

UG

Course Code: CH302

Credit: 3

Version: 1

Prerequisite Course: **Chemical Process Calculations, Heat Transfer, Mass Transfer-I, Mass Transfer-II**

Department: **Chemical Engineering**

Course Name: **Process Engineering and Plant Design**

L-T-P: **3-0-0**

Approved on:

**Process Design and Development:** General design considerations; The hierarchy of chemical process design, the nature of process synthesis and analysis; Developing a conceptual design and finding the best flowsheet: input information and batch versus continuous, Input/output structure of the flowsheet; Recycle structure of the flowsheet; Separation system; Heat Exchanger Networks.

**Plant Design:** Process design development and general design considerations.

**Process Economics:** Economic feasibility of project using order-of-magnitude cost estimates, plant and equipment cost estimation, product cost estimation.

**Cash Flows:** Time value of money, investment, costs, sales, profits, taxes, depreciation.

**Profitability Analysis:** Rate of return, payback period, discount rate of return, net present worth, internal rate of return, comparing investment alternatives.

#### **Books**

1. Douglas, J. M., "*Conceptual Design of Chemical Processes*," McGraw-Hill, 1989.
2. Peters, M. S., Timmerhaus, K. D., and West, R.E., "*Plant Design and Economics for Chemical Engineers*," 5<sup>th</sup> ed., McGraw-Hill, 2003.
3. Biegler, L., Grossmann, I. E. and Westerberg, A. W., "*Systematic Methods of Chemical Engineering and Process Design*," Prentice Hall, 1997.
4. Seider, W.D., Seader, J.D., and Lewin, D.L., "*Product and Process Design Principles: Synthesis, Analysis, and Evaluation*," John-Wiley, 2003.