Principles of Industrial Measurement (INTC 1301)

Credit: 3 semester credit hours (3 hours lecture)

Prerequisite/Co-requisite: None required

Course Description

A study of the principles and devices for the measurement of control variables such as temperature, pressure, flow, level, and basic control functions.

Required Textbook and Materials

1. Process Technology-Equipment and systems Fourth Edition by Charles E. Thomas
    a. ISBN number is 9781285444581
2. Notebook

Course Objectives

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

1. Apply the principles of process instruments and devices.
2. Describe the control loop as applied to control detection of pressure, temperature, level and flow.
3. Understand the calibration of measurement instruments.
4. Demonstrate safety procedures.

Course Outline

A. Introduction
    1. Introduction of faculty and students
    2. Review Syllabus
    3. Review Class Policies
    4. Review Lab Assignment
B. Introduction to Compressors
    1. Compressor applications and Class
    2. Types of compressors
    3. Supporting equipment in a compressor system
    4. Startup, Shutdown, and Troubleshooting of Systems
C. Heat Exchangers
    1. Types of Heat Exchangers
    2. Heat transfer and fluid flow
    3. Shell and tube heat exchangers
    4. Reboilers
    5. Plate and frame heat exchangers
    6. Heat exchanger symbols
D. Cooling Towers
    1. Applications and theory of operation of cooling towers
    2. Basic components of a cooling tower
    3. Cooling tower classification
    4. Cooling tower symbols
E. Boilers
    1. Boiler applications and operation
    2. Types of Boilers
    3. Main components of boilers
    4. Boiler operation
    5. Steam system symbols
F. Furnaces
    1. Furnace applications and operation
    2. Components of a furnace
    3. Furnace types
    4. Common furnace problems and solutions
    5. Furnace symbols

Approved mm/yyyy

G. Utility Systems
    1. Introduction to Process Systems
    2. Raw Water and Fire Water System
    3. Boiler Feed Water System
    4. Types of Cooling Systems
    5. Relief and Flare Systems
    6. Storage Systems
H. Reactor Systems
    1. Introduction to Reactions
    2. Types of Reactors
    3. Reaction Furnaces
    4. General Reactor Design
    5. Considerations
I. Distillation Systems
    1. Overview of Distillation Systems
    2. Distillation Examples
    3. Plate Columns
    4. Packed Columns
    5. Plate Distillation System
    6. Troubleshooting Distillation system

Grade Scale

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

Course Requirements

1. The student will take class notes
2. The student will take quizzes given
3. The student will complete homework as assigned
4. The student will take unit tests
5. The student will take a Final Exam

Attendance Policy

1. Missing more than 20% of classes will result in an automatic "F" for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

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.

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.

Course Schedule

Week	Topic	Reference
1	Course introduction, and policies and Compressors • Lecture: • Chapter exercises and worksheets	Chapter 5 Handouts
2	Compressors and Heat exchangers • Lecture: • Chapter exercises and worksheets	Chapter 5&7
3/4	Heat Exchangers • Lecture: • Review chapter 5 & 7 • Test 1	Chapter 7
5/6	Cooling Towers • Lecture • Chapter exercises and worksheets	Chapter 8
7/8	Boilers • Lecture: • Chapter exercises and worksheets • Review chapters 8 & 9 • Test 2	Chapter 9
9/10	Furnaces • Lecture: • Chapter Exercises and worksheets	Chapter 10
11/12	Utility Systems • Lecture: • Chapter Exercises and worksheets • Review chapters 10 & 13 • Test 3	Chapters 13
13	Reactor Systems • Lecture: • Chapter Exercises and worksheets	Chapter 14
14/15/16	Distillation Systems • Lecture: • Chapter Exercises and worksheets • Test 4	Chapter 15

	• Review for Final