AFRITEQ ACADEMY
SCHOOL OF ENGINEERING

Module 0.5

Introduction to Engineering

Name:

ESCE
2024

| Topic | Introduction to Engineering |

What is Engineering?

Engineers are innovative problem solvers. While scientists and inventors create things, it's the engineer that figures out how the creation can be used to solve real-world problems. Engineers love to figure out how things work and use their knowledge in practical ways. This can include building electronics, planning buildings or bridges, or even creating robots or spaceships to further human ingenuity.

Engineering has left behind some amazing creations including the pyramids, Eiffel Tower, Roman aqueducts, ancient road systems, and more. Applying math and science to solve problems and overcome challenges is essential in answering the question 'what is an engineer?'. But there are different types of engineers so no matter what your interests are – space, electronics, city design – there is a place for engineers.

Engineering is part of STEM education, which aims to engage students with science, technology, engineering and mathematics yet, as a discipline, it has been practiced for thousands of years.

Teaches Innovation

Engineering teaches kids to think out of the box. They quickly learn that when they do, great things can happen.

Prepares for the Future

There is no shortage of engineering jobs. If kids can learn now, they can set themselves up for a bright future.

Builds Confidence

Kids need to believe in their projects for them to succeed. This takes confidence. Even for kids who may not have tons of confidence when they start, they quickly learn that if they believe in themselves and their work, others will too.

Instills Collaboration

Many times, kids can learn from others and use their insight to make their projects better. Learning how to collaborate is a skill they can use their entire lives.

WHY YOU SHOULD PURSUE A CAREER IN ENGINEERING

1. An Innovative Field
2. A Diverse Industry
3. Lucrative Profession
4. An Impactful Career
5. International Career Opportunities

Topic	Disciplines of Engineering

In the world of engineering, there are many different types of work. Where you apply your skills depends on your interests and your talent. Here are the most common types of engineers.

Aerospace Engineer

Aerospace engineers design and manufacture communications satellites and ground based satellite dishes. These technologies send and receive signals for television, telephone and the Internet.

Agricultural Engineer

Agricultural engineers specialize in developing ways to improve our farms and our food supply for the future. They use traditional practice and knowledge to help find modern solutions that improve the way food is grown, produced and transported to the people.

Biomedical Engineer

Biomedical engineers are involved in designing artificial hearts and pacemakers that may extend a person's life, creating lifelike prosthetic limbs for greater mobility and freedom Improving glucose monitors and more that help life.

Chemical Engineer

Chemical Engineers are involved in developing unscratchable plastics for PlayStation or Nintendo game systems, creating fade resistant dyes for jeans and clothing, inventing new dyes to color toothpaste and analyzing materials for sports equipment.

Civil Engineer

Civil engineers work on infrastructure projects, such as the design and construction of airports, bridges, water, and sewage treatment plants, roads and streets, tunnels, and other critical systems that our society needs to operate.

Computer Engineer

Computer engineers determine what instructions a computer needs in order to turn on and move information around, design cables which link computers together to form networks and develop peripheral computing devices such as printers, modems, scanners and digital cameras.

QUIZ! In electricity, voltage is measured in volts. What is current measured in? _____

Electrical/Electronics Engineer

An Electrical/Electronics Engineer is a professional who designs, develops, tests, and supervises the manufacturing and maintenance of electrical and electronic equipment. This includes a wide range of devices, from small integrated circuits to large power generation systems. These engineers apply principles of electrical theory to engineering projects and use their expertise to innovate and improve technology that powers our world.
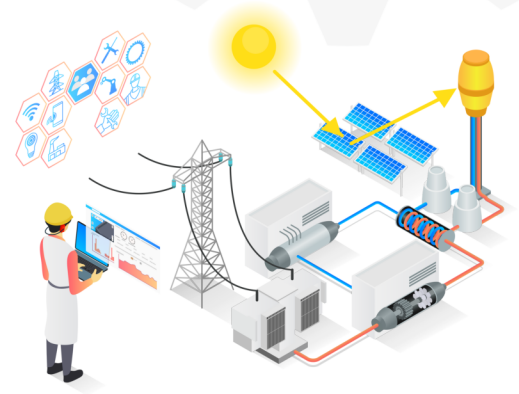
Environmental Engineer

Environmental engineers can monitor mercury levels in fish, invent alternative, non-polluting energy technologies like wind power, look at ways to reduce toxic emissions from big factories and design methods to quickly clean up oil spills in the ocean.

Materials Engineer

Material engineers use science to create incredible new materials by manipulating the atomic and molecular structure of substances to create flame resistant cloth for Formula One racing suits to developing high definition computer screens.

Mechanical Engineer

Mechanical engineers are inventive people who research, develop and build machines that help others. Mechanical engineers are involved in the design of:

- CD players
- Nintendo and Sega game wear
- Snowmobiles
- Rocket engines

Petroleum Engineer

Petroleum engineers plan and manage the recovery of oil and gas from petroleum reservoirs. They design and oversee the development of an oil well and figure out how to clean-up oil spills and other potential environmental contamination caused by extracting oil and gas from the Earth

Software Engineer

Software engineers cooperate with computer analysts to develop software solutions for specific needs, draw up detailed design documentation including charts and diagrams that outline how software works, prepare instructions for software installation and test software on various computer platforms and operating systems.

