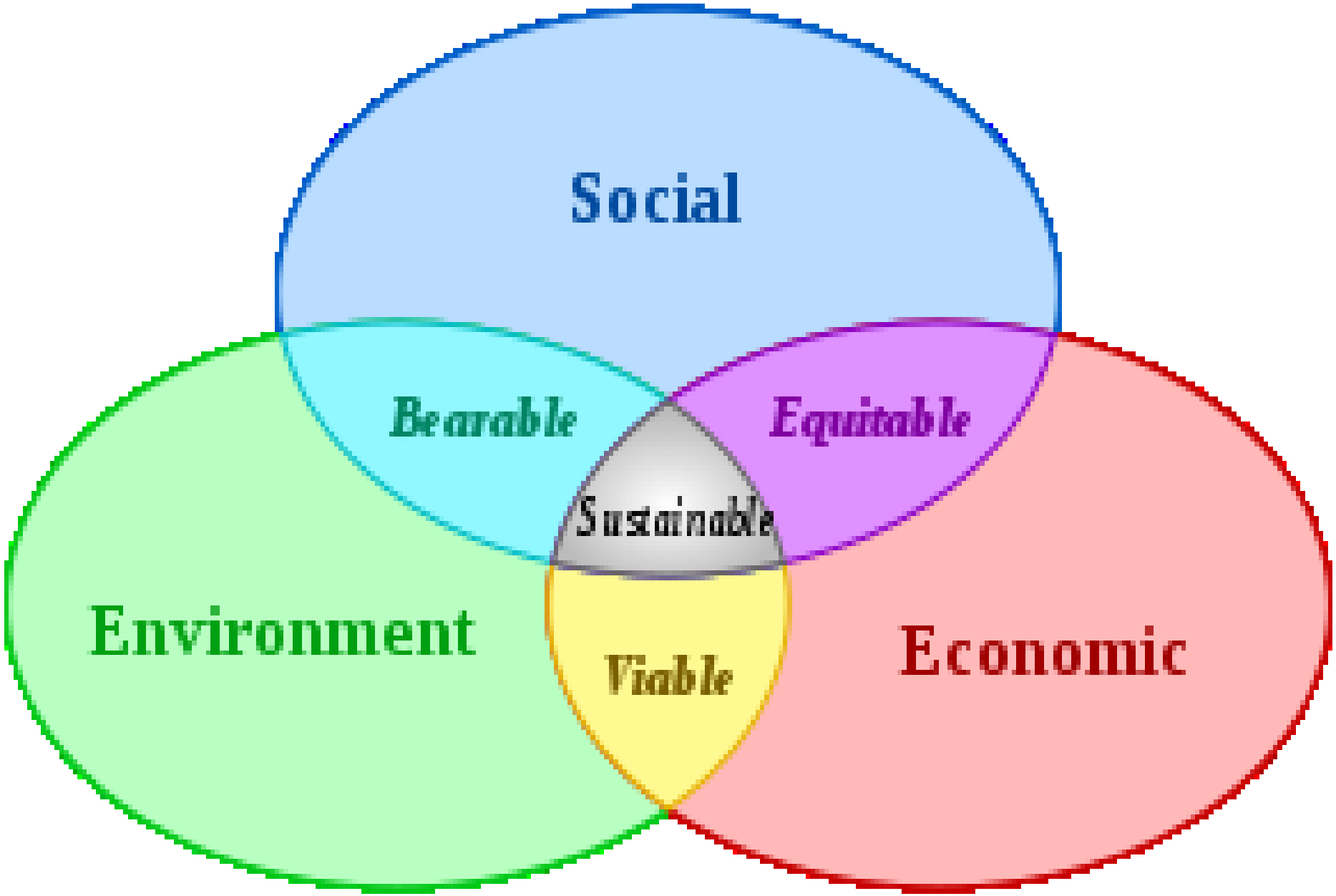
Background Perspectives:

- **Course Objective:**
- **To familiarize the students with their roles in the society, ethical and legal environment in which engineering is practiced, contract administration, regulatory environment and contemporary issues in Engineering**

