GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Chemical Engineering

Subject Name: **Computer Aided Process Synthesis**
Subject Code: **160505**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	4	8	70	30	50

Detailed Process Synthesis - Algorithmic Methods:

Sr. No	Course Content	Total Hrs.
1.	**The Design Process**- Design Opportunities, Steps in Product Process Design, Environmental Protection, Safety Considerations, Engineering Ethics, Role of Computers. Reactor Design and Reactor Network Synthesis- Objectives, Reactor Models, Reactor Design for Complex Configurations, Reactor Network Design Using the Attainable Region.	12
2.	**Synthesis of Separation Trains**- Objectives, Criteria for Selection of Separation Methods, Selection of Equipment, Sequencing of Ordinary Distillation for the Separation of Nearly Ideal Fluid Mixtures, Sequencing of Operations for the Separation of Non-ideal Fluid Mixtures, Separation Systems for Gas Mixtures, Separation Sequencing for Solid-Fluid Systems.	15
3.	**Heat and Power Integration**- Objectives, Minimum Utility Targets, Networks for Maximum Energy Recovery, Minimum Number of Heat Exchangers, Threshold Approach Temperature, Optimum Approach Temperature, Superstructures for Minimization of Annual Costs, Multiple Utilities, Heat-integrated Distillation Trains, Heat Engines and Heat Pumps.	**30**
4.	**Optimal Design and Scheduling of Batch Processes**- Objectives, Introduction, Design of Batch Process Units, Design of Reactor-separator Processes, Design of Single Product Processing Sequences, Design of Multi-Product Processing Sequencing.	**15**

Text Books:

1. Warren D. Seider, J. D. Seader, Daniel R. Lewin, “Product and Process Design Principles: Synthesis, Analysis, and Evaluation”, 2nd Edition, Wiley(2003)
2. Systematic Methods of Chemical Process Design by Lorens T Biegler, E. I. Gnacio Grossmann Arthur W Westerberg, PHI International.

Reference Books:

1. T.F. Edgar and D.M. Himmelblau, “Optimization of Chemical Processes”, Chemical Engg. Series, McGraw Hill
2. Richard G. Brereton, “Chemometrics: Data Analysis for the Laboratory and Chemical Plant”, April 2003 Wiley