

**KUWAIT UNIVERSITY**  
**College of Graduate Studies**  
**CHEMICAL ENGINEERING DEPARTMENT**  
**SECOND SEMESTER 1995-'96**  
***Fluid Phase Equilibria (ChE 575)***

**Instructor: Dr. M. R. Riazi**

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**Office Hours:** Saturday, Monday (10:00 - 11:00 a.m.)

Sunday, Tuesday (9:30 - 11:00 a.m.) *Or by appointment.*

**Assistant:** *Reena Susan George* (Ext. # 5926)

**Class Hours:** Sunday & Tuesday (6:30 - 8:00 p.m.)

**Place:** Bldg. 6 Kh., Room # 305

**COURSE OBJECTIVE:**

This course starts with basic thermodynamics and relationship among thermodynamic properties with a discussion of intermolecular forces. The main emphasis would be on vapor-liquid equilibria (VLE) through detailed calculation of fugacities in gases and liquids. Application of various cubic equations of state in high pressure VLE calculations will also be discussed. The analysis should be useful to engineers engaged in design of equipment for separation operations. Practical problems especially for reservoir fluids and petroleum products will be presented to the students.

**TEXT BOOK:**

***Main Reference Text:***

Prausnitz, J.M., Lichtenthaler, R.N., de Azevedo, E.G.  
"MOLECULAR THERMODYNAMICS OF FLUID-PHASE EQUILIBRIA",  
2nd edition, Prentice-Hall Inc., 1986.

***Supplementary Reference:***

Smith, J.M. and H.C. Van Ness,  
"INTRODUCTION TO CHEMICAL ENGINEERING  
THERMODYNAMICS",  
4th edition, McGraw-Hill, 1987.

**GRADING:**

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

Homework & Other Assignments :	30%
Mid-Term Exam :	30%
Final Exam :	40%

## **COURSE OUTLINE**

1. The Phase-Equilibrium Problem (Ch. 1)
2. Basic Definitions and Various Types of VLE Calculations (Ch. 2)
3. Thermodynamic Properties from PVT Data (Ch. 3)
4. Intermolecular Forces and the Theory of Corresponding States (Ch. 4)
5. Fugacities in Gas Mixtures (Ch. 5)
6. Fugacities in Liquid Mixtures (Ch. 6)
7. Theories of Solutions (Ch. 7)
8. High Pressure VLE Calculations (Ch. 10)
9. Solubilities of Gases in Liquids (Ch. 8)
10. Solubility of Solids in Liquids (Ch. 9)

It will be attempted to prepare additional notes to ease understanding of basic principles.