

Lamar University
CHEN 4360 Plant Design I
MWF 9:10-10:05 or 10:20-11:15 Lucas 109

General Course Information

Instructor: Dr. Peyton C. Richmond, Chemical Engineering
Office: 108 Lucas Building
Office Hours: 1:00 – 2:30 p.m. Wednesday, Friday, or by appointment
Phone: 409-880-2147
E-mail: peyton.richmond@lamar.edu
Text-Required: Turton, R., et al., “Analysis, Synthesis, and Design of Chemical Processes,” 4th Ed., Prentice Hall (2012)
Ref-Optional: “Perry’s Chemical Engineer’s Handbook,” 7th ed., McGraw Hill, New York, NY (1997). Aspen Plus Process Simulation Package.

Course Objectives

The Plant Design I course is the first of two capstone undergraduate chemical engineering courses culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints.

Student Learning Outcomes

At the successful conclusion of this course students will be able to:

1. Describe process design development procedures and general design considerations.
2. Prepare design process flowsheets showing reactors, distillation columns, and other process equipment including regulatory controls.
3. Perform economic analysis for a plant design. Calculate capital investment, product cost, and profitability
4. Prepare and interpret process simulations for unit operations including heat exchangers, separators, reactors, mixers, pipe segment, distillation and flare systems
5. Calculate and specify process equipment design parameters.
6. Demonstrate understanding of safety analysis applied to design and operation including HAZOP analysis, layer of protection analysis, and the importance of material safety data sheets
7. Prepare an initial plant design. Include list of major process equipment, raw materials, utilities, manpower, and safety requirements.
8. Submit results in an acceptable written report including economic analysis and safety information.

Blackboard

Supplementary information including class notes, PowerPoint slides, class announcements, the course syllabus, test dates, and other information will be posted on Blackboard. Further instructions will be provided when the information is posted. All submissions must be electronic via Blackboard.

E-Mail

If you have any questions about the course or need assistance please contact me by e-mail. I am also available in person or by telephone during office hours. Note that submissions are not accepted via e-mail.

Grading and Evaluation Criteria

- The standard grading scale is used (0-59=F, 60-69=D, 70-79=C, 80-89=B, 90-100=A); however, a curve may be applied subject to the discretion of the instructor.
- Attendance is mandatory. Unexcused absences may be applied to reduce a major test grade as follows: (2x free, 3x = -5, 4x = -10, etc.)
- Assignments are due on the assigned day at 11:59 pm via Blackboard. Late submissions will not be accepted without a valid school related excuse (e.g., Blackboard availability).
- Point distribution:
 - **85%** of the grade is based on examinations and final.
 - **10%** of the grade is based on individual project submissions.
 - **5%** of the grade is based on lab/homework submissions.

Academic Honesty Policy

- Consequences for proven dishonesty may include failing the assignment, failing the course, or referral to university authorities.

Topics

1. Chemical Process Structure (Ch. 1-3)
2. Process Equipment Operating Conditions and Capital Cost (Ch. 5-7)
3. Cost Estimation and Profitability (Ch. 8-10)
4. Plant Design I Project
5. Tests and Reviews

Course Outline

Week	Topics	Exams
1-5	Chemical Process Structure	Exam 1
6-10	Process Equipment Operating Conditions and Capital Cost	Exam 2
11-15	Cost Estimation and Profitability	Exam 3
	Cumulative	Final

Students with Disability Policy

Lamar University is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center (DRC) is located in the Communications building room 105. Office staff collaborate with students who have disabilities to provide and/or arrange reasonable accommodations.

For students:

- If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact the DRC at [409-880-8347](tel:409-880-8347) or drc@lamar.edu to arrange a confidential appointment with the Director of the DRC to explore possible options regarding equitable access and reasonable accommodations.
- If you are registered with DRC and have a current letter requesting reasonable accommodations, we encourage you to contact your instructor early in the semester to review how the accommodations will be applied in the course.

Emergency Procedures

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at:

<http://www.lamar.edu/about-lu/administration/risk-management/index.html>

Following are procedures for the first two:

Severe Weather

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter (CADD)

- **CALL** - 8-3-1-1 from a campus phone (880-8311 from a cell phone). Note: Calling 9-1-1 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID**- If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY**- Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND**- Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.

Academic Continuity

In the event of an announced campus closure in excess of four days due to a hurricane or other disaster, students are expected to login to Lamar University's website's homepage (www.Lamar.edu) for instructions about continuing courses remotely.

This course complies with university policies on disabilities, accommodations, and academic dishonesty as printed in the Lamar University *Student Handbook* and *Faculty Handbook*