

Code No: 025

SYLLABUS

CHEMICAL ENGINEERING

DEGREE STANDARD

UNIT 1: PROCESS CALCULATIONS AND THERMODYNAMICS

Properties of Gases, Liquids and Solids, Gas Laws, Material and Energy balances, Laws of Thermodynamics, Ideal and Non ideal Gases and Solutions, Thermochemistry Phase and Chemical Equilibria.

UNIT 2: MECHANICAL OPERATIONS AND ENGINEERING MATERIALS

Size Reduction, particle size Analysis, Mixing, Filtration, Sedimentation and Settling. Material Science: Metallic, Non-metallic and Polymeric materials, corrosion.

UNIT 3: INORGANIC AND ORGANIC CHEMICAL TECHNOLOGY

Acids, Fertilizers, marine Chemicals, Cement, Glass, Ceramic and Refractories. Petroleum Refining Products, Fermentation Products, Oils, Soaps and Detergents, Pulp and paper, Dyes.

UNIT 4: TRANSFER OPERATIONS

Momentum: Newtonian and Non Newtonian fluids, Compressible and Non compressible fluids, flow through packed bed, Fluidised bed, Fluid Machinery. Heat transfer: By conduction, convection and radiation, heat exchangers, Evaporation. Mass transfer: Diffusion, Theories of mass transfer, Interface mass transfer, Analogy of the above three operations.

UNIT 5: CHEMICAL REACTION ENGINEERING

Chemical Kinetics, Rate equations, Interpretation of rate data, Design of reactors, Catalysis, Multiphase reactors.

UNIT 6: INSTRUMENTATION AND PROCESS CONTROL

Dynamics of process elements, open loop and closed loop systems, various controller modes (PID). Instrumentation: Sensors for Pressure, Flow, Temperature, Control valves, Computer Control of Processes.

UNIT 7: COMPUTATIONAL METHODS

Curve fitting, Equations with real and rational Coefficients, Imaginary roots and irrational roots, Transformation of equations. Numerical solutions of linear and non linear algebraic equations, Ordinary differential equations and partial differential equations.

UNIT 8: SEPARATION OPERATIONS

Distillation, Absorption, Liquid-Liquid Extraction, Adsorption, Crystallization, Humidification, Drying.

UNIT 9: SAFETY IN CHEMICAL INDUSTRIES AND ENVIRONMENTAL ENGINEERING

Industrial safety principles, Fault free analysis, Occupational health hazards, Fire and explosion prevention. Air, Water and land pollution, causes, effects and remedies, Nuclear waste disposal, Noise control.

UNIT 10: DESIGN AND OPTIMISATION

Process selection, Flow diagrams, Plant location and layout, Cost estimation, Plant utilities, Optimisation techniques, Heat exchanger networks, Pinch technology.