Syllabus for Diploma in Engineering

Chemical Engineering

Semester – I

Subject Name: Chemical Engineering Equipment Design

Subject Code: 09CH1101

Objective: To understand various design of equipment's used in chemical process industries.

Credits Earned: 4 Credits

Course Outcomes: After completion of this course, student will be able to:

1. To Know and understand the various equipments used in the Chemical process Industries.
2. To Know and understand the flow diagram and block diagram of the chemical process Industries.
3. To know and understand the various accessories and mounting of chemical engineering equipments.

Pre-requisite of course: Basic concepts of Chemistry& Mathematics.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
2	4	0	4	50	30	20	25	25	150

Contents:

Unit	Topics	Tutorial Hours
1	**Various laboratory equipment and devices.** Basic chemical engineering symbols, Laboratory glass ware, instruments and their practice.	3
2	**Block Diagram and Flow diagram** Basic of block diagram and flow diagram of chemical process industries	3
3	**Storage vessels and Pressure vessel:** Types of storage vessel and pressure vessel in detail, Heads, Covers, and Supports.	4
4	**Reaction Vessel :** Types of reaction vessel in detail, glass line reactor jacketed reactor etc, and different parts of reactor vessel.	4
5	**Pumps and Valves :** Types of industrial pump and valve, basic technologies like capitation priming.	3
6	**Size reduction equipment ;** Classification of size reduction equipments, Jaw crusher, Roll Crusher, Ball mill etc.	3
7	**Heat Exchanger equipment:** Shell & Tube heat exchanger, Plate & Frame Heat exchangers, Evaporators. .	4
8	**Distillation:** Simple distillation unit, criteria for selecting distillation operation, Atmospheric and vacuum distillation unit.	4
	Total Hours	**28**

References:

1. "Process equipment design", by M. V. Joshi.
2. "Outline chemical Technology" by Gopal Rao..
3. "Chemical Engineering plant", by Vilbrandt & Dryden.
4. "Hand book of chemical engineering" , by Don W. Green, Robert H. Perry, 8thEighth Edition.

List of Tutorial:

1. Draw free hand sketches and drawings of complete distillation tower assembly using appropriate dimensions.
2. Draw the block and flow diagram of continuous manufacturing process.
3. Prepare sketches for various types of Storage vessels and pressure vessel detail, Heads, Covers, and Supports.
4. Prepare detailed drawing of jacketed reactor with agitator, and it`s parts using given dimensions.
5. Prepare detailed drawing of jacketed reactor with agitator, and it`s parts using given dimensions.
6. Draw free hand sketches and drawings of different types of pumps and valves.
7. Draw free hand sketches and drawings of different size reduction equipments.
8. Draw free hand sketches and drawings of shell and tube heat exchanger and evaporator using given dimensions.
9. Draw free hand sketches and drawings of complete distillation tower assembly using appropriate dimensions.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
30%	50%	20%	-	-	-

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory