

# CHEE 4520: Chemical Process Economics and Design

## Spring 2016

**Course Sections:**

CHEE 4520-001      10:00-10:50 MWF PL3060

**Instructor:**

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**Assigned Text:**

Turton, R., R.C. Bailie, W.B. Whiting, J.A. Schaeiwitz, D. Bhattacharya, Analysis, Synthesis, and Design of Chemical Processes, 4<sup>th</sup> Ed., Prentice Hall, Upper Saddle River, NJ (2012).

**Course Objectives:**

The objective of this class is to develop students' ability to analyze and design chemical processes. Specifically, students should be able to: (1) translate verbal or written specifications into process flow sheets; (2) use Visio and Aspen Plus to draw and simulate process flow sheets; (3) design processes to accomplish specific tasks; (4) determine process economics; (5) evaluate process safety hazards; (6) understand ethical issues related to process design; (7) give oral presentations; (8) use technology to assist the preparation and presentation of technical reports.

Upon completion of this class, the students will have demonstrated: (1) the ability to identify, formulate and solve engineering problems; (2) the ability to apply knowledge of mathematics, science and engineering to solve engineering problems; (3) the ability to understand, analyze and design chemical processes; (4) proficiency in the use of computers and software; (5) the ability to communicate their work to technical and non-technical audiences; (6) an awareness that changes in technology require lifelong learning and continued professional development; (7) an awareness of the importance of safety practices; (8) knowledge of contemporary issues including the environmental, societal and global consequences of their work; (9) knowledge of an engineer's professional and ethical responsibilities.

**CHEE 3120 Course Requirements:**

<b>Problem Sets</b>	<b>One per week</b>	10%
	Homeworks are due at the start of class on the due date; <b>late assignments will not be accepted.</b> The lowest homework score will be dropped.	
<b>Quizzes</b>	<b>Two or three per term</b>	5%
	Quizzes will be administered at the beginning of class. The lowest quiz score will be dropped.	
<b>Exams</b>	<b>Midterm 1 (2/29)</b>	15%
	<b>Midterm 2 (4/15)</b>	15%
	<b>Final exam (5/4, 10:15 - 12:15)</b>	25%
<b>Projects</b>	<b>Design project</b>	20%
	<b>Safety project/presentation</b>	10%
<b>Participation</b>	<b>Classroom discussion</b>	
	The final grade may be varied as much as 5%.	

**Tentative Class Schedule:**

<b>Week #</b>	<b>Dates</b>	<b>Subject</b>	<b>Textbook Chapter</b>
1	1/11, 1/13, 1/15	Introduction; Process Diagram Structure and Synthesis	1, 2
2	MLK, 1/20, 1/22	Process Structure and Synthesis Continued	2
3	1/25, 1/27, 1/29	Tracing through the Process Flow Diagram (PFD)	5
4	2/1, 2/3, 2/5	Understanding Process Conditions	6
5	2/8, 2/10, 2/12	Health, Safety and the Environment	26
6	2/15, 2/17, 2/19	Estimation of Capital Costs	7
7	2/22, 2/24, 2/26	Estimation of Manufacturing Costs	8
8	<b>2/29</b> , 3/2, 3/4	Manufacturing Costs Continued	<b>8 / EXAM I</b>
9	3/14, 3/16, 3/18	Process Simulation (Aspen Plus)	13
10	3/21, 3/23, 3/25	Process Simulation Continued	9, 13
11	3/28, 3/30, 4/1	Engineering Economic Analysis	9
12	4/4, 4/6, 4/8	Profitability Analysis	10
13	4/11, 4/13, <b>4/15</b>	Evaluation of Economic Risk	<b>10 / EXAM II</b>
14	4/18, 4/20, 4/22	Using Experience-Based Principles	11
15	4/25, 4/27, 4/29	Ethics and Professionalism	25