Principles of Industrial Measurement (INTC1301)

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 Second Edition by Charles E. Thomas
    a. ISBN number is 9781418030674
2. Notebook

Course Objectives

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

1. Apply the principles of process instruments and devices. (SCANS C5.4, C6.4, C7.4, C19.4, F1.4, F2.2, F4.3, F5.4, F6.3, F9.4, F11.3, F12.4, F15.4)
2. Describe the control loop as applied to control detection of pressure, temperature, level and flow. (SCANS C5.4, C6.4, C7.4, C19.4, F1.4, F2.2, F4.3, F5.4, F6.3, F9.4, F11.3, F12.4, F15.4)
3. Understand the calibration of measurement instruments. (SCANS C5.4, C6.4, C7.4, C19.4, F1.4, F2.2, F4.3, F5.3, F6.3, F9.4, F11.3, F12.4, F15.4)
4. Demonstrate safety procedures. (SCANS C5.4, C6.4, C7.4, C19.4, F1.4, F2.4, F5.4, F6.3, F8.3, F9.4, F11.3, F12.4, F15.4)

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. 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

Approved mm/yyyy

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

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 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 Evaluation

Final grades will be calculated according to the following criteria:

Activity	***Percentage***
Homework/Labs	10%
Quizzes	10%
Major Test	50%
Final	30%

Late Penalties will be assessed on all work turned in late. 5 points per day

Course Requirements

1. The student will take class notes
2. The student will take Quizes 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.

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
4. Headphones may be worn only upon Instructor approval
5. Do not bring children to class.
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 from expulsion from LIT.
7. 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.

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 and Compressors	Chapter 5

	• Lecture: • Chapter exercises and worksheets	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 • Review for Final	Chapter 15

Contact Information:

INTC 1301
Course Syllabi

Instructor:	Mr. Edgar Neely
Office:	Building: T1 Room: 109
Telephone:	(409) 839-2057
E-mail:	**edgar.neely@lit.edu**
Office Hours:	12:30 pm – 4:30 pm M & W
	8:50 am – 10:50 am Friday