Chapter 1

- **History of Engineering Practices [3 hours]**
  1. **Man and Society**
  2. **Technology and Society**
  3. **History of Engineering Practice in Eastern Society**
  4. **History of Engineering Practice in Western society**
  5. **Engineering Practices in Nepal**


Social
Bearable
Equitable
Sustainable
Environment
Viable
Economic

- **Cultures of East and West**
- **There is a difference between the cultures of East and West. Western culture attaches significant values to the material gains achieved by individuals. Hence, the Western culture evaluates things giving more and more comfort to the individual.**
- **Eastern culture attaches significant values to high morality, power of truth, achieved by individuals and achievements in religious activities etc are regarded higher than those acquiring materialistic and physical objects. Eastern culture to the group of people is a family, a community and a society as a whole. Eastern culture especially exhibits due respect to the old.**

- **Western values**

- **Achievements and success**
- **Activity and work**
- **Moral orientation**
- **Efficiency and practicability**
- **Progress**
- **Material comfort**
- **Equality**
- **Freedom**
- **Use of technology**
- **Individualistic**
- **High concern over time**

Western Society

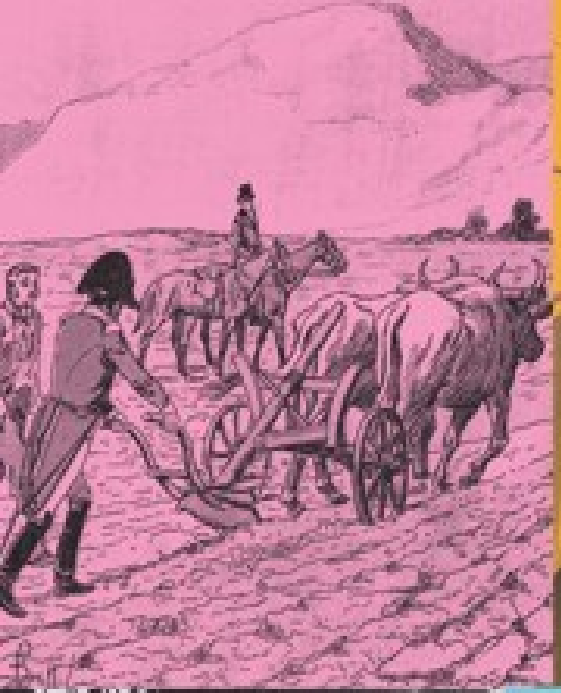
- The concept of the Western part of the earth has its roots in Greco-Roman civilization in Europe, with the advent of Christianity.
- In the modern era, Western culture has been heavily influenced by the traditions of Renaissance, Protestant Reformation,
- Age of Enlightenment, and shaped by the expansive colonialism of the 16th-20th centuries.
- In the contemporary cultural meaning, the Western world includes many countries of Europe, including Central European states (except for their socialist period (1945-c.1990), as well as many countries of European colonial origin in the Americas and Oceania, such as the United States of America, Canada, Australia, New Zealand, Argentina, Brazil, Mexico, etc.

