ChE 120: Introduction to Chemical Engineering
Approaches to Chemical Engineering Processes

Outline of the Lecture/ Study Topics

Dimensions, Units and Conversions
Scaling, Dimensionless Variables and Estimation
1.5 Weeks  5 (x2/3) lectures

Focus on Process Variables
Composition / Time with P&T
1 Week 2 (x2/3) lectures

Material (Chemical) Balances
Single/ Multiple Units
Recycle and Bypass
Reactive Systems
3 Week 8 (x2/3) lectures

First Exam
Non Ideal Behavior of Fluids
Z(T,P) from PV=nZR
Introductions to other EOS
1.5 Weeks  5 (x2/3) lectures

Phase Behavior
Single Component (VLE)
Multiple Components (VLE)
Solid Phases (including sorption)
3 Week 8 (x2/3) lectures

Second Exam
Energy Balances
First Law and (work/heat) Enthalpy
2 Weeks  6 (x2/3) lectures

Whole Processes Analysis/ Design (an introduction)
A Few Examples
1.5 Weeks  5 (x2/3) lectures

Third Exam
What Tools will we learn to use (better or)?

*Computer Based: Spread Sheets (Excel)*
*Math. Analyses: MathCad*
*Web Based: Dream Weaver*

**EXPECTATIONS**

Units & Estimates

Mass (Chemical) Balances
  * Single and Multiple Process Steps
    * With Phase Changes
    * With Recycle & Bypass
    * Including Reactions

Equations of State for Gasses
  * Ideal and NOT

Phase Behavior
  * VLE
    * Single Components & Mixtures
  * Liquid-Solid
    * Sorption

Energy Balances: an Introduction
  * First Law of Thermodynamics

What is Chemical Engineering?

Tools you will need: Spread-Sheets & MathCad
A. Dimensions, Units and Conversions: Scaling, Dimensionless Variables and Estimation
   F&R Chapter 2

27 January First Day of class

1 February

3 February Faculty Senate Mtg. may start 15 min. late

   B. Focus on Process Variables: Composition / Time with P&T
      F & R Chapter 3

8 February,
   HW1 Due Ch2: 6, 11, 19, 25 28 and Dimensionless Project

10 February

   C. Material (Chem.) Balances: Single/ Multiple Units, Recycle and Bypass, Reactive Systems
      F & R Chapter 4 (and some from Ch. 8 & 9)

15 February
   HW2 Due Ch 2: 35, 38, 40, 45 and 3: 4, 9, 13

17 February Faculty Senate Mtg. may start 15 min. late

22 February
   HW3 Due

24 February

29 February

2 March
   HW4 Due
   4: 3, 6, 7, 13, 21

7 March

9 March
   HW5 Due
   4: 21, 23, 26, 31, 41

SPRING BREAK 11-20 March

21 March Review
23 March First Exam Chapters 1-4

   D. Non Ideal Behavior of Fluids: Z(T,P) from PV=nZR, Introductions to other EOS
      Readings: F & R Chapter 5
28 March

30 March

HW 6 Due
5: 1,4,12,14,17

4 April

Readings:F & R Chapter 6

6 April

HW7 Due
5: 35, 49, 64
6: 2

E. Phase Behavior: Single Component (VLE), Multiple Components (VLE), Solid Phases (including sorption)

Counseling Period 10-14 May

11 April

13 April

HW8 Due
6: 3, 4, 12, 24, 26

Patriots Day 17 April (Monday)

18 April  Review

20 April- No Class Monday Classes followed-Second Exam in the evening

F. Energy Balances: First Law and (work/heat) Enthalpy
   F & R Chapter 7

25 April

HW9 Due

27 April

2 May

HW10 Due

4 May

5 May Third Exam

G. Whole Processes Analysis/ Design (an introduction): A Few Examples

9 May

11 May Last Day of Classes