

KUWAIT UNIVERSITY
College of Engineering & Petroleum
CHEMICAL ENGINEERING DEPARTMENT

SECOND SEMESTER 2007-'08

MASS TRANSFER OPERATIONS (ChE 440 -1)

- Prerequisites** : 0640-345
- Instructor** : **Prof. M. R. Riazi**
Office: Bldg. 8 Kh., 5th Floor, Room # 535, Chem.
Eng. Dept. Phone: 498-5772 (Dept. # 4817662)
Email: mrriazi@gmail.com
- Office Hours** : Sunday, Tuesday, Wednesday (8:00 – 9:00;10:00 - 11:30)
Monday (8:00 – 9:00 , 10:00 - 12:00)
Or by appointment.
- Assistant** : Engineer Latifa Al-Duwesh
Office : Bldg. Old 14 Kh, (Ext 498 - 5872)
Office Hours :
Sunday, Tuesday, Thursday (10 :00 –12 :00)
Monday (9 :00-12 :00), Wednesday (9 :00-10 :00)
- Class Hours** : Sunday, Tuesday and Thursdays (9:00 - 10:00)
Class duration: Sunday February 17 – Tuesday May 27th.
- Class Room** : Buldg. 7 Kh., Room # 303

Course Objective:

The course begins with general analysis of the concepts of binary and multicomponent separation processes in chemical engineering. It also covers analysis of equilibrium conditions, vapor-liquid equilibrium in ideal and non-ideal systems. The separations processes discussed are Distillation (flash, batch, steam and multi-component), solid-liquid and liquid-liquid extractions, absorption, adsorption, and cooling tower. Emphasis will be on the analysis of binary system distillation (McCabe-Thiele method, reflux analysis, energy balances, plate efficiencies and enthalpy-composition).

Main Text Book:

Christie J. Geankoplis
"Transport Processes and Separation Process Principles"
4th Edition, Prentice Hall, Inc., New Jersey, 2003. (www.phptr.com)

Supplementary Book:

W.L. McCabe, J.C. Smith, P. Harriott,
"UNIT OPERATIONS OF CHEMICAL ENGINEERING"
7th Edition, McGraw-Hill, Inc., New York, 2005.

Grading: The course grade will be based (approximately) on the following considerations:

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|-------------------------|---|-----|
| Attendance | - | 8% |
| Homeworks & Project(s) | - | 10% |
| Quizzes | - | 12% |
| Midterm Exams (2 exams) | - | 30% |
| Final Exam | - | 40% |

COURSE OUTLINE

| CHAPTER | SUBJECT |
|----------------|---|
| 10 | INTRODUCTION TO SEPARATION UNITS |
| 10 | PRINCIPLES OF MULTISTAGE SEPARATION UNITS |
| 11 | VAPOR-LIQUID SEPARATION PROCESSES |
| 11 | VAPOR-LIQUID EQUILIBRIUM RELATION |
| 11 | DISTILLATION OF BINARY and MULTICOMPONENT SYSTEMS |
| 10 | ABSORPTION PROCESS |
| 12 | ADSORPTION PROCESS |
| 12 | EXTRACTION AND LEACHING PROCESSES |
| 10 | COOLING TOWERS |

EXAM DATES :

The Exam place will be specified before each exam.

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| EXAM I | : | Chapters 11 (Distillation). Thursday, 5:30-7:30 PM April 3, 2008 |
| EXAM II | : | Chapters 10 & 12(Absorption, Adsorption, Extraction and Leaching). Thursday, 5:30-7:30 PM May 23, 2008 |
| FINAL EXAM | : | (Comprehensive – all chapters) Monday: June 2, 2008, 8:00 – 10:00 PM |