

Industrial Troubleshooting (INMT 2345)



Credit: 3 semester credit hours (2 hours lecture, 4 hours lab)

Prerequisite/Co-requisite: CNSE 1371

Course Description

An advanced study of the techniques used in troubleshooting various types of industrial equipment to include mechanical, electrical, hydraulic, and pneumatic systems and their control devices. Emphasis will be placed on the use of schematics and diagrams in conjunction with proper troubleshooting procedures.

Required Textbook and Materials

1. *Audel Mechanics & Millwrights Guide* by Davis & Nelson 5th
2. ISBN number is 0-7645-4171-4
3. Equipment to be furnished by students:
 - a. Hard Hat (red)
 - b. Hearing protection (Ear plugs or Muffs)
 - c. Fire retardant clothing (Nomex or equal)
 - d. Safety Glasses (Z87+)
 - e. Gloves (leather or equal)
 - f. Shoes or Boots (substantial leather or equal w/heels- no open toes)

Course Objectives

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

1. Demonstrate a working knowledge of various troubleshooting techniques
2. Properly troubleshoot hydraulic, pneumatic, and electrical systems using schematics and diagrams
3. Troubleshoot mechanical drive systems

Course Outline

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|---|--|
| I. Troubleshooting techniques and safety | C. Complete exercises on hydraulics |
| A. Techniques of troubleshooