

## CO OF ALL SUBJECTS

### 1) Material & Energy Balance Computations (Theory)

Subject Code: CE - PCC -301 T(BCE)

Course outcomes: After completion of the course, students will be able:

CO1: To understand the basic concept, units, and conversion of chemical process calculations.

CO2: To understand the application of various gas laws, volume changes, humidity and saturation, solubility and crystallization.

CO3:

To perform material and energy balances processes/equipment without and with reactions.

on

chemical

CO4: To do energy balances on chemical processes/equipment without and with reactions.

CO5: To perform energy balances on chemical processes/equipment with chemical reactions and heat and combustion problems

### 2) Particle & Fluid Particle Processing

Subject Code : CE - PCC -302T (BCE)

Course outcomes: After completion of the course, students will be able to understand:

CO 1: Solid particle characterization & relevance of fluid and particle mechanics and mechanical operations in chemical engineering

CO 2: Crushing and screening principles and equipment's used for them.CO 3:

Handling & transportation of solids and fluid solid systems.

CO 4: Separation of solids from fluids by using sedimentation and basic principles, operation and equipment's used for them.

CO 5: Separation of solid from fluids by using Filtration, flotation and classification and basic principles, operation and equipment's used for them

### 3) Thermodynamics II

Subject Code: CE - PCC -303T ( BCE)

Course outcomes: After completion of the course, students will be able to:

CO 1: Understand and apply the laws and rules of thermodynamics, equilibrium and phase rule.

CO 2: Understand various thermodynamics properties and relationships, and coefficients of species and their properties.

CO 3: Understand Liquid phase properties from VLE, Models for excess Gibbs energy, heat effects and property change on mixing

CO 4: Understand different Equilibria, equilibrium criterion, evaluation of equilibrium constant and equilibrium conversion at different conditions.

CO5: Understand molecular/statistical thermodynamics

4)Process Technology & Economics (Theory):  
Subject Code: CE-PCC-401T (BCE)

Course Outcomes: After completion of the course, students will be able:

CO1 :understand about Raw materials, operating conditions, basic block diagram and simplified process flow diagram for manufacturing of inorganic chemicals

CO2 :understand about R Raw materials, operating conditions, basic block diagram and simplified process flow diagram for manufacturing for Petroleum refining and cracking operations, syngas and hydrogen

CO3 : understand about RRaw materials, operating conditions, basic block diagram and simplified process flow diagram for manufacturing of various Petrochemicals

CO4:understand about R Industrially relevant fuels, coal, coal based chemicals and fuels Common utilities

CO 5: get an Idea about Introduction to project, Various components of cost of production and their estimation and analysis of working results Project

5)Mass Transfer I (Theory)  
Subject Code: CE-PCC-402T (BCE)

Course Outcomes: After completion of the course, students will be able:

CO 1: To understand concept and theories of diffusion.CO 2: To understand convective mass transfer, interphase mass transfer and theories of mass transfer and their applications.

CO 3: To understand gas absorption in plate and packed column and design; absorption in wetted wall columns, packed tower and spray tower.

CO 4: : To understand absorption in tray towers, tray efficiencies, calculation of number of trays for absorption, Equipments for Absorption

CO5: To understand Batch distillation; continuous binary fractionation Azeotropic distillation multicomponent distillation and Methods of distillation

6)Fluid Mechanics:  
Subject Code: CE - PCC-403T (BCE)

Course Outcomes: After completion of the course, students will be able:

CO1: To understand the basic properties, classification of fluid and fluid statics.

CO2: To understand the fluid energy balance, energy losses and various pipe fitting

CO3: To understand Velocity Distribution, Fluid Friction and Two-phase flow, and flow patterns in two phase flow.

CO4: To understand various flow working principle and expressions for flow rate measuring meters

CO5: To understand Transportation of fluids, Classification of pumps and their Properties

## 7) Numerical Methods in Chemical Engineering

Subject Code: CE - PCC -404T (BCE)

Course Outcomes: After completion of the course, students will be able:

CO1 : To understand and apply various linear algebraic equations to chemical engineering problems

CO2 : To understand and apply Root finding methods for solution on non-linear algebraic equations to chemical engineering problems

CO 3: To understand and apply Interpolation and Approximation various methods to chemical engineering problems

CO4 : To understand and apply various methods of : Numerical integration and numerical differentiation to chemical engineering problems

CO5 : To understand and apply various Ordinary Differential Equations and PartialDifferential Equations to chemical engineering problems

## 7) COURSE CODE: (new)CE-PCC-501T

SEMESTER: V SEM (Odd)

COURSE TITLE:Heat Transfer

Course Outcome :

CO1: Use the basic laws Governing modes of heat transfer & Estimating rate of heat transfer, Transfer area and tempertaure distribution for various geometries of objects for steady state and unsteady state heat Transfer

CO2: Assessing heating & cooling operations and phenomena of natural & Forced Convection and estimating heat transfer coefficient in various conditions

CO3: Analysing Boiling & Condensation Operations and estimation of heat transfer coefficient for convection with phase change

CO4: Estimation of Design Parameters double pipe & Shell & Tube Heat Exchanger from first principles as per requirements of situation /Problem & evaluation various design Parameters

CO5: Able to explain & relate Radiative heat transfer for their applications , Analysing given Situation/problemfor the estimation of heat transfer coefficient for different types of heat transfer equipment such as Packed Bed, Fluidised bed.

## 8) Subject: CT-PCC-503T (BCE)

Mass Transfer I (Theory)

After completion of the course, students will be able:

CO1: To understand concept and theories of diffusion.

CO2: To understand convective mass transfer, interphase mass transfer and theories of mass transfer and their applications.

CO3: To understand gas absorption in plate and packed column and design; absorption in wetted wall columns, packed tower and spray tower.

CO4: To understand absorption in tray towers, tray efficiencies, calculation of number of trays for absorption, Equipments for Absorption

CO5: To understand Batch distillation; continuous binary fractionation Azeotropic distillation

multicomponent distillation and Methods of distillation

9) Subject: CT-OLE-505T (BCE)  
Open Elective- I: Environmental Pollution and Control (Theory)

Course Outcomes:

After completion of the course, students will be able to:

CO1: Understand the concept of water quality. Classify the sources, types of environmental pollutant and fundamentals of pollution parameters.

CO2: Analyse the natural process of water purification and understand the importance of air pollution and estimation of design parameters of the equipment for industrial air pollution control.

CO3: Identify the sources of water pollution and estimation of design parameters of water treatment process.

CO4: Understand, classify and select the techniques for the processing of solid waste.

CO5: Assess the global and national environmental policies along with pollution control in selected process industries.

10) Renewable Source of Energy  
COURSE CODE: (new)CE-PCC-505T

Course Outcome : student should able to

CO1: Understand the use of solar energy and the various components used in the energy production.

CO2: Design the various components used in the wind energy production.

CO3: Apply the Bio-energy resources and their classification, types of bio-gas plants.

CO4: Understand concept of hydrogen generation and storage and its application in fuel cells.

CO5: Apply concept of energy audit and cost-effective analysis & Understand geothermal, tidal and ocean as non-conventional energy generation sources;

11) Subject: CT-PCC-601T (BCE)  
Chemical Reaction Engineering II (Theory)

Course Outcomes: After completion of the course, students will be able to:

CO1: Determine the rate laws for heterogeneous non-catalytic gas-solid and gas-liquid reactions using proper model equations

CO2: Solve the problems on tower design for gas-liquid reactions and fluidized bed reactor design for gas-solid reactions

CO3: Determine the rate laws for heterogeneous catalytic reactions and design the contactor (reactor) for given gas-solid-liquid catalytic reactions

CO4: Develop the kinetic models for step growth polymerization and free-radical polymerization reactions

CO5: Solve the problems on non-isothermal continuous flow reactor and non-adiabatic reactor operations.

COURSE CODE: BTCHE603T (old)  
COURSE TITLE :PROCESS EQUIPMENT DESIGN

Course Outcomes:

- CO1 Ability to select different materials for various Process equipment
- CO2 Utilize & Analyse basics parameters  
parameters of Process equipment design
- CO3 Ability to illustrate & Apply procedures to design Various types of pressure  
vessels to Illustrate & design special vessels (e.g. tall vessels) and various parts of  
vessels (e.g. heads, Flanges, gaskets etc
- CO4 Illustrate & Design Various Supports for Process Equipment
- CO5 Ability to Illustrate & design wind girders, roofs etc.
- CO6 Analying & Applying various parameters for designing various agitator  
systems, Reaction vessels, Jacketed vessels, coils etc.

Subject: CT-PCC-603T (BCE)  
Process Dynamics & Control (Theory)

Course Outcomes:

- After completion of the course, students will be able to:
- CO1: Understand & apply the concept of control system block diagram and its  
elements.
  - CO2: Apply the knowledge base to solve the problems of First order control  
systems and servo and regulatory control.
  - CO3: Apply the knowledge base to solve the problem of dynamics of second order  
control systems and estimation of various parameters
  - CO4: Understand, Analyse & apply the knowledge base in selection of various  
modes of controller for Chemical Process Industries
  - CO5: Evaluating the performance of Direct digital feedback control system.  
Understand the working mechanism of various instruments

**Course Name: BTCHE 701 T**

**Transport Phenomena**

- CO1
- CO2
- CO3
- CO4
- CO5
- CO6

**Course Name: BTCHE 702 T**

- CO1
- CO2
- CO3
- CO4

C05

C06

**Course Name: BTCHE 703 T**

C01

C02

C03

C04

C05

C06

**Course Name: BTCHE 704 T**

C01

C02

C03

C04

C05

C06