KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

CHEMICAL ENGINEERING DEPARTMENT

CHE 251: CHEMICAL PROCESS CALCULATIONS

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LECTURE 1: INTRODUCTION TO ENGINEERING AND CHEMICAL ENGINEERING

Learning Objectives

At the end of the lecture the student is expected to understand the following:

- Who is an Engineer?
- The Engineering Technology Team
- Engineering Disciplines and Related Fields
- The Engineering Method

Who is an Engineer?

Engineers are individuals who combine knowledge of science, mathematics and economics to solve technical problems that confront society. The practical knowledge of engineers distinguishes them from scientist.

The root of the word *enginee*r derives from *engine* and *ingenious*, both of which come from the Latin root in *generare*, meaning "to create"

Engineers are problem solvers, who assemble the necessary resources to achieve a clearly defined technical objective. Engineering education emphasizes mathematics, science and economics making it an applied science.

The Engineering Technology Team

Modern technical challenges are seldom met by the lone engineer. Technology development is a complex process involving the coordinated efforts of a technology team consisting of:

- *Scientists,* who study nature in order to advance human knowledge.
- *Engineers,* who apply their knowledge of science, mathematics and economics to develop useful device, structures and processes.
- *Technologist,* who apply science and mathematics to well-defined problems that generally do not require the depth of knowledge possessed by engineers and scientists
- *Technicians,* who are generally supervised by engineers and scientist to accomplish specific tasks such as drafting, laboratory procedures and model building.
- *Artisans,* who have manual skills (welding, machining, carpentry) to construct devices specified by scientists, engineers, technologists and technicians.

The Engineering Method

Although Engineers use knowledge generated by the scientific method, they do not routinely use the method. The goal of Scientists and Engineers are different. Scientists are concerned with discovering *what is,* whereas engineers are concerned with *what will be.* To achieve our goals engineers use the engineering method, which is briefly stated:

1. Identify and define the problem
2. Assemble a design team
3. Identify constraints and criteria for success
4. Search for solutions
5. Analyze each potential solution
6. Choose the “best” solution
7. Document the solution
8. Communicate the solution to management
9. Construct the solution
10. Verify and evaluate the performance of the solution