Introduction to Engineering Disciplines

Summer School- A Taste of Science and Engineering

Dr. Modupe O. Jimoh







Introduction to Engineering Disciplines



Introduction



- Engineering encompasses the necessary knowledge and procedures to conceptualize, design, manufacture, construct, operate, maintain, dispose, or recycle something with substantial technical aspects for a particular purpose. This could be a concept, a model, a product, a device, a process, a system, or a technology.
- Technology is an enabling package of knowledge, devices, systems, processes, and other technologies, created for a specific purpose. The word technology is used colloquially to describe a complete system, a capability, or a specific device.
- The Engineer, and others, use technology to create something new; a product, a manufacturing process, a system, a new technology.

Agricultural Engineering

- Agricultural Engineers are the specialists who help solve global challenges which affect all of us, such as feeding a growing population with increasingly scarce resources while protecting the environment.
- Agricultural engineers build, service and repair agricultural, horticultural and forestry machinery and equipment.



Chemical Engineering

- The engineering disciplines associated with the process of natural and synthetic materials, liquids and gasses.
- Closely related fields: Mining, Oil, Gas and Nuclear engineering.

Chemical Engineering Employment Sectors biotecnika Biotechnology **Chemical and allied Process Plant** Pharmaceutical & products Construction **Toiletries** +Water Industry Food & Beverage **Environment Protection** Energy (Oil, industries & Recycling Gas, & Nuclear) Process plant & Materials (Plastics, dyes, Academics IT metals, paper, etc.) Equipment Manufacture Consultancy Others

Civil Engineering

The engineering disciplines associated with the creation, improvement and maintenance of both the built and natural environment.





Environmental Engineering

Environmental engineers develop methods to protect and preserve natural resources, including water, air, and soil, in order to promote a sustainable future.



Computer Engineering

- Computer engineering is a branch of computer science and electrical engineering.
- This field of study combines several disciplines to design and develop software and hardware systems.

COMPUTER ENGINEERING AT A GLANCE

Computer engineers design innovative hardware and software for various computer systems, making this one of the most dynamic professions in the engineering field.

CORE GOAL Design Innovative & Efficient Computing Components

Research, Design, Develop & Test Computer Hardware & Software

COMPUTER ENGINEERING INDUSTRIES

Telecommunications, High-Tech Manufacturing, Automotive, Health Care & Others

Sources: Houston Chronicle, Institute of Electrical and Electronics Engineers

Mechanical Engineering

The engineering disciplines associated with machines and motion.

Manufacturing/ Industrial Engineering

Manufacturing engineers are professionals who design, operate and maintain integrated systems and specialized machinery for producing consumer products and performing specialized manufacturing processes.

An industrial engineer is the professional in charge of developing approaches that improve processes within an organization.

Automotive Engineering

- > Automotive engineering is one of the branches of vehicle engineering, along with aerospace engineering and naval architecture.
- ≻lt involves various elements such as mechanical, electrical, electronic, software, and safety engineering, which are applied to the design, manufacture, and operation of motorcycles, automobiles, and trucks, as well as their respective subsystems.
- \succ The field also covers the modification of vehicles.

ELECTRIC CONNECTED SHARED CARS VEHICLES (EV) MOBILITY Hybrid and electric End-to-end solutions for infotainment. modules including Fleet management **AUTONOMOUS** mobility, telematics, vehicle design, electric (traffic-monitoring VEHICLES cybersecurity, over the powertrain, in-wheel assistance, navigation air (OTA) updates, electric motor etc), logistics for Vision and embedded software. integration, battery launching electric sensor-based solution ECU management vehicles (recharge for different levels of point, repairing autonomy, ADAS centers etc.) 0 IoT AI **COMPOSITES 3D PRINTING** IoT-enabled and Vehicle health monitoring, driver data-driven solutions Light-weighting Prototype for engineering, behavior analysis, engineering, styling development, manufacturing, supply visual analytics for and design, body component chain, aftersales and quality inspection, engineering (interior, manufacturing, services cloud-based vehicle exterior, seating, body simulation for telemetry processing

in white and closures)

assembly design. composite analysis

Biomedical Engineering

Biomedical engineers work to develop technologies that improve and maintain the physical and mental health of patients, including prosthetic limbs and surgical implants.

THE UNIVERSITY OF WARWICK

Systems Engineering

Systems engineering is an interdisciplinary approach governing the total technical and managerial effort required to transform a set of stakeholder needs, expectations, and constraints into a solution and to support that solution throughout its life.

Engineering Business Management

Humanitarian Engineering

- Humanitarian engineering is the application of engineering for humanitarian aid purposes.
- Humanitarian engineering combines multiple engineering disciplines in order to address many of the world's crises and humanitarian emergencies, especially to improve the well-being of marginalized populations.

THE UNIVERSITY OF WARWICK

Summary

- Aeronautical Engineering
- Textile Engineering
- Mechatronics Engineering
- Civil Engineering
- Robotics Engineering
- **Power Engineering** ٠
- Aerospace Engineering
- Mechanical Engineering
- Structural Engineering
- Industrial Engineering ٠
- Marine Engineering
- Petroleum Engineering
- Automobile Engineering
- Production Engineering
- Metallurgical Engineering

- Ceramic Engineering
- Biomedical Engineering
- Construction Engineering
- **Electronics Engineering**
- Marine Engineering
- Tool Engineering

Major

Engineering

Branches

- Telecommunication Engineering
- Environmental Engineering
- Transportation Engineering
- Communications Engineering
- Biotechnology Engineering
- Electrical Engineering
- Computer Science Engineering
- Chemical Engineering ٠
- Mining Engineering

0

Civil Engineers solve problems with infrastructure and large structures.

- **Electrical Engineers** solve power aeneration/distribution problems.
- Electrical equipment Communications systems

Biomedical Engineers

healthcare problems.

Chemical Engineers

solve problems with

Plastics and polymers

Medicines and food

Petrochemicals

chemicals and materials.

solve clinical/

Medical devices

Prosthetics

Surgical implants

Mechanical Engineers solve problems with

systems in motion.

Engines

Bridges

Buildings

Highways

Turbines Robots

solve aircraft and spacecraft problems.

- Aviation systems
- Defense systems
- Rockets and fuel systems

Environmental Engineers solve pollution and ecological problems.

Systems that promote sustainability

- Waste disposal systems
- Pollution control mechanisms

Thank you for listening