

# CHEN 4460 – LAB PLAN

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(Updated August 21, 2011)

All page references are for Seider, W.D., J.D. Seader, D.R. Lewin, and S. Widagdo “Product and Process Design Principles”, 3rd Edition Wiley, 2008 (SSLW) unless otherwise noted.

Week	Dates	Lecture and Multimedia Material	Computer Exercises
1	8/18	No labs	
2	8/23, 8/25	MM: Principles of Flowsheet Simulation <ul style="list-style-type: none"> <li>• Getting Started in Aspen               <ul style="list-style-type: none"> <li>○ Brief Introduction</li> <li>○ Setting Up</li> <li>○ Sample Problem</li> </ul> </li> </ul> <p><b>SSLW Chapter 5, pp. 110-120</b></p>	MM: Tutorials <ul style="list-style-type: none"> <li>• Material and Energy Balances               <ul style="list-style-type: none"> <li>○ Ammonia/Water Separation</li> </ul> </li> </ul>
3	8/30, 9/1	MM: Principles of Flowsheet Simulation <ul style="list-style-type: none"> <li>• Getting Started in Aspen               <ul style="list-style-type: none"> <li>○ Convergence</li> </ul> </li> </ul> <p><b>SSLW Chapter 5, pp. 120-131</b></p>	MM: Tutorials <ul style="list-style-type: none"> <li>• Material and Energy Balances               <ul style="list-style-type: none"> <li>○ Ethylchloride Manufacture</li> </ul> </li> </ul> <p><b>Homework #1 (Due Week 4 in lab)</b></p> <ul style="list-style-type: none"> <li>• Exercise A.1 (Aspen Notes)</li> <li>• Exercise A.2 (Aspen Notes)</li> </ul>
4	9/6, 9/8	<b>Lab Recitation Lecture #1</b> <ul style="list-style-type: none"> <li>• Heuristics for Process Synthesis</li> </ul> <p>MM: Pumps, Compressors and Expanders</p> <ul style="list-style-type: none"> <li>• Overview               <ul style="list-style-type: none"> <li>○ Pumps</li> <li>○ Compressors and Expanders</li> </ul> </li> </ul> <p>MM: Heat Exchangers</p> <ul style="list-style-type: none"> <li>• Overview               <ul style="list-style-type: none"> <li>○ Introduction</li> <li>○ Heat Requirement Models</li> <li>○ Shell-and-Tube HX</li> <li>○ Multiple-Stream HX</li> </ul> </li> </ul>	
5	9/13, 9/15	MM: Separators <ul style="list-style-type: none"> <li>• Overview               <ul style="list-style-type: none"> <li>○ Phase Equil. And Flash</li> </ul> </li> </ul> <p>MM: Physical Property Estimation</p> <ul style="list-style-type: none"> <li>• Overview               <ul style="list-style-type: none"> <li>○ Property Estimation                   <ul style="list-style-type: none"> <li>▪ Phase Equilibria</li> <li>▪ Equil. Diagrams</li> <li>▪ Property Data Regression</li> </ul> </li> </ul> </li> </ul>	<b>Homework #2 (Due Week 6 in lab)</b> <ul style="list-style-type: none"> <li>• Exercise B.1 (Aspen Notes)</li> <li>• Exercise B.2 (Aspen Notes)</li> <li>• Exercise B.3 (Aspen Notes)</li> </ul>
6	9/20, 9/22	<b>Lab Recitation Lecture #2</b> <ul style="list-style-type: none"> <li>• Separation Trains</li> </ul>	MM: Tutorials <ul style="list-style-type: none"> <li>• Heat Transfer               <ul style="list-style-type: none"> <li>○ Toluene Manufacture</li> </ul> </li> </ul>
7	9/27, 9/29	MM: Separators <ul style="list-style-type: none"> <li>• Overview               <ul style="list-style-type: none"> <li>○ Introduction</li> <li>○ Split-Fraction Model (SEP2)</li> <li>○ Phase Equil. and Flash</li> <li>○ Distillation</li> </ul> </li> </ul>	MM: Tutorials <ul style="list-style-type: none"> <li>• Separation Principles               <ul style="list-style-type: none"> <li>○ Flash and Distillation                   <ul style="list-style-type: none"> <li>▪ Flash</li> <li>▪ Distillation</li> </ul> </li> </ul> </li> </ul>

Week	Dates	Lecture and Multimedia Material	Computer Exercises
8	10/4, 10/6	<b>Lab Recitation Lecture #3+4</b> <ul style="list-style-type: none"> <li>Azeotropic Distillation</li> <li>Choosing Property Models</li> </ul> MM: Physical Property Estimation <ul style="list-style-type: none"> <li>Property Package Selection</li> </ul>	<b>Homework #3 (Due Week 9 in lab)</b> <ul style="list-style-type: none"> <li>Exercise D.1 (Aspen Notes)</li> </ul>
9	10/11, 10/13	MM: Chemical Reactors <ul style="list-style-type: none"> <li>Overview <ul style="list-style-type: none"> <li>Introduction</li> <li>Stoichiometric Reactors</li> <li>Equilibrium Reactors</li> <li>PFR</li> <li>CSTR</li> </ul> </li> </ul>	MM: Tutorials <ul style="list-style-type: none"> <li>Reactor Design Principles <ul style="list-style-type: none"> <li>Overview <ul style="list-style-type: none"> <li>Theory</li> <li>Setting Up Reactors</li> </ul> </li> </ul> </li> </ul>
10	10/18, 10/20		MM: Tutorials <ul style="list-style-type: none"> <li>Reactor Design Principles <ul style="list-style-type: none"> <li>Ammonia Converter</li> </ul> </li> </ul> <b>Homework #4 (Due Week 12 in lab)</b> <ul style="list-style-type: none"> <li>Exercise E.1 (Aspen Notes)</li> </ul>
11	10/25, 10/27	<b>Lab Recitation Lecture #5</b> <ul style="list-style-type: none"> <li>Introducing LINGO</li> <li>Will be given Tuesday 10/25</li> </ul> <b>Lab Recitation Lecture #6</b> <ul style="list-style-type: none"> <li>Solution for Midterm Exam</li> <li>Will be given Thursday 10/27</li> </ul>	<b>Homework #4 (Due Week 12 in lab)</b> <ul style="list-style-type: none"> <li>Exercise E.1 (Aspen Notes)</li> </ul> <b>Homework (Due 11/1 in class)</b> <ul style="list-style-type: none"> <li>SSLW 24.1</li> <li>Problems in Handout</li> </ul>
12	11/1, 11/3	<b>Lab Recitation Lecture #7</b> <ul style="list-style-type: none"> <li>Simulation Project Overview</li> <li>Preparing Reports</li> </ul>	<b>Simulation Project</b> <ul style="list-style-type: none"> <li>Report due 12/2</li> <li>Build Steady State Simulation</li> </ul>
13	11/8, 11/10		<b>Simulation Project</b> <ul style="list-style-type: none"> <li>Build Steady State Simulation</li> </ul>
14	11/15, 11/17	<b>Lab Recitation Lecture #8</b> <ul style="list-style-type: none"> <li>Heat Integration</li> </ul>	<b>Simulation Project</b> <ul style="list-style-type: none"> <li>Finalize Initial Simulation</li> <li>Perform Integration Analysis</li> </ul>
15	11/22, 11/24	Thanksgiving Holiday	
16	11/29, 12/1		<b>Simulation Project</b> <ul style="list-style-type: none"> <li>Simulate Integrated Process</li> </ul>

**NOTE:**

If normal class and/or lab activities are disrupted due to a high number of students experiencing illness or an emergency or crisis situation (such as a widespread H1N1 flu outbreak), the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials.