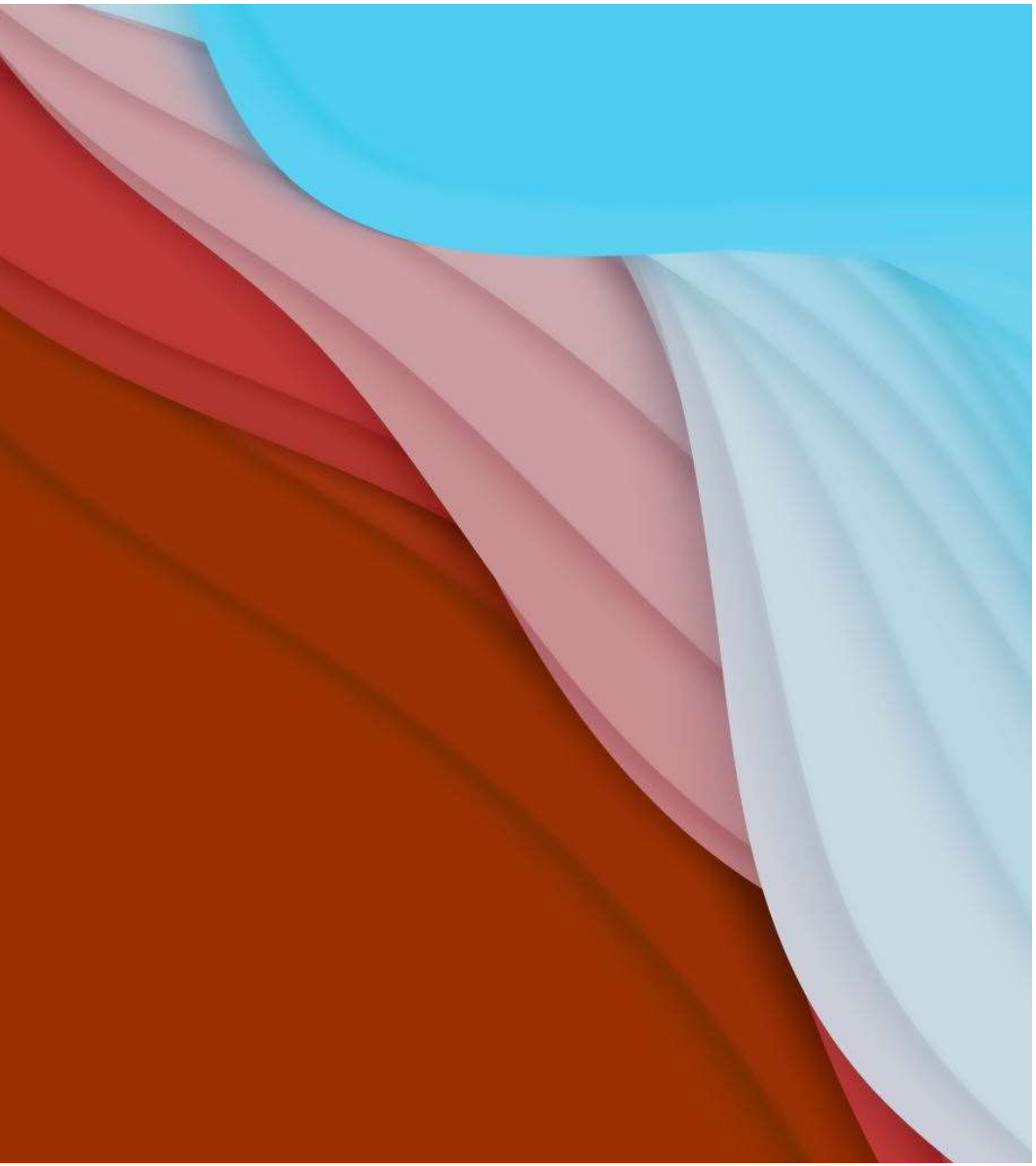
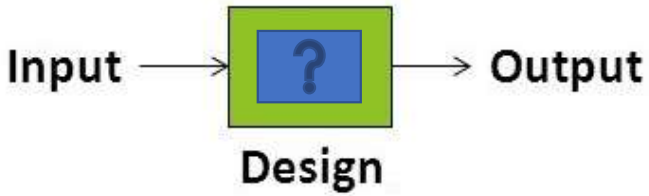


CEN4415
PROCESS DESIGN I

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

1. Sinnot, R.K. 1999, Coulson's & Richardson's Chemical Engineering, Volume 6, Chemical Engineering Design, ButterWorth Heinemann, Oxford.

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