I CHE121 Chemical Engineering Principles-I

Course Outlines

- **Title:** Chemical Engineering Principles-I
- **Code Number:** CHE121
- **Semester:** 2nd
- **Credit hours:** 2
- **Pre-requisites course requirements/ skills:** Basic knowledge and understanding of engineering science principles, physical laws, and mathematical tools and solution of linear algebraic equations.
- **Learning Outcomes:**

  Upon successful completion of the course, the students will be able to

  1. Acquire the basic knowledge of Chemical Engineering principles.
  2. Solve the problems related to dimensional analysis and process variables
  3. Stoichiometry and material balances for process units

- **Contents**

  Unit I: Dimensional Analysis

  1.1 Dimensional Consistency

  1.2 Dimensional analysis and degree of freedom

  1.3 Systems of units, dimensions and conversion factor

  1.4 Legal frame work and OHS Management system

  Unit II: Unit Conversions

  2.1 Unit conversions in all system of measurements relating to Density, Specific gravity, Volume, Temperature, Pressure, Flow rate, etc

  2.2 Molar calculations in terms of mole fraction and mass/weight fraction

  2.3 Concept of “Basis” set for engineering calculations

  Unit III: Mass Balance Calculations

  3.1 The concept of material balance and its Pre-requisites

  3.2 Prediction of solution of Material Balance problems

  3.3 Material Balance with-out chemical reaction

3.4 Material balance with chemical reaction

3.5 Material balance with chemical reaction

3.6 Material balance problems with multiple sub-systems

- **Teaching-learning Strategies**

  The teaching and learning strategy has been designed on the understanding of concepts and the ability to critically analyze and apply the learned content through lectures, discussion, activities, case studies using computer, multi-media and writing board instructional aids.

  Lectures: 3 hours per week

- **Assignments- Types and Number with calendar**

A minimum of two assignments to be submitted before the written exam of final term

- **Assessment and Examinations:**

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written examination at the mid-point of the semester.
2.	Formative Assessment	25%	It includes: classroom participation, attendance and assignments.
3.	Final Assessment	40%	Written examination at the end of semester.

- **Textbooks and reference readings**

1. Himmelblau, D.M., Riggs, J.B. (2012) "Basic Principles and Calculations in Chemical Engineering" 8th Edition, Prentice Hall.
2. Felder, R.M., Rousseau, R.W., Bullard, L.G., Newell, J.A. (2016) "Felder's Elementary Principles of Chemical Processes" 4th Edition, Wiley.
3. Reklaitis, G.V., Schneider, D.R. (1983) "Introduction to Material and Energy Balances" Wiley.
4. Hicks, T., Chopey, N. (2012) "Handbook of Chemical Engineering Calculations" 4th Edition, McGraw Hill.