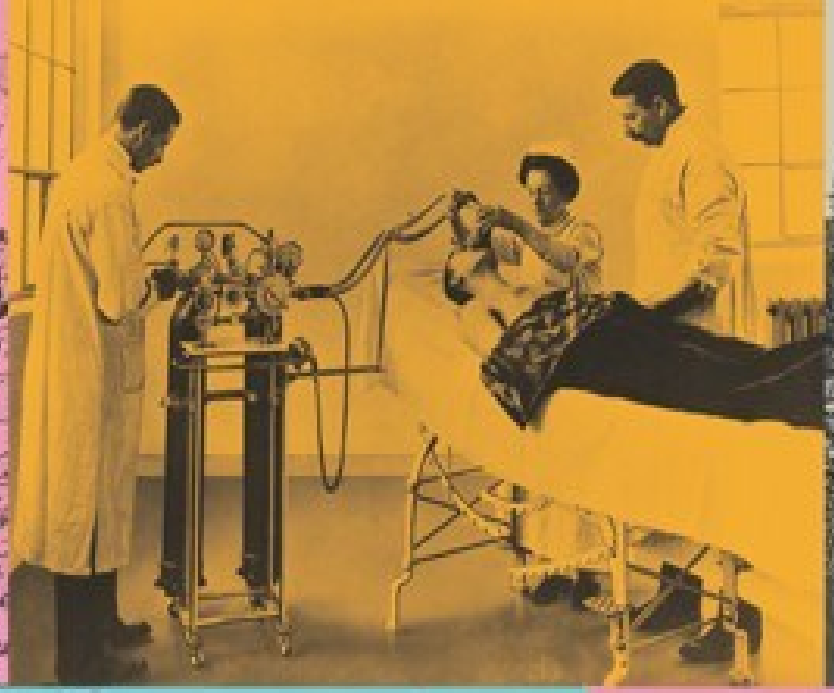
Eastern Society

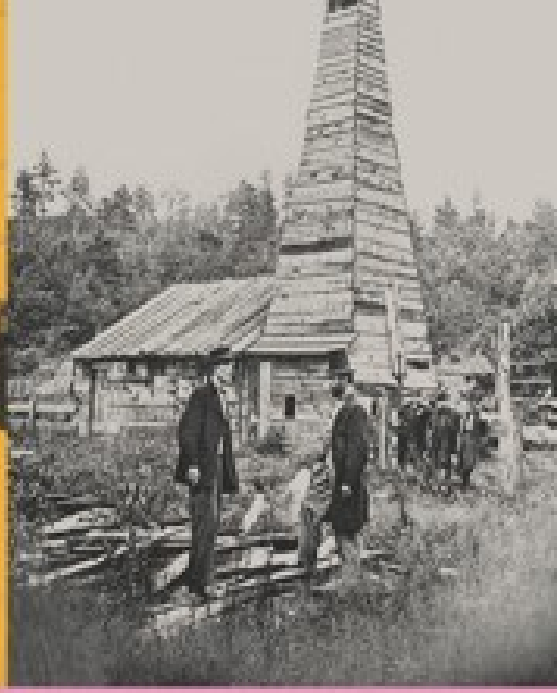
- **The term Eastern world refers very broadly to the various cultures or social structures and philosophical systems of Asia or geographically the Eastern cultures. This includes the Indian subcontinent (comprising Bangladesh, Bhutan, India, Myanmar, Pakistan, SriLanka,theMaldives,and Nepal),the FarEast (comprising China, Taiwan, Vietnam, Cambodia, Malaysia,Mongolia, Indonesia, Japan, NorthKorea, SouthKorea),the MiddleEast (Israel, Palestine,Jordan, Syria, Lebanon, Iran, Iraq, SaudiArabia, Qatar, Bahrain, Yemen,and Egypt),andCentralAsia (Uzbekistan, Kazakhstan, Turkmenistan, Tajikistan, Afghanistan, and Kyrgyzstan**

