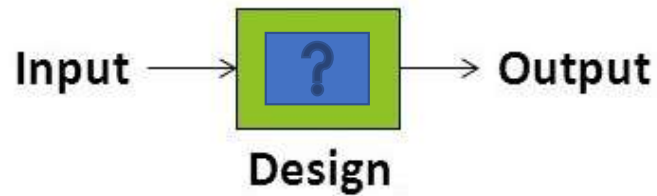


**CEN4417**  
**PROCESS DESIGN I**

# **INTRODUCTION TO DESIGN**

# INTRODUCTION TO DESIGN

Chemical Engineering **Process Design** is the design of processes for the **desired** *physical* and/or *chemical transformations* of substances.



# Constraints in Design

## External constraints

- Some constraints will be **fixed** and **invariable**, such as those that arise from physical laws, government regulations, and standards.
  - The constraints that are outside the designer's influence can be termed the **external constraints**.

# Constraints in Design

## Internal constraints

- Others will be **less rigid** and **can be relaxed** by the designer as part of the general strategy for seeking the best design, which are called **internal constraints**, such as choice of process, choice of process conditions, materials, and equipment.

## Setting the Design Basis

- The most important step in starting a process design is *translating the customer need* into a **design basis**.
- The design basis is a more **precise statement of the problem** that is to be solved.
- If the design is carried out for a client, then the design basis **should be reviewed with the client** at the start of the project.
- Most companies use **standard forms** to capture design basis information.

## Fitness Testing

- Design alternatives must be **tested** for fitness for purpose.
- Design engineer must determine *how well each design* concept **meets** the *identified need*.
- Design engineer builds a **mathematical model** of the process, usually in the form of **computer simulations** of the process.
- The performance model may include a **pilot plant** or other facility for predicting plant performance and collecting the **necessary design data**.

## **CODES AND STANDARDS**

- 1.** Materials, and properties.
- 2.** Testing procedures..
- 3.** Preferred sizes.
- 4.** Methods for design and fabrication.
- 5.** Codes for operation.



American National Standards Institute (**ANSI**)

American Petroleum Institute (**API**)

American Society for Testing Materials (**ASTM**)

American Society of Mechanical Engineers (**ASME**)

National Fire Protection Association (**NFPA**)

Instrumentation, Systems and Automation Society (**ISA**)

International Organization for Standardization (**ISO**)

## REFERENCES

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2. Turton R., Bailie R.C., Whitin W.C., Shaeiwitz J.A. 1998, *Analysis, Synthesis and Design of Chemical Processes*, Prentice Hall, New Jersey.