

## 22ELCT308 PROCESS EQUIPMENT DESIGN

Hours Per Week :

L	T	P	C
1	2	2	3

**PREREQUISITE KNOWLEDGE:** Basics of unit operations in food industry and design specification.

### COURSE DESCRIPTION AND OBJECTIVES:

This course helps to equip the students to study the design aspects of the food processing equipments and also to understand the relationship between process design and safety.

### MODULE-1

#### UNIT-1

8L+0T+8P=16 Hours

#### BASIC ON EQUIPMENT DESIGN:

Introduction on process equipment design, Application of design engineering for processing equipments, Design parameters and general design procedure.

#### UNIT-2

8L+0T+8P=16 Hours

#### SPECIFICATION & DESIGN CODES:

Material specification, Types of material for process equipments, Design codes, Pressure vessel design, Design of cleaners.

#### PRACTICES:

- Design of pressure vessel.
- Design of cleaners.
- Design of belt conveyor.
- Design of bucket elevator.
- Design of screw conveyor.

### MODULE-2

#### UNIT-1

8L+0T+8P=16 Hours

#### HEAT EXCHANGER:

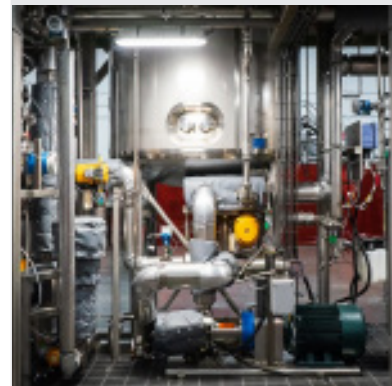
Design of tubular heat exchanger, shell and tube heat exchanger and plate heat exchanger, Design of belt conveyor, screw conveyor and bucket elevator.

#### UNIT-2

8L+0T+8P=16 Hours

#### DRYERS:

Design of dryers, design of milling equipments, optimization of design with respect to process efficiency, energy and cost, computer aided design.



Source:  
<https://www.epicmodularprocess.com/wp-content/uploads/2018/07/Process-Equipment->

**SKILLS:**

- ✓ Develop various food products by acquiring strong basic knowledge about food processes.
- ✓ Design and modify food processing equipments.
- ✓ Apply emerging technologies for development of new equipment.

**PRACTICES:**

- Design of milling equipments.
- Design of tubular heat exchanger.
- Design of shell and tube type heat exchanger.
- Design of plate heat exchanger.
- Design of dryer.

**COURSE OUTCOMES:**

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply knowledge in designing different process equipments which are used in industries	Apply	1	1, 2, 4, 7
2	Analyse the problems which rises during choosing of materials used for equipments and even designing equipments	Analyse	1	1, 2, 4, 7
3	Design pressure vessel, homogenizers, cleaners, storage vessels	Create	1	1, 2, 4, 7, 11, 12
4	Develop different heat exchangers and material handling equipment's	Create	2	1, 2, 4, 7, 11, 12
5	Creative Study on existing problems to dry food material using primitive dryers and come out with new idea of developed technologies	Create	2	1, 2, 4, 7, 11, 12

**TEXT BOOKS:**

1. Mahajani, V. V. and Umarji, S. B., "Process equipment design" Macmillan, 2008.

**REFERENCE BOOKS:**

1. Geankoplis C. J. "Transport processes and unit operations" Prentice-Hall, 2012.
2. Rao, D. G. "Fundamentals of Food Engineering PHI Learning Pvt. Ltd" New Delhi, 2011.