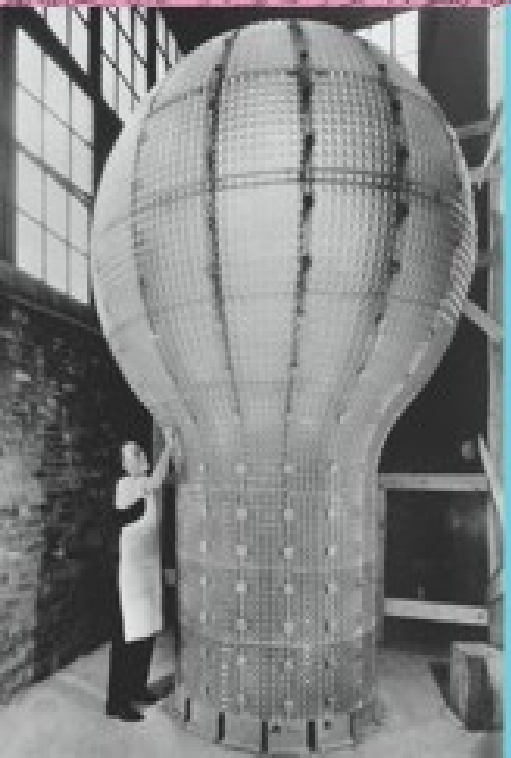
- **The term refers to how input is transferred to output. Technology is a systematic knowledge which facilitates in the use of machines and tools. One of the most distinctive of all human characteristics is that men are tool-using animals. People have used increasingly sophisticated techniques to act on the social and the natural world for thousands of years and they have done so in many ways that have transformed, and continue to transform, the very conditions of life on this planet.**
- **Over the generations, simple tools and machines made by human beings such as the knife, the wheel, the plough, the compass, the clocks, the printing press, the steam engines, the nuclear reactors, the computer, the mobile phones, etc have dramatically influenced our social and natural surroundings. These all are the examples of technologies, the practical application of scientific or other knowledge.**
- **Technology and social change are intimately connected, particularly in the modern world, where rapid technological and social change tends to go hand in hand. Many people in modern societies seem to implicitly assume that technological development and human progress is much the same thing.**

technology










592
592

- **According to Wikipedia - Technology and society or technology and culture refers to the cyclical co-dependence, co-influence, co-production of technology and society upon the other (technology upon culture, and vice-versa). This synergistic relationship occurred from the dawn of humankind, with the invention of the simple tools; and continues into modern technologies such as the printing press and computers.**

Impact and consequences of technology on society

1. Modern examples of technological development
2. Economics and technological development
3. Values
4. Ethics

Challenges traditional ethical norms:

Creates an aggregation of effects:

Changes the distribution of justice:

Provides great power:

5. Lifestyle
6. Institutions and groups
7. International
8. Environment

Impact and consequences of technology on

- , Hydrology Professor Uri Shamir once noted: ‘If there is a political will for peace, water will not be a hindrance. If you want reasons to fight, water will give you ample opportunities’

- Peace
- Conflict
- Climate change
- Food security
- Water
- Route

causes of international tensions

- **ENERGY PLANNING,**
- **POLICY AND ECONOMY;**
- **GENERAL AND MISCELLANEOUS//**
- **MATHEMATICS, COMPUTING, AND INFORMATION SCIENCE;**
- **HEALTH HAZARDS; RISK ASSESSMENT; OCCUPATIONAL SAFETY; REGULATIONS;**
- **COST BENEFIT ANALYSIS; DECISION MAKING; PRODUCTIVITY; HAZARDS; SAFETY**

Why engineering and safety?

Cost– benefit and other risk acceptance studies are routinely conducted by the Nuclear Regulatory Commission, the Environmental Protection Agency, the Federal Aviation Administration, and other agencies. These studies are particularly useful for low probability-high consequence events where public safety is a key criterion for decision making. This includes the design and assessment of buildings, bridges, levees, and other infrastructure systems for protection against seismic, flood, hurricane and other natural hazards.

- **en·gi·neer·ing/ˌenjəˈni(ə)riNG/**
- **Noun: The branch of science and technology concerned with the design, building, and use of engines, machines, and structures.**
- **The work done by, or the occupation of, an engineer.**
- **Synonyms :technique - technics**

What is engineering ?

- **Engineering is the practical application of science and math to solve problems, and it is everywhere in the world around you.**
- **From the start to the end of each day, engineering technologies improve the ways that we communicate, work, travel, stay healthy, and entertain ourselves.**
- **Engineers are problem-solvers who want to make things work more efficiently and quickly and less expensively.**
- **From computer chips and satellites to medical devices and renewable energy technologies, engineering makes our modern life possible.**
- **In particular, engineers have a wide range of study options and career paths that let them design, build, and manage those ideas into reality.**

What is Engineering?

