

COURSE TITLE	PROCESS ECONOMICS AND PROJECT MANAGEMENT
COURSE CODE	01CH1704
COURSE CREDITS	3

Objective:

- 1 The course is intended to make students understand the overall technical and economic aspects involved in the plant designing process.

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

- 1 Understand the chemical engineering plant design and general design considerations
- 2 Analyze the process design development related features
- 3 Evaluate the factors participating and deciding the cost and profitability
- 4 Apply various approaches of project management and scheduling methods

Pre-requisite of course: Mass Transfer, Heat Transfer and Momentum Transfer.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	General Considerations Chemical Engineering Plant Design, General Overall Design Considerations, Practical Considerations in Design,, Engineering Ethics in Design. Concept of Project Engineering and role of chemical engineer, Plant Layout,, Preparation of the Layout, Plant Operation and Control. Process auxiliaries.	8
2	Process Design Development Development of Design Database, Process Creation, Process Design,, Piping and Instrumentation Diagrams, Equipment Design and Specifications,, Preliminary Design, Flowsheet Synthesis and Development.	6
3	Analysis of Cost Estimation Cash Flow for Industrial Operations, Factors Affecting Investment and Production Costs, Capital Investment -Estimation, Cost Indexes., Methods for Estimating Capital Investment, Estimation of Revenue, Estimation of Total Product Cost, Gross Profit, Net Profit, and Cash Flow., Interest, Time Value of Money, Taxes, and Fixed Charges, , Depreciation, CAPEX, OPEX and ROI	10

Contents : Unit	Topics	Contact Hours
4	Profitability, Alternative Investments, and Replacements Profitability Standards, Methods for Calculating Profitability, Alternative Investments, Replacements, , Practical Factors in Alternative-Investment and Replacement Analysis.	6
5	Project Management: Introduction, Scoping, planning and approvals for physical work, contracting for engineering and construction activities. , Project execution with regards to health, safety, environment, cost, quality and schedule, Planning of project schedule by BAR CHART, Inventory control scheduling a project using CPM/PERT methods	10
Total Hours		40

Textbook :

- 1 Introduction to Process Engineering & Economics , Max S. Peters , Klaus Timmerhaus,, McGraw Hill Publications, 2002
- 2 Chemical Engineering Design, R.K. Sinnott, Butterworth Heinmann, 2004

References:

- 1 Unit Operations in Chemical Engineering, Unit Operations in Chemical Engineering, Mc Cabe, Smith, Harriott, Macgraw Hill Publication, 2017
- 2 Project Management: Processes, Methodologies, and Economics, Project Management: Processes, Methodologies, and Economics, Avraham Shtub, Jonathan F. Bard, Shlomo Globerson, Larsen and Keller Education, 2017

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					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

- 1 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.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Instructional Method:

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

Supplementary Resources:

- 1 <https://archive.nptel.ac.in/courses/103/105/103105166/>