

## **ChEN 4353 Process Design I - Course Schedule Overview**

### **Week 1-22 August**

Chapt 1 (p.1 -25), Chapt 2, Chapt 3 Product Design- ARTICLES on Product Design  
Introduction to course – Product and Process Design  
Product Design-1 Overview  
Product Design-2 Property Estimation

### **Week 2-29 August**

Chapters 16 and 17  
Product Design-3 Innovation Maps  
Product Design-4 Six Sigma in Product Design  
Product Design-5 Engineering Ethics

### **Week 3–5 September (Holiday Monday, Ring Away Wednesday-Friday)**

Chapt 1 (p25-31) Chapter 4 Process Creation-  
Ethics in Chemical Engineering  
Process Safety  
Process Design Overview  
Process Creation

### **Week 4–12 September**

Chapt 4&5&6 Aspen for Process Creation–  
Use of Aspen for Process Creation-1  
Use of Aspen for Process Creation-2  
Heuristics for Process Simulation

### **Week 5 – 19 September (Celanese in Class Monday)**

Chapt 4&5 Aspen Tutorials and Problems Solved in Class (**Reserve the ICC**) -

### **Week 6 - 26 September (Away Wednesday and Friday)**

Chapt 5&6 ProMax Tutorials and Problems Solved in Class (**Reserve the ICC**) -

### **Week 7–3 October**

Chapter 22-22 (p543-597) &23 Profitability Analyses -  
Annual Costs  
Earnings  
Profitability Analysis  
Equipment Sizing for Capital Cost Estimates – Pressure Vessel, etc.  
Capital Cost Estimates  
Cost Accounting

### **Week 8- 10 October FALL BREAK**

### **Week 9-17 October (AIChE Meeting, Ring Away)**

Review for Mid Term Exam -  
*Mid Term Exam, Wednesday 19 October*  
*Capital Cost Estimates*

## **Single Unit Design Examples with short Design Reports Each Week**

### **Week 10-24 October**

Chapt 18 Heat Exchange-  
Heat Exchanger Design

Heat Exchanger Optimization  
Heat Transfer Coefficients  
Pressure Drop and Pumping Cost

**Week 11-31 September**

Chapter 19 Separations-  
Separation Tower Design  
Separation Tower Optimization  
Tower Diameter  
Pressure Drop

**Week 12-7 November**

Chapter 20 – Pumps and Compressors  
Pump Design – When to use different designs  
Compressor Design – When to use different designs  
Two stage compressors and their design

**Week 13-14 November**

Chapt 7 Reactors -  
Reactor Design - Pressure Vessel Sizing and Cost  
Gas Phase Reactor - Ethylene Reactor  
Catalytic Fixed Bed Reactor Design  
Fluid Bed Reactor Design

**Week 14-21 November (Holiday Thursday & Friday)**

Chapt 7 Reactors -  
Reactor Design - Pressure Vessel Sizing and Cost  
Gas Phase Reactor - Ethylene Reactor  
Catalytic Fixed Bed Reactor Design  
Fluid Bed Reactor Design

**Week 15-28 November**

Articles on Process Trouble Shooting –  
Mini Plant Software  
K-T Strategy

**Week 16-5 December**

Article on 6Sigma –  
Design of Experiments/Response Surface Mapping  
Use of 6Sigma in Unit/Process Optimization  
Chapter 7 (Articles on Reactive Distillation) - Reactive Distillation Example Methyl Acetate  
Course Review

**Finals Week 12 -16 December**

Final Exam