SARDAR PATEL UNIVERSITY
B.Sc. SECOND SEMESTER
Core Course – Industrial Chemistry (Voc.)
US02CICV21 (T) **Process Calculations and Mechanical Operations**
Effective from June 2018
4 Credits, 4 periods per week
Total Marks 100, Internal -30 Marks, External-70 Marks, Exam duration: 3 hours

UNIT – I : Units and dimensions, Units for composition of systems, Ideal gas equation, behaviour of gaseous mixture, Roult's Law, Henry's Law, vapour pressure of liquids and solutions.

Elementary Concepts of Unit operations and Init processes, Preparation of flow diagrams, Concepts of material balance, material balance problems, Strategy for material balance calculation for the processes without and with reactions.

UNIT – II: Concept of energy balance, forms of energy, energy balance equations for batch and steady state flow processes, Heat capacity and specific heat, Enthalpy change calculations for non reactive and reactive systems.

Combustion and combustion reactions, Calculation of air requirement and flue gas composition, Flue gas analysis, Calorific value of fuels, Psychometey, Humidification & Dehumidification operations, Humidity and Saturation, Psychometric chart

Unit-III: Filtration-Introduction, Rate equation, Filter media & filter aids, Industrial filter, sand filter, Plate and & frame filter, leaf filter, Rotary drum filter, Sparkler filter, Nutsche filter, Centrifugal filtration, Basket centrifuge

Sedimentation-Batch & continuous sedimentation, thickeners, Separation of Solids based on specific properties, Clarification and Clarification equipment's, Cyclones, Froth flotation and Jigs.

Unit-IV: Mixing, Introduction, Mixing liquids with liquids, Mixing solids with solids, Mixing viscous mass. Conveyors & elevators-Introduction Belt conveyor, Screw conveyor, Pneumatic conveyor.

Size reduction and size separation – Introduction, primary and secondary crushers, fine grinders, Methods of operating crushers, laws of crushing, Industrial Screens.

BOOKS:

1. Unit operation Volume I. K.A.Gavhane (Nirali Prakashan)

2. Introduction to Chemical Engineering. W.L.Badger & J.I. Banchero (McGraw Hill)

3. Unit operation in chemical engineering. W.L.Mccabe & J.C.Smith

4. Unit operation, Volume II. Coulson & Richardson

5. Stoichiometry, B.I. Bhatt & S.M. Vora (Tata McGraw Hill Co).

6. Chemical process principles, (Part I). C.A. Haugen, K.M. Wastson, R.A. Ragatz (Asia Publishing House).

7. Process calculations (Stoichiommetry) K.A. Ghavane (Nirali Prakashan).

8. Basic Principles & Calculations in Chemical Engineering, David M. Himmelblau (Prentice Hall).

9. Chemical Engineering thermodynamics, J.M. Smith & Vanners (MacGraw Hill).

10. Fuel and Combustion, Samir Sarkar (Orient Longman Ltd).

11. Fuel and Combustion, S.P. Sharma & Chandra Mohan (Tata McGraw Hill Co.).

SARDAR PATEL UNIVERSITY
B.Sc. SECOND SEMESTER
Core Course – Industrial Chemistry (Voc.)
US02CICV22 (P) Industrial Chemistry Practical
Effective from June 2018
2 Credits, 4 periods per week
External-50 Marks, Exam duration: 2 hours