Unit Operations (CTEC 2545)

Credit: 5 semester credit hours (4 hours lecture, 4 hours lab)

Prerequisites: PTAC 2438, PTAC 2314

Course Description

Instruction in the principles of chemical engineering and process equipment with emphasis on scale-up from laboratory bench to pilot plant.

Required Textbook and Materials

1. *Simtronics Student Workbook – SPM 700* (Kampus Korner Bookstore only)
2. Equipment (purchased by the student)
    a. fire retardant clothing
    b. hardhat
    c. safety glasses
    d. ear plugs
    e. gloves
    f. shoes with a defined heel (no open toes/sandals)

Course Objectives

Upon completion of this course, the student will be able to:

A. Describe unit operation concepts;

B. Solve elementary chemical mass/energy balance;

C. Use the interpretation of analytical data in the application of distillation and fluid flow principles.

Course Outline

A. Introduction
    1. Discuss Introduction of faculty and students
    2. Review Syllabus
    3. Review Class Policies
    4. Review Lab Policies
    5. Operate Computer Equipment
    6. Operate Mechanical Lab Equipment
    7. Follow proper Safety Procedures

B. Simtronics Distillation Software
    1. Complete Lesson requirements
    2. Perform Simulator Tutorials
    3. Demonstrate proper Startup Procedures
    4. Demonstrate proper Shutdown Procedures
    5. Complete “what-if” scenarios in the Work Book

C. Mechanical Lab
    1. Introduction and Performance Objectives of Mechanical Lab
    2. Describe Factors that Affect a Mechanical Lab
    3. Explain Mechanical Lab Operation

4. Describe Mechanical Lab Equipment and Instruments
5. Explain Normal Mechanical Lab Conditions
6. Demonstrate Troubleshooting a Mechanical Lab
7. Perform Team Presentation on Procedures for Mechanical Lab

D. Distillation Table Top
1. Describe Performance Objectives of Distillation Table Top
2. Discuss Factors that Affect Distillation Table Top Operations
3. Perform Distillation Table Top Operation
4. Describe Distillation Table Top Equipment and Instrumentation
5. Describe Normal Distillation Table Top Conditions
6. Describe Troubleshooting Distillation Table Top Procedures
7. Perform Team Presentation on Operating Procedures for Distillation Table Top

E. Propylene Glycol (PG) Unit
1. List Introduction and Performance Objectives of PG Unit
2. Describe PG Unit
3. List Factors that Affect PG Unit
4. Describe PG Unit Operation
5. Describe PG Unit Equipment and Instrumentation
6. List Normal PG Unit Conditions
7. Describe Troubleshooting PG Unit
8. Perform Team Operation of PG Unit

Grade Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
0 – 59	F

Course Evaluation

Final grades will be calculated according to the following criteria:

Homework	10%
Lab	50%
Final	40%

Course Requirements

1. Demonstrate proficiency on all Lab Equipment
2. Work as a Team for Writing Procedures and Presentations of Operating Procedures

Attendance Policy

1. According to campus policy, students must be in attendance for 80% of class days. Following is the policy for absences in all 16 week process technology classes and labs.

CTEC 2545
Course Syllabus

Miss 3 classes or less	receive calculated grade
Miss 4 classes	10 points dropped from calculated grade
Miss 5 classes	20 points dropped from calculated grade
Miss 6 classes	30 points dropped from calculated grade
Miss 7 or more classes	student receives an 'F'

2. Three student tardies will be considered one absence. A student is considered to be tardy once the instructor has completed taking roll.
3. Class attendance and participation is an individual student responsibility. Students taking traditional face-to-face courses are expected to attend class and to complete all assignments by stated due dates.

Course Policies

1. No food, drinks, or use of tobacco products in class.
2. Beepers, telephones, headphones, and other electronic devices must be turned off while in class.
3. Do not bring children to class.
4. Assignments submitted late will be reduced 50 points each day.
5. If a test is missed due to an emergency situation, the student will have one week to make it up; otherwise a grade of 0 will be assigned. Students are responsible for scheduling the make-up date.
6. No cheating of any kind will be tolerated. Students caught cheating or helping someone to cheat can and will be removed from the class for the semester. Cheating can result in expulsion from LIT.
7. A student who wishes to drop a course is responsible for initiating and completing the drop process. A student who stops coming to class, and fails to drop the course, will earn an "F" in the course.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the online resource: http://www.lit.edu/depts/stuserv/special/defaults.aspx

Student Code of Conduct Statement

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office.

Supplemental Instruction

Supplemental Instruction (SI) consists of group tutoring sessions conducted once a week for 50 minutes for selected subjects. The SI Leader is a peer who helps students learn difficult content in those specific courses. The SI Leader attends the class with the students to keep up with the course content and engage students in interactive learning strategies at the 50 minute sessions. For this course, the supplemental instruction session will be held on WE DO NOT HAVE SUPPLEMENTAL INSTRUCTION. See your instructor for assistance.

Starfish

LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.

8/29/2025 A. Introduction

1. Discuss Introduction of faculty and students
2. Review Syllabus
3. Review Class Policies
4. Review Lab Policies
5. Operate Computer Equipment
6. Operate Mechanical Lab Equipment
7. Follow proper Safety Procedures

9/19/2025 B. Simtronics Distillation Software

1. Complete Lesson requirements
2. Perform Simulator Tutorials
3. Demonstrate proper Startup Procedures
4. Demonstrate proper Shutdown Procedures
5. Complete "what-if" scenarios in the Work Book

10/17/2025 C. Mechanical Lab

1. Introduction and Performance Objectives of Mechanical Lab
2. Describe Factors that Affect a Mechanical Lab
3. Explain Mechanical Lab Operation
4. Describe Mechanical Lab Equipment and Instruments
5. Explain Normal Mechanical Lab Conditions
6. Demonstrate Troubleshooting a Mechanical Lab
7. Perform Team Presentation on Procedures for Mechanical Lab

10/30/2025 D. Distillation Table Top

1. Describe Performance Objectives of Distillation Table Top
2. Discuss Factors that Affect Distillation Table Top Operations
3. Perform Distillation Table Top Operation
4. Describe Distillation Table Top Equipment and Instrumentation
5. Describe Normal Distillation Table Top Conditions
6. Describe Troubleshooting Distillation Table Top Procedures
7. Perform Team Presentation on Operating Procedures for Distillation Table Top

11/15/2025 E. Propylene Glycol (PG) Unit

1. List Introduction and Performance Objectives of PG Unit
2. Describe PG Unit
3. List Factors that Affect PG Unit
4. Describe PG Unit Operation
5. Describe PG Unit Equipment and Instrumentation
6. List Normal PG Unit Conditions
7. Describe Troubleshooting PG Unit
8. Perform Team Operation of PG Unit