

CHE 201 - Introduction to Chemical Engineering

Course Credit 3-0-3

Second Semester 2007-2008 (072)

<u>Course Instructors</u>	<u>Lecture</u>	<u>Tutorial</u>
Dr. Muhammad A. Al-Saleh Office: 16-212 Tel.: 2194 Office Hours: SMW 10-11 AM Email: masaleh@kfupm.edu.sa	Sec. 01 Room 4-259 SMW: 8:00-8:50 a.m. Sec:02 Room 4-238 SMW:9:00-9:50 a.m	Room 4-259 S 1:10-3:00 p.m Room 4-259 U 1:10-3:00 pm
Dr.Basim Abussaud Office: 16-232 Tel.: 7514 Office Hours: Email: basim@kfupm.edu.sa	Sec. 03 Room 6-257 SMW:. 10:00-10:50 a.m	Room: 4-238 U:1:10-3:00 am.
Dr. Mohammed Ba-Shammakh Office:16-207 Tel;7464 Office Hours: SMW 10:00 – 10:50 a.m Email: shammakh@kfupm.edu.sa	Sec.04 Room 6-103 SMW 11:00-11:50 am	Room 4-238 T:1:10-3:00 pm

Textbook: **Elementary Principles of Chemical Processes**, 3/e, by Richard M. Felder & Ronald W. Rousseau, J. Wiley, 2000.

Pre-requisites: PHYS 102, CHEM 102

Objective: To introduce students to basic concepts in chemical engineering: Basic principles and calculations of chemical engineering; material balances and their applications; ideal and real gases including mixtures; concepts of multiphase systems.

Outcomes: Upon successful completion of this course, you will be able to:

1. Convert quantities from one set of units to another quickly and accurately.
2. Define and determine properties of process streams including fluid density, flow rate, chemical composition (mass and mole fractions, concentrations), fluid pressure, and temperature.

3. Draw and label process flowcharts from verbal process descriptions. Carry out degree of freedom analyses (process bookkeeping)
Write and solve material balance equations for single-unit and multiple-unit processes, processes with recycle and bypass, and reactive processes.
4. Perform pressure-volume-temperature calculations for ideal and non-ideal gases. Incorporate the results of these calculations into process material balance calculations.
5. Perform vapor-liquid equilibrium calculations for systems containing one condensable component and for ideal multicomponent solutions. Incorporate the results of these calculations into process material balance calculation

Grading Policy:

Two Major Exams (25 % each)	50%
Final Exam	35%
Homeworks	5%
Quizzes (# 6)	5%
Attendance & Class participation	5%
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Total	<u>100%</u>

Attendance: Attendance will be regularly taken and the university regulations will be strictly enforced.

Examination Schedule: 1st Exam, Tuesday ,March 18,2008 , 6:30 pm
2nd Exam, Tuesday ,May 13,2008 , 6:45 pm

Course Outline:

- **Introduction to Chemical Calculations (Chapter 2)** 5 lectures
 - Units and Dimensions, Conversion of Units, Systems of Units
 - Force and Weight
 - Dimensional Homogeneity and Dimensionless Quantities
 - Process Data Representation and Analysis
- **Process and Process Variables (Chapter 3)** 6 lectures
 - Mass and Volume
 - Flow Rate
 - Chemical Composition
 - Pressure
 - Temperature
- **Fundamentals of Material Balances (Chapter 4)** 16 lectures
 - Process Classification
 - Balances

- Material Balances Calculations
- Balances on Multiple-Unit Processes
- Recycle and Bypass
- Balances on Reactive Systems
- Combustion Reactions

- **Single-Phase Systems (Chapter 5)** 6 lectures
 - Liquid and Solid Densities
 - Ideal Gases
 - Equations of State for Real Gases

- **Multi-Phase Systems (Chapter 6)** 7 lectures
 - Single-Component Phase Equilibrium
 - The Gibbs Phase Rule
 - Gas-Liquid Systems: One Condensable Component
 - Multi-Component Gas-Liquid Systems

- **Review & Exams & Examination Reviews** 5 lectures