Unit Operations (CTEC 2545)

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

LAMAR INSTITUTE OF TECHNOLOGY

MODE OF INSTRUCTION
Face to Face

PREREQUISITE/CO-REQUISITE:
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.

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

1. Describe unit operation concepts.
2. Solve elementary chemical mass/energy balance.
3. Use the interpretation of analytical data in the application of distillation and fluid flow principles.

INSTRUCTOR CONTACT INFORMATION

Instructor: Robert Lange

Email: rlange1@lit.edu

Office Phone: 409-245-8667

Office Location: ExxonMobil PATC Building room 207

Office Hours: Posted on Door Schedule: 10-11AM M-F and other varying times

REQUIRED TEXTBOOK AND MATERIALS

1. *Instructor will provide training materials*
2. **Equipment (purchased by the student if not provided by LIT)**
   a. **fire retardant clothing**
   b. **hardhat**
   c. **safety glasses**
   d. **ear plugs**
   e. **gloves**

Approved: Initials/date

f. shoes with a defined heel (no open toes/sandals, no crocks) pants, blue jean type material, no shorts, no holes, no tears

ATTENDANCE POLICY

You are required to log on weekly to Blackboard and review the week's course material. Additionally, you are required to check your LIT emails weekly.

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

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'

A student is absent if they are not physically in the classroom. An excused absence simply means that the student can make up any missed work.

Three student tardies will be considered one absence. A student is tardy once the instructor has collected roll sheet.

Class attendance and participation is an individual student responsibility. Students taking traditional face-to-face courses are expected to attend class and complete all assignments by stated due dates. Excessive absences and tardies will be dealt with on a case-by-case basis.

DROP POLICY

If you wish to drop a course, you are responsible for initiating and completing the drop process by the specified drop date as listed on the Academic Calendar available on the LIT website otherwise the grade you receive in the course will impact your GPA.

STUDENT EXPECTED TIME REQUIREMENT

For every hour in class (or unit of credit), students should expect to spend at least two to three hours per week studying and completing assignments. For a 3-credit-hour class, students should prepare to allocate approximately six to nine hours per week outside of class in a 16-week session OR approximately twelve to eighteen hours in an 8-week session. Online/Hybrid students should expect to spend at least as much time on this course as in the traditional, face-to-face class.

COURSE CALENDAR

MODULE	TOPIC	READINGS (Due on this Date)	ASSIGNMENTS (Due on this Date)
8/24	CTEC-2545 Orientation Course introduction and policies.		
8/26	DCS graphics and unit overview		
8/31	Common safety terminology with emphasis on PSM		
9/2	Review of Process Equipment and Flows LIT unit start-up		
9/9	Basic permitting overview with emphasis on LOTO		
9/14	LIT unit start-up Troubleshooting of Process equipment		
9/16	Sampling of different process streams and use of lab data for unit adjustments		
9/21	Process Unit shutdown and preparation for turnaround LIT unit shutdown		
9/23	Process Unit start-up after turnaround LIT unit start-up		
9/28	Process unit shutdown from upset scenario LIT unit shutdown		

9/30	Process unit hot restart after upset scenario LIT unit start-up		Homework Due
10/5	**Test 1**		Test 1 in class
10/7	Environmental overview with emphasis on operator responsibility		
10/12	Fired equipment overview		
10/14	Flares and Safety reliefs		
10/19	Storage and product transfers		
10/21	Effects of weather on process units		
10/26	Emergency response		
10/28	LIT unit start-up and shutdown		
11/2	Radio communications		
11/4	Electrical safety		
11/9	**Test 2**		Test 2 in class
11/11	Hazard recognition and housekeeping		
11/16	Written procedures		
11/18	Safety Critical Devices		
11/23	**Test 3**		Test 3 in class
11/30	LIT unit start-up		
12/2	LIT unit shutdown		
12/7	Simulate LIT unit clearing and LOTO for turnaround		
12/7	Tabletop discussion		
12/9	**Test 4**		Test 4 in class
12/9	**Test Final Exam**		Test Final Exam in class

COURSE EVALUATION

Final grades will be calculated according to the following criteria:

Homework	10%
Tests	50%
Final	40%

GRADE SCALE

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

TECHNICAL REQUIREMENTS

The latest technical requirements, including hardware, compatible browsers, operating systems, etc. can be online at https://lit.edu/online-learning/online-learning-minimum-computer-requirements. A functional broadband internet connection, such as DSL, cable, or Wi-Fi is necessary to maximize the use of online technology and resources.

DISABILITIES STATEMENT

The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. LIT provides reasonable accommodations as defined in the Rehabilitation Act of 1973, Section 504 and the Americans with Disabilities Act of 1990, to students with a diagnosed disability. The Special Populations Office are in the Eagles' Nest Room 129 and help foster a supportive and inclusive educational environment by maintaining partnerships with faculty and staff, as well as promoting awareness among all members of the Lamar Institute of Technology community. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409)-951-5708 or email specialpopulations@lit.edu. You may also visit the online resource at Special Populations - Lamar Institute of Technology (lit.edu).

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. Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document.

AI STATEMENT

Lamar Institute of Technology (LIT) recognizes the recent advances in Artificial Intelligence (AI), such as ChatGPT, have changed the landscape of many career disciplines and will impact many students in and out of the classroom. To prepare students for their selected careers, LIT desires to guide students in the ethical use of these technologies and incorporate AI into classroom instruction and assignments appropriately. Appropriate use of these technologies is at the discretion of the instructor. Students are reminded that all submitted work must be their own original work unless otherwise specified. Students should contact their instructor with any questions as to the acceptable use of AI / ChatGPT in their courses.

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.

ADDITIONAL COURSE POLICIES/INFORMATION

Schedule is subject to change due to unforeseen circumstances.