

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4 Chemical Engineering

Subject Name Fundamental Chemical Engineering Calculations & Stoichiometry
(Institute Elective-I)

Sr.No	Course content
1.	Dimensions and units: Dimensions and system of units, Fundamental and derived units, Dimensional consistency, Dimensional equations, Different ways of expressing units of quantities and physical constant.
2.	Basic chemical calculations: Composition of gaseous mixtures, liquid mixtures, solids etc. Ideal gas laws and its application. Dalton law, Raoult's law, Henry's law, humidity and saturation, measurement and calculations of pH, BOD, COD, density, Specific gravity.
3.	Material balance without chemical reactions: Process flow sheet, Material balance with and without recycle; Bypass, Purge streams, Material around equipments related unit operations like Distillation towers, Extractors, Dryers, Evaporators, Crystallizers, Humidification and dehumidification towers.
4.	Material balance involving chemical reactions: Concept of limiting and excess reactants, percentage conversion and yield etc.
5.	Energy balances: Heat capacity of gases and gaseous mixtures, liquids & solids, Sensible heat change in liquid & gases, enthalpy changes during phase transformation, enthalpy changes accompanied by chemical reactions, standard heat of reaction, adiabatic reactions.
6.	Stoichiometry and Unit operations: Distillation, Absorption and stripping, extraction & Leaching, Crystallization, Psychometric, Drying, Evaporation etc

PRACTICAL AND TERM-WORK

Practical/Tutorial work based on theory

Reference Books:

- 1 'Stoichiometry', B. I. Bhatt & S. M. Vora, McGraw Hill Publishing Company Limited, 4th edition, 2004.
- 2 "Basic Principles and calculations in Chemical engineering" by David M Himmelblau, seventh Edition, 2006
3. Process Calculation for Chemical Engineering, Second Revised Edition, Chemical Engineering Education Development Centre, I.I.T., Madras, 1981.