

CH 401 CHEMICAL ENGINEERING PLANT DESIGN AND ECONOMICS

Course Description & Objectives:

This course introduces the student to the basic concepts of process design development ,general design considerations, Estimation of capital investments , Interest and investment cost, Taxes ,Insurance And Depreciation , Profitability & Optimum Design

Course Outcomes:

The student will be able to

- 1. Compare projects using the methods of net present value, discounted cash flow and equivalent minimum investment period*
- 2. Develop a plant capital cost estimate based on published data,*
- 3. Determine the impact of taxation, depreciation and investment incentives on the economic viability of a project.*
- 4. know the procedures involved in optimum designing*

UNIT I- Introduction to Process Design

Introduction – Process design development, design considerations, Cost and asset accounting.

UNIT II- Estimation of Capital Investment

Cash flow for industrial operations, Factors effecting Investment, Total product cost, Estimation of capital investments, Cost indices, Cost factors.

UNIT III- Interest and Investment Costs

Interest and investment cost, types of interest, nominal and effective interest rates, Continuous interest, Present worth and discount annuities, Interest on investment

UNIT IV - Taxes, Insurance & Depreciation

Source of capital taxes and types of taxes ,Insurance – Types of insurances, Self insurance, Depreciation-Types of depreciation, Service life, Salvage value, Present Value, Methods for determining depreciation, group depreciation.

UNIT V - Profitability & Optimum Design

Profitability, Alternative investments and replacements, Profitability standards, discounted cash flow, Capitalized cost payout period, Alternative investments, Optimum design, Design strategy, Optimum conditions, Optimum production rates.

TEXT BOOK:

1. K.D. Timmerhaus & M.S. Peters, “Plant Design and Economics for “ Chemical Engg.”, 3rd ed., McGraw Hill, 1981.