- **ed·u·ca·tion**
- **[ej-*oo*-key-sh*uh*n] Show IPA**
- ***noun*1.the act or process of imparting or acquiri ng generalknowledge, developing the powers of reasoning andjudgment, and generally of prepari ng oneself or othersintellectually for mature life.**
- **2.the act or process of imparting or acquiring pa rticularknowledge or skills, as for a profession.**
- **3.a degree, level, or kind of schooling: *a universit y education.***
- **4.the result produced by instruction, training, o r study: *toshow one's education.***
- **5.the science or art of teaching; pedagogics.**

what is education?

1. instruction, schooling, learning. EDUCATION, TRAINING imply a discipline and development by means of study and learning. EDUCATION is the development of the abilities of the mind(learning to know): *a liberal education.* TRAINING is practical education (learning to do) or practice, usually under supervision, in some art, trade, or profession: *training in art, teacher training.* 4. learning, knowledge, enlightenment. EDUCATION, CULTURE are often used interchangeably to mean the results of schooling. EDUCATION, however, suggests chiefly the information acquired. CULTURE is a mode of thought and feeling encouraged by education. It suggests an aspiration toward, and an appreciation of high intellectual and esthetic ideals: *The level of culture in country depends upon the education of its people.*

Synonyms of education

- ***What Is Education?*** **is a profound philosophical exploration of how we transmit knowledge in human society and how we think about accomplishing that vital task.**
- **Most contemporary approaches to education follow a strictly empirical track, aiming to discover pragmatic solutions for teachers and school administrators.**
- **Jackson argues that we need to learn not just how to improve on current practices but also how to think about what education means—in short, we need to answer Dewey by constantly rethinking education from the ground up. Guiding us through the many facets of Dewey's comments, Jackson also calls on Hegel, Kant, and Paul Tillich to shed light on how a society does, can, and should transmit truth and knowledge to successive generations.**
- **Teasing out the implications in these thinkers' works ultimately leads Jackson to the conclusion that education is at root a moral enterprise.**

What is Education?

- Beginning from the civilization
- Rome empire
- Babylonian
- Eastern civilization
  - Takshashila
  - Nalanda
  - Vikrmashila
  - Vishwakarma
  - Pathshala, gurukul etc
- Church, School, college, university

- **Before the Industrial Revolution in the late 18th century, there were only two kinds of engineers:**
- **Military engineers – who built fortifications, catapults, and later, cannons**
- **Civil engineers – who built bridges, harbors, aqueducts, buildings and other structures**

- **The history of engineering can be roughly divided into four overlapping phases, each marked by a revolution:**
- **Pre-scientific revolution:**
  - **The prehistory of modern engineering features ancient master builders and Renaissance engineers such as Leonardo da Vinci.**
- **Industrial revolution:**
  - **From the eighteenth through early nineteenth century, civil and mechanical engineers changed from practical artists to scientific professionals.**
- **Second industrial revolution:**
  - **In the century before World War II, chemical, electrical, and other science-based engineering branches developed electricity, telecommunications, cars, airplanes, and mass production.**
- **Information revolution:**
  - **As engineering science matured after the war, microelectronics, computers, and telecommunications jointly produced information technology.**

History of engineering

- Besides old civilization legend .....
- First bridge (iron) 1850 AD in bagmati
- Water Supply Bir Dahara (1888-1895
- Pharping hydro project 1911
- 1956 planned development
- Gyhendra samsher
- Shanti mall
- Kularatna tuladahar
- 1942 technical training school & 1959 nepal engineering Institute

history of Engineering works & education in Nepal

- **Engineering is an incredibly broad field which involves the harnessing of mathematical and scientific concepts to create practical and useful things, ranging from automobiles to wind turbines. This field is huge, encompassing people in a wide range of industries, and some people call it "the invisible science," because engineers are often unsung and unheralded, despite the fact that the work they do is very important. Many colleges and universities offer courses in engineering, for people who are interested in pursuing this field as a career.**
- **Engineering is a very ancient field of human endeavor. Early humans utilized their knowledge of the natural world to figure out things like irrigation schemes and how to build boats which didn't sink. Over time, as humans learned more about science and mathematics, engineering got more complex, and this field paved the way for the modern society we live in today. Chances are that you are benefiting from a product of engineering right now, as you are probably using a computer to read this article.**

engineering

- **There are a number of subfields encompassed by engineering. Among these are mechanical, computer, electrical, military, civil, environmental, aerospace, and chemical engineering. All of these fields require different types of training; aerospace engineers, for example, learn a great deal about physics and space in the course of their work, while environmental engineers consider issues like pollution control and the impact of humans on their environment.**

engineering

- **An engineering education is based on a strong foundation in math and science.**
- **Additional courses emphasize the application of this knowledge to a specific engineering field.**
- **Studies in the social sciences and the humanities give the engineer a broader education.**

Engineering Technology Council of the American Society for Engineering Education.

- ***Engineering technology is the profession in which a knowledge of mathematics and natural sciences gained by higher education, experience, and practice is devoted primarily to the implementation and extension of existing technology for the benefit of humanity.***
- ***Engineering technology education focuses primarily on the applied aspects of science and engineering aimed at preparing graduates for practice in that portion of the technological spectrum closest to product improvement, manufacturing, construction, and engineering operational functions.***
- **Thus engineering technology is the application of engineering principles and modern technology to help solve or prevent technical problems.**

What is engineering?

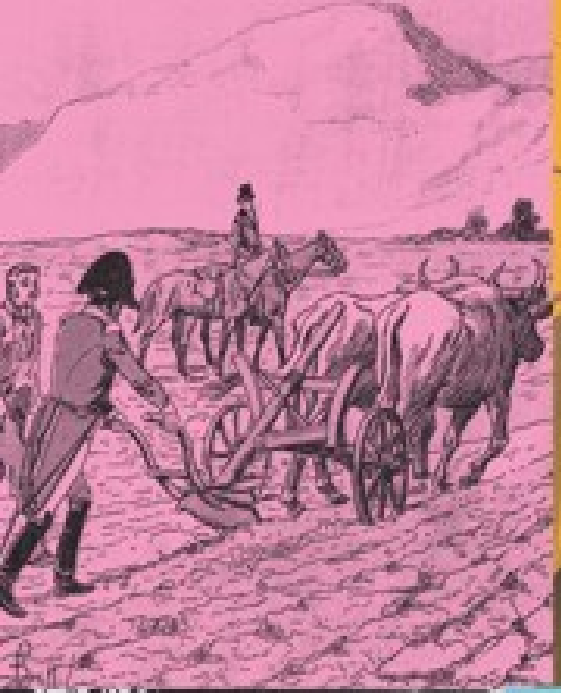
- **Update and expand your technical skills and knowledge**
- **Understand and apply new technologies**
- **Solve on-the-job problems**
- **Network with your peers**

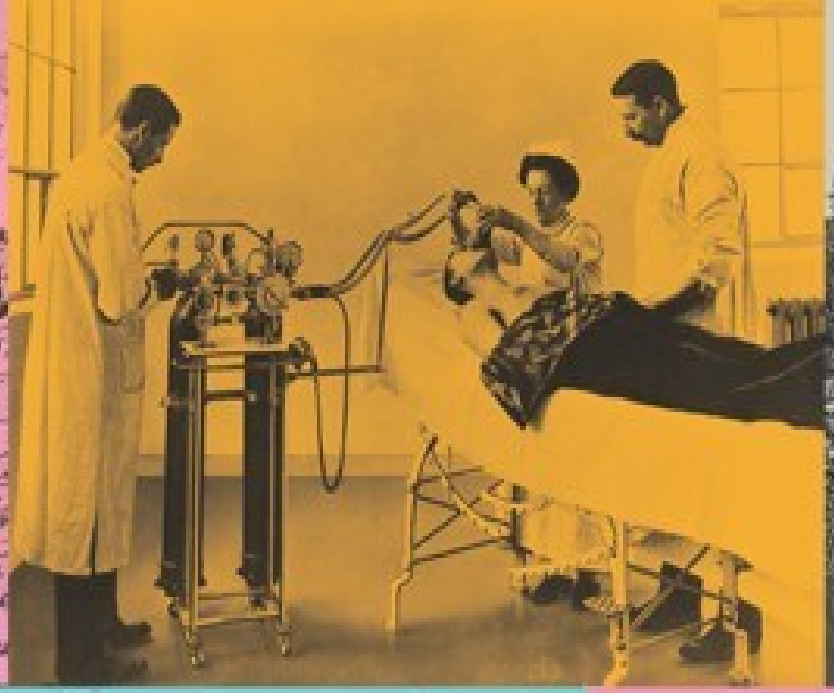
Education and training

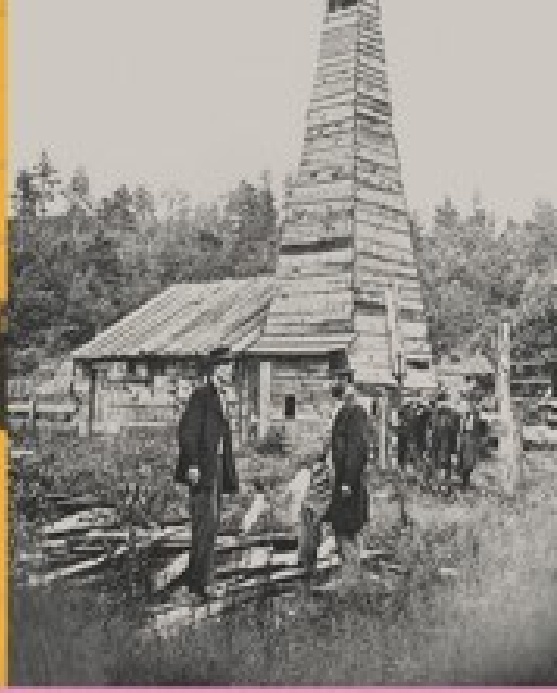
- **Industry expects an increasing shortage of high quality engineers over the next years.**
- **Industry and universities are in good agreement on the ways in which university engineering courses should be improved to provide graduates better motivated and attuned to the needs of industry and business.**
- **Research quality has benefited from the strong focus on research performance and increased funding for research.**
- **We must now turn that focus on teaching and make our learning and teaching approaches for engineering students fit for 21st Century 'learners' and able to deliver the knowledge and skills industry needs.**
- **This requires increased funding for engineering courses and an increase in the perceived status of and reward for innovative teaching in our strongest universities.**

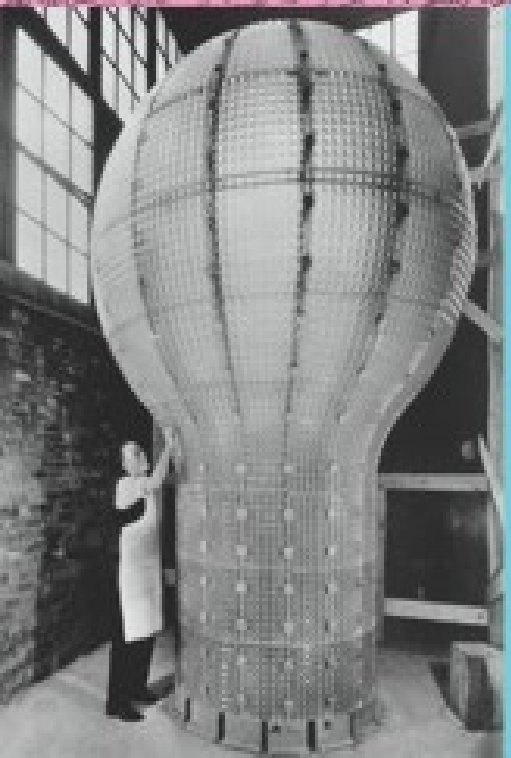
- .....
- **Ethics,**
- **environment,**
- **equality,**
- **sustainability etc**

Why engineering today?










592
592