

Subject: Chemical Engineering Plant Design

	CHE-	Chemical	3CH	
451	Engineering Plant Design		Theory+Lab (3+0)	
Pre- req.	Chemical Engineering Principles II, Mass Transfer		Category	Core Depth
Course Contents as per PEC Guidelines 2023-2024				
• Fundamentals: General design considerations. Design codes, standards and materials selection. • Economic evaluation and optimization: Basic Concepts of Cost Indexing & • Process Design: Process design and development, process flow sheeting, flow diagrams, PFD and PID, Equipment and instrument symbols. • Hazards identification and Risk Assessment: Process Hazards Checklists and surveys, Safety Reviews, • Applications: stationary equipment like, • Vessel design. Low, Medium and high- pressure storage and transportation vessels; Cryogenic vessels • Rotating equipment including Pumps, Motors, compressors, turbines. • Design Ethics: Local and Global Impact Analysis. • Applications: stationary equipment • Design of mass transfer equipment; material transport; material handling • Heat transfer equipment including furnaces and refrigeration units. • Piping and pipeline. design. • Design Ethics: Local and Global Impact Analysis.				

	Weekly plan/ Reference Books
1	Fundamentals: General design considerations. Design codes, standards and materials selection.
2-3	Economic evaluation and optimization: Basic Concepts of Cost Indexing & Process Design: Process design and development, process flow sheeting, flow diagrams, PFD and PID, Equipment and instrument symbols.
4	Hazards identification and Risk Assessment: Process Hazards Checklists and surveys, Safety Reviews, Applications: stationary equipment like,
5	Vessel design. Low, Medium and high-pressure storage and transportation vessels; Cryogenic vessels Rotating equipment including Pumps, Motors, compressors, turbines.
6	Design Ethics: Local and Global Impact Analysis. Applications: stationary equipment
7-8	Design of mass transfer equipment; material transport; material handling Heat transfer equipment including furnaces and refrigeration units.
9-10	Mid Term Exams
11-12	Piping and pipeline. design.
13	Design Ethics: Local and Global Impact Analysis
14	Basics of Material Balance
15-16	Basics of Energy Balance
17	Revision
18	End Semester Exam
TEXT AND REFERENCE BOOKS: • Peters Max S., Timmerhaus Klaus D. "Plant Design and Economics for Chemical Engineers" 4th Ed. 1991. McGraw-Hill Inc. • Ludwig Ernest E. "Applied Process Design for Chemical and Petrochemical Plants" Vol 1, 2 & 3, 3 Ed. 2002, Gulf Publishing Company. • Walas Stanley M. "Chemical Process Equipment Selection and Design "Butterworth Heinemann" 1999. • Coulson J. M, and Richardson, "Chemical Engineering", Vol VI, "Butterworth Heinemann" 1999. • Wells G. L. Rose L. M. "The art of Chemical Process Design" 1986. Elsevier. • Smith Robin "Chemical Process Design" 1995. McGraw-Hill Inc. • Backhurst & Harker, "Chemical Process Design, John Wiley • Evans, "Handbook of Chemical Equipment Design" • E. L. Cussler and G. D. Moggridge, "Chemical Product Design", 2001, Cambridge University Press. • Special Issue of Chemical Engineering Research and Design, Part A 80 (A1), 2002 on "Process and Product Development" • James Wel, Molecular Structure and Property: Product Engineering, Ind. Engg. Chem. Res. 41(8) 1917-1919 (2002) • Robbin Smith, "Chemical Process: Design and Integration," 2005, Wiley.	