| Topic | Your Guide to Becoming an Engineer |

SECONDARY SCHOOL

UNIVERSITY - ENGINEERING DEGREE

GRADUATION

EMPLOYMENT 4 - 5 YEARS

CERTIFICATIONS AND PROFESSIONAL LICENSES

PROUD PRACTISING ENGINEER

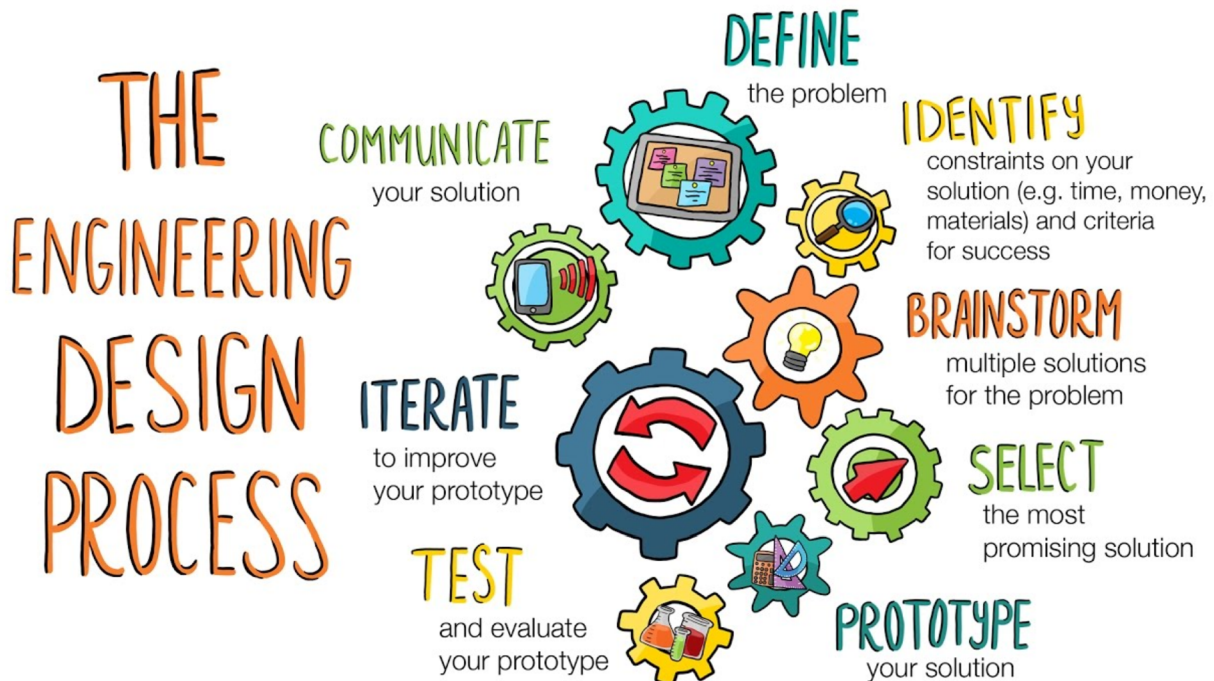| Topic	Your Guide to Becoming an Engineer

If you like...

- Problem solving
- Being creative
- Working with tools
- Making models
- Playing with Lego
- Helping others

You can become an Engineer!

The Engineering Design Process is a series of steps that engineers follow to come up with a solution to a problem. Many variations of the model exist, but the core steps remain similar.

1 . Ask: Identify the Problem

- Define the problem clearly.
- Identify the needs and constraints.
- Ask critical questions to understand the problem better.

2. Imagine: Brainstorm Solutions

- Generate a list of potential solutions.
- Think creatively without limiting your ideas.
- Discuss with peers to expand your thinking.

3. Plan: Select a Solution

- Evaluate the feasibility of each solution.
- Choose the best solution considering the constraints and requirements.
- Develop a detailed plan, including sketches and diagrams.

4. Create: Build a Prototype

- Gather the necessary materials and tools.
- Follow your plan to build a working model or prototype.
- Work collaboratively with your team to ensure accuracy and quality.

5. Test: Evaluate the Prototype

- Test your prototype to see if it solves the problem.
- Record the results and identify any issues or areas for improvement.
- Gather feedback from peers and instructors.

6. Improve: Refine the Design

- Analyze the test results and feedback.
- Make necessary adjustments and improvements to your design.
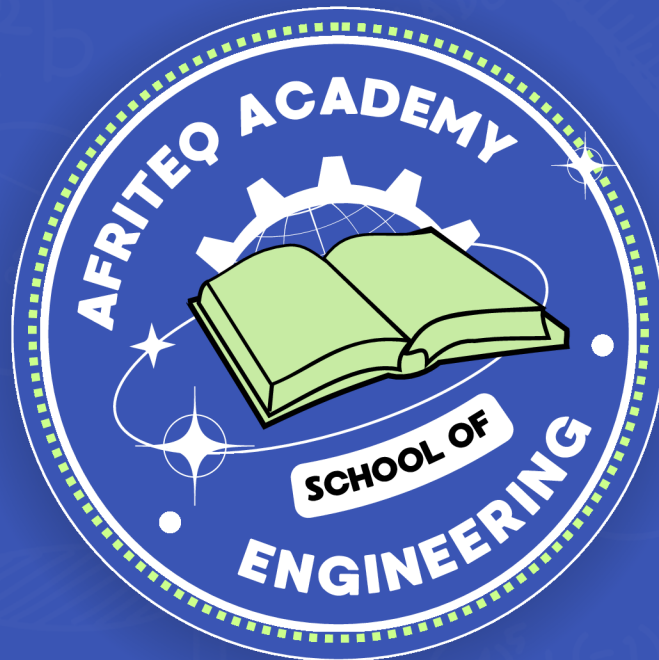- Repeat the testing process to ensure the improvements work.

7. Share: Communicate the Results

- Prepare a presentation of your project.
- Explain your design process, including the challenges and successes.
- Share your findings with others through a final presentation or report.

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