Unit Operations (CTEC 2545)

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

Prerequisites: PTAC 2420, PTAC 2314

Course Description

This lab is designed to provide hand-on experience in process instruments, controls, computers, and mechanical applications

Required Textbook and Materials

1. Distillation Expert-Trainer Version 2.0 (Dexter) New Student Workbook
2. Equipment (purchased by the student)
   a. fire retardant clothing
   b. hardhat
   c. safety glasses
   d. ear plugs
   e. gloves
   f. shoes (no open toes/sandals)

Course Objectives

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

A. Students will install, maintain, and calibrate level detectors. (SCANS C3.3, C5.5, C8.4, C9.3, C11.4, C13.4, C14.5, C15.5,C16.5, C17.3, C19.3, C20.5, F1.4, F2.3, F3.3, F4.5, F5.4, F6.4, F7.4, F8.4,F9.3,F12.5,F13.3, F16.3).

B. Students will install, maintain, and calibrate flow detectors. (SCANS C3.3, C5.5, C8.4, C9.3, C11.4, C13.4, C14.5, C15.5,C16.5, C17.3, C19.3, C20.5, F1.4, F2.3, F3.3, F4.5, F5.4, F6.4, F7.4, F8.4,F9.3,F12.5,F13.3, F16.3).

C. Students will install, maintain, and calibrate pressure detectors. (SCANS C3.3, C5.5, C8.4, C9.3, C11.4, C13.4, C14.5, C15.5,C16.5, C17.3, C19.3, C20.5, F1.4, F2.3, F3.3, F4.5, F5.4, F6.4, F7.4, F8.4,F9.3,F12.5,F13.3, F16.3).

D. Students will install, maintain, and calibrate temperature detectors. (SCANS C3.3, C5.5, C8.4, C9.3, C11.4, C13.4, C14.5, C15.5,C16.5, C17.3, C19.3, C20.5, F1.4, F2.3, F3.3, F4.5, F5.4, F6.4, F7.4, F8.4,F9.3,F12.5,F13.3, F16.3).

E. Students will install, maintain, and calibrate miscellaneous detectors. (SCANS C3.3, C5.5, C8.4, C9.3, C11.4, C13.4, C14.5, C15.5,C16.5, C17.3, C19.3, C20.5, F1.4, F2.3, F3.3, F4.5, F5.4, F6.4, F7.4, F8.4,F9.3,F12.5,F13.3, F16.3)

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor **S**ecretary's **C**ommission on **A**chieving **N**ecessary **S**kills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job.

In 1991 the Commission announced its findings in *What Work Requires in Schools.* In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

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
   8. Demonstrate proper operation ofSimtronics Software

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

C. Mechanical Lab
   1. Introduction and Performance Objectives of Mechanical Lab
   2. Descripe 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. PerformTeam 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. Monoethylene Glycol (MEG) Unit
   1. List Introduction and Performance Objectives of MEG Unit
   2. Describe MEG Unit
   3. List Factors that Affect MEG Unit
   4. Describe MEG Unit Operation
   5. Describe MEG Unit Equipment and Instrumentation
   6. List Normal MEG Unit Conditions
   7. Describe Troubleshooting MEG Unit
   8. Perform Team Operation of MEG 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/Labs	20%
Quizzes	20%
Exams	30%
Final Exam	30%

Late Penalties will be assessed on all work turned in late. 50 points per day

No make-ups will be given for Quizzes or Exams missed unless previous arrangements have been made with the instructor.

Course Requirements

1. Demonstrate proficiency on Lab Equipment
2. Take 4-5 Quizzes
3. Take 4-5 Exams
4. Work as a Team for Writing Procedures and Presentations of Operating Procedures
5. Perform Unit Operations during 48 hour run

Attendance Policy

1. You are responsible for information missed during classes. Regular attendance in class is important to the successful completion of the objectives of the course. Class attendance will be taken on a daily basis. *After the third (3rd) absence, your final grade will drop one letter grade for each additional absence, regardless of the reason. Two tardiness equals one absence.*
2. Missing more than 20% (6 days) of classes will result in an automatic "F" for the course.
3. Absences are counted for unexcused, excused and coming to class late.
4. Missing more than 20% of a class period will count as an absence.
5. Being tardy 2 times equals 1 absence.

Course Policies

1. No food, drinks, or use of tobacco products in class.
2. No foul or harsh language will be tolerated

3. Turn off all Cell Phones during lectures and Exams
4. Do not bring children to class.
5. 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 from expulsion from LIT.
6. If you wish to drop a course, the student is responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an 'F' in the course.
7. BACK-Ups. It is the student's responsibility to make back-up copies of their work. Do not rely on the server to be their 100% of the time. Faculty are unable to assist you if you lose your work. Remember that in order for your work to be graded, it must be in your account on the server.
8. Internet Usage
    a. Classroom computers have access to the internet.
    b. Student usage of the internet will be monitored.
    c. Proper usage of the internet will be allowed. Used for classroom research or as directed.
    d. Any unauthorized use of the internet will not be tolerated.
    e. Improper usage of the internet, such as profanity, pornography, gambling, etc… will result in disciplinary action not limited to expulsion from LIT.

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 office in Student Services, Cecil Beeson Building.

Course Schedule

Week	Topic	Reference
1	Course introduction and policies • Lecture • Lab policies	Handouts
2	• Computer Equipment • Mechanical Lab Equipment • Safety Procedures • Simtronics Software	Handouts Computer Tutorials
3/4	• Dexter Lessons	Handouts

Week	Topic	Reference
	• Simulator Tutorial • Startup Procedures • Shutdown Procedures • Start Completion of Work Book	Computer Tutorials
5/6	• Introduction and Performance Objectives of Mechanical Lab • Mechanical Lab Description • Factors that Affect a Mechanical Lab • Mechanical Lab Operation • MEG Piping and Instrumentation Diagrams	Handouts Computer Tutorials
7/8	• Introduction and Performance Objectives of Distillation Table Top • Distillation Table Top Description • Factors that Affect Distillation Table Top • Distillation Table Top Operation • Distillation Table Top Equipment and Instrument Lists • Normal Distillation Table Top Conditions • Troubleshooting Distillation Table Top • Team Presentation on Procedures for Distillation Table Top	Handouts Computer Tutorials
9/10	• Introduction and Performance Objectives of the Monoethylene Glycol Unit • Monoethylene Glycol Unit Description • Factors that Affect a Monoethylene Glycol Unit	Handouts Computer Tutorials
11/12	• Monoethylene Glycol Unit Operation • Monoethylene Glycol Unit Equipment and Instrument Lists • Normal a Monoethylene Glycol Unit Conditions • Troubleshooting a Monoethylene Glycol Unit	Handouts Computer Tutorials
13/14	• Troubleshooting a Monoethylene Glycol Unit	Handouts Computer Tutorials
15/16	• Final Review • Final Exam	Handouts Computer Tutorials