Syllabus for Diploma in Engineering

Chemical Engineering

Semester – 6th

Subject Name: Chemical Engineering Plant Economics

Subject Code:09CH1602

Objective: To understand various design and development of plant with cost calculation and analysis of profitability in chemical process industries.

Credits Earned: 5 Credits

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

1. To Know and understand basic economic concept and apply this concepts in the project works undertaken and to chemical engineering situation by solving problem
2. To Know, understand and Select appropriate process for a project Differentiate the equipment and able to prepare specification sheet.
3. Evaluate cost including capital investment, product cost, breakeven point, depreciation cost for equipment and the total project cost and solve problem on profitability and replacement analysis

Pre-requisite of course: Basic concepts of Chemical Engineering and it`s equpiments and diffrent unit operations.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
4	2	0	5	50	30	20	25	25	150

Contents:

Unit	Topics	Tutorial Hours
1	**Introduction** Role of chemical engineers, Need for plant design, Process design, basic for good design	3
2	**Project Development** Objective of plant Project, Process evoluation stages and their importance, Pilot plant formation, Techanical factors, Ecnonomic Factors, Legal phases	3
3	**Process Design** Selection of Process, Continous v/s Batch Processing, shift and operating Schedule, Types of flow diagrame, block diagrame, Material and Energy Blance.	4
4	**Selection Process Equipment and materials** Selection of material and process equipments, selection of pumps and dryers.	4
5	**Plant location and Layout** Factors to be considered in plant and sight location, Primary factors, Specific factors, principels of plant layout, factors methods for plant layout, unit area concpet, Two-dimensional layout, scale models	3
6	**Economic Evaluation of Project** Capital and Fixed cost, Working capital investment, Depreciation, Methods for determining depreciation, total product cost, Utilities, maintenance and repairs cost, Net and gross earnings, Profitabilty analysis, Percent Return on investment, Payout time, Break Even chart, Turn Over Ratio,	3
7	**Optimum design** Procedure for determining optimum stage, Optimum economic design for insulation thickness, pipe diameter, Optimum Operation Design, Process Auxillaries .	4
	Total Hours	**28**

References:

1. “Plant design and Economics for Chemical Engineers”,McGraw Hill 3rd Edition by M.S. Peters and Timmerhaus.
2. “Chemical Engg. Plant Design.” by Vibrant and Dryden.

List of Tutorial:

1. Preparation of Block Diagram.
2. Preparation of flow diagrame..
3. Material balance and energy balance calculation.
4. Prepare specification sheet for Heat Exchanger.
5. Prepare specification sheet for Distillation column.
6. Problem based on cost calculation.
7. Problem bassed on fiding out break even point..
8. Problems bassed on finding out optimum value.

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
20%	40%	20%	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