

GUJARAT TECHNOLOGICAL UNIVERSITY

CHEMICAL ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Plant Design & Project Engineering**

Subject Code: **170503**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
3	0	0	3	70	-	30	50

Sr. No	Course Content	Total Hrs.
1.	Introduction: Basic considerations in chemical engineering plant design, project identification, preliminary techno-economic feasibility.	3
2.	Process design aspects: Selection of process-factors affecting process selection. Importance of Laboratory development pilot plant, scale up methods, safety factors, types of flow diagrams.	4
3.	Selection of process equipments: Standard versus special equipment-material of construction for process equipments, selection criteria, and specification sheets.	4
4.	Process auxiliaries: Piping design, layout, and supports for piping insulations. Pipe fittings, types of valves, selection of valves, process control and instrumentation control system design.	4
5.	Process utilities: Process water, boiler feed water, water treatment, waste treatment and disposal, steam, oil heating system, chilling plant, compressed air and vacuum.	4
6.	Plant location and layout: Factors affecting plant location, factors in planning layouts, principles of plant layout, use of scale models.	8

7.	Cost estimation: Factors involved in project cost estimation - Total capital investment, Fixed capital and working capital, types and methods for estimation of total capital investment, Estimation of equipment cost	8
8.	Estimation of total Project cost & product cost: Factors involved in project cost, factors affecting investment and production costs, utilities cost, evaluation of product cost,	6
9.	Depreciation: Types and methods of determining depreciation, evaluation of depreciation methods.	3
10.	Profitability, alternative investments and replacement: Methods for profitability evaluation, Evaluation of Break Even Point, % rate of return, Practical factors in alternative investment and replacement studies.	4
11.	Project management: Planning of project schedule by BAR CHART, Inventory control scheduling a project using CPM/PERT methods.	6

Text Books:

1. M.S. Peters and Timmerhaus, "Plant design and Economics for Chemical Engineers", McGraw Hill 3rd Edition
2. F.C. Vibrandt and C.E. Dryden, "Chemical Engineering Plant Design", McGraw Hill Fifth Edition

Reference Books:

1. Industrial Engineering and Management by O. P. Khanna
2. Project Engineering : Suhas Mokashi ,Mcmillan Publisher