those parts of the world, where mathematics of measurements and computation developed and flourished.

The early regions of engineering development were Mesopotamia, Egypt, Greece, and Rome. Engineering originally concerned itself with structures such as buildings, bridges, roads, canals and aqueducts. The power supply was gained by animals, human beings and materials used were those generally available earth, wood, stone and bricks. Basically the role of an engineer is to convert scientific theory into useful application, and in so doing he provides for man's materials needs and well being. From era to era, the objectives that he has pursued and tools of analysis at his disposal have changed.

Engineers, unlike scientists, work toward the solution of specific practical problems. Scientists, on the other hand, are interested in investigating, what occurs and why and are less concerned with the practical applications of their investigation. Engineering is a profession may be to early recorded times, when the term 'engineer' was applied to persons who built irrigation canals, dams, palaces, temples, roads and other facilities to satisfy the needs of their fellowmen. In later times, engineers became active in military operations, where they were in charge of building fortresses and war machines. New materials and processes enabled engineers to become sophisticated, and the profession grew in importance. By the middle of the 20th century, there were nearly one million engineers in the United States alone.

Definition of Engineering

Engineering[1] is the practical application of science. This is accomplished through knowledge, mathematics, and practical experience applied to the design of useful objects or processes. Professional practitioners of engineering are called engineers.

Engineering is the discipline of acquiring and applying scientific and technological knowledge to the design, analysis, and/or construction of works for practical purposes.[2]

Engineering is the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind[3]

Need for engineering education in India

Engineering education is basic and essential input for national development and for strengthening the industry, economy and ultimately improving the quality of life of the people. It has made a significant contribution to India's economic development. The various educational programmes have advanced the country, diversified and augmented its production since independence because of the manpower produced by technological institutions of the country. Skilled workforce is the best resource of the nation.

In India, there is a rapid increase in the demand of engineers and other technologically qualified professionals. There is demand for Indian engineering professionals due to the IT boom, the booming industrialization and the globalization. Hence there has been an increased emphasis on providing high quality technological education to churn out large number of engineers every year to cope up with the rising demand.

Quality of Engineering Education

In India, Engineering education is imparted at various levels namely craftsmanship, diploma, degree, post-graduate and research in specialized fields.

Engineering graduates today require not only adequate technological ability and problem solving skills, but must also be endowed with soft skills like cooperative working, communication and presentation skills, business ethics and inter-personal relationships. They must also possess deep commitment to safety, reliability, quality and sustainability of all engineering activities in which they take part.

Engineering Institutions have now a new responsibility to provide opportunities to every student to acquire these abilities in addition to their technological knowledge.

History of engineering education

Early Engineering began with man's first steps towards civilization. The first 'engineers' were the pre-historic men who put fire to use, discovered home to make tools and weapons, and devised forms of shelter.

Most of the visible remains of ancient civilizations are examples of engineering skill. The pyramid of Egypt, built with crude machines and the muscles of men and animals, were intended as monuments to kings but are actually monuments to the unknown engineers who planned them. The ports of the Phoenicians, the Hanging Gardens of Babylon, the Great Wall of China, and the magnificent public building of ancient Greece - all that attests to the advanced engineering ability of their builders. The Romans were the greatest engineers of the ancient world, and some of their roads and aqueducts are still used. Ruins of their theaters, baths, temples and arenas are found throughout the part of Europe, Africa, and Asia they occupied.

Engineering education in India

Engineering education in India started during the British era and focused mainly on civil engineering. At the time engineering education was based on the British model which laid emphasis on professional practice. After independence it has been constantly influenced by American Educational System in its contents.

A brief history of engineering education in India is available in the Rao Committee report and the Ministry of Human Resource Development website[4].

The engineering college at Roorkee (1847) and Poona Civil Engineering College at Pune (1854) were established. Bengal Engineering College in Shibpur (1856), Banaras Hindu University (1916), Harcourt Butler Technological Institute, Kanpur (1920) were some of the earliest engineering colleges established and continue till the present day. In 1945 the Sarkar Committee was appointed to suggest options for advanced technological education in India.

The Sarkar Committee recommended the establishment of higher technological institutes based on the Massachusetts Institute of Technology in the four regions of India. This resulted in the setting up of the five Indian Institutes of Technology at Kharagpur (1959), Bombay (1958), Kanpur (1959), Madras (1960) and Delhi (1961) (Delhi was added on to the original four). The All India Council for Technical Education was set up in 1945, to oversee all technological education (diploma, degree and postgraduate) in the country.

Engineering education has been one of the most sought after and rewarding career options all over the world for the world for the creative and intelligent students having a passion for the innovation. The inventions of engineering can be seen all around us and the engineers are to be thanked for developments of machines and many other everyday appliances that make our lives so easy. Today, it is hard to imagine a world without the engineering inventions. Technological innovation has opened up many doors and it must continue to do so in the times ahead.

Before independence, engineering education was imparted in 35 engineering colleges and other similar institutions. Owing to the subsequent policy of the Government of India to industrialize the country rapidly, more engineers and technologists were needed. As a result of this by the end of 1975, the number of teaching institutions which are imparting education at the diploma or degree levels (in engineering and technology) has gone up to 437. In addition to this, there are more than 300 industrial training institution spreads all over the country.

In India[5] engineering is considered to be an exciting field for study as it offers a plethora of career opportunities and is considered to be a very stable field. If we look at the growth of engineering education in India. But, in the recent times, there has been an exponential increase in the number of engineering colleges. The number of engineering colleges in the year 1947 was only 44 and in the academic year 2010-1, the was increased to 130 (this does not include in central government and state government universities). We have enough engineering institutions, producing about two million engineers (graduates and diploma holders put together) per annum.

REFERENCES

1. *In:* http://www.en.wikipedia.org/w/index.php?title=Category:Engineering& from=D.
2. *In:* http://www.en.wikipedia.org/wiki/Engineering.
3. *In:* http://www.rpaulsingh.com/research/presentations/ethicsrps1/tsld003.html.
4. *In:* http://www.education.nic.in/tecedu.asp.
5. Nagendra Parashar, B S and Datta, G L (2011). Academic structure in Engineering Education. *University News*, 49(40); October 3-9, pp1-6.