



Process Troubleshooting (PTAC 2446)

Credit: 4 semester credit hours (3 hours lecture, 3 hours lab)

Prerequisites: PTAC 2438

Course Description

Instruction in the different types of troubleshooting techniques, procedures, and methods used to solve process problems.

Required Textbook and Materials

1. *Instruction will supply the information needed for this class.*

Course Objectives

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

1. Collect data and identify techniques for troubleshooting.
2. Utilize applicable troubleshooting methods to solve process problems.
3. Equipment requirements for the LIT Unit
4. Equipment (FRC, hardhat, safety glasses available in the labs by LIT)
 - a. fire retardant clothing
 - b. hardhat
 - c. safety glasses
 - d. ear plugs
 - e. gloves YOU are required to provide if needed!
 - f. shoes (no open toes/sandals)
- I. Normal blue jeans like material, NO SHORTS, NO HOLES, NO TEARS, NO NOTHING
5. Failure not to wear proper safety equipment will get you expelled from the UNIT IMMEDIATELY and you will be counted absent for the day.
6. ZERO Tolerance. SAFETY ABOVE ALL ELSE!

Course Outline

7. Introduction
 - Introduction of faculty and students
 - Review Syllabus
 - Review Class Policies
 - Review Lab Policies
8. Basic Column flow
 - Must be able to draw Basic Column Flows from memory for interview purposes
 - Must be able to explain what each piece of equipment used in the makeup of the Basic Column Flows that has to do with process operations
9. Preparation for Process Troubleshooting
 - Introduction to valves used in the process industry

PTAC 2446
Course Syllabi

- Process Control Loop using the types of valves
- Breakdown of a control valve parts (Final Control Element)
- Placing control loop on bypass
- Process Variables used in the Basic Column Flows
- Process Instrument Controllers (Faceplate on DCS)
- Process Instruments and Controllers

10. Troubleshooting Temperature Process Variable

- Loss of heat on reboiler, cause, effects and troubleshoot to fix the cause
- Thermocouple, Resistance Temperature Detector (RTD), Thermometer
- Temperature symbols, such as TRC, TIC, TC
- Introduction to P&ID on LIT Glycol/Water Unit
- Reading instrumentation on P&ID's
- Programmable Logic Controller (PLC) Trips
- Cooling Tower Temperature Control

11. Troubleshooting Pressure Process Variable

- Introduction to Process variable control loop
- Different types of pressure relief systems
- Pressure symbols such as PI, PT, PC
- Hand Off Automatic (HOA) switches
- Pressure Regulators
- Green Sea Pot
- PLC Trips

12. Troubleshooting Level Process Variable

- Introduction to Level Process Variable
- Level symbols such as LI, LRC, LC
- How to read sight glasses on vessels
- How to confirm a plug on a bridle leg on a sight glass
- How to remove the plug from the sight glass bridle leg
- Interface Level
- Water boots
- PLC trips

13. Troubleshooting Flow Process Variables

- Introduction to differential pressure Transmitters (capsule)
- Flow orifice, restrictive flow orifice and Minimum Flow
- Annubar
- Micromotion Meter
- Kickback control valves
- Azeotrope flows
- Flow symbols such as FIC, FRC, FC
- Low flow shutdown on pumps
- Small class on Centrifugal Pump information with flow process variable intent
- Rotor Meter flows

14. Troubleshooting a Decanter Process

- Introduction and Performance Objectives of Decanter Systems
- Decanter System Description
- Factors that Affect a Decanter System
- Decanter System Operation
- Decanter System Equipment and Instrument Lists
- Normal Decanter System Conditions
- Troubleshooting a Decanter System

15. Troubleshooting a Reaction Process

- Introduction and Performance Objectives of Reaction Systems
- Reaction System Description
- Factors that Affect a Reaction System
- Reaction System Operation
- Reaction System Equipment and Instrument Lists
- Normal Reaction System Conditions
- Troubleshooting a Reaction System

16. Troubleshooting a Distillation Process

- Introduction and Performance Objectives of a Distillation Process
- Distillation Process Description
- Factors that Affect a Distillation Process
- Distillation Process Operation
- Distillation Process Equipment and Instrument Lists
- Normal Distillation Process Conditions
- Troubleshooting a Distillation Process

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:

<i>Activity</i>	<i>Percentage</i>
Quizzes	20%
Exams	80%

Course Requirements

- Learn and apply the tools, steps, and methods for Process Troubleshooting.
- Operate, equipment and instrumentation, normal data, and factor associated with a Temperature Process Variable.
- Operate, objectives, equipment and instrumentation, normal data, and factor associated with a Pressure Process Variable.
- Operate, objectives, equipment and instrumentation, normal data, and factor associated with a Level Process Variable.
- Operate, objectives, equipment and instrumentation, normal data, and factor associated with a Flow Process Variable.
- Operate, objectives, equipment and instrumentation, normal data, and factor associated with a Decanter System.
- Operate, objectives, equipment and instrumentation, normal data, and factor associated with a Reactor System.

Attendance Policy

1. Missing more than 20% of classes will result in an automatic “F” for the course...
Summer classes 4 days MAXIMUM, Spring and fall semesters 7 days MAXIMUM
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 45 minutes of a class period will count as an absence.
4. **Leaving class without the Instructor knowledge counts as 1 absence**
5. Being tardy 2 times equals 1 absence.

Course Policies

1. No food, drinks, or use of tobacco products in class.
2. No LAPTOPS. No activity on cell phones during class, no visible headphones,

and all other electronic devices must be turned off while in class. No recording devices allowed without approval from instructor.

3. Do not bring children to class.
4. 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. It is the students responsibility to notify instructor of absence in writing by email.
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 in expulsion from LIT.
6. 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.
7. No make-up for missed quizzes.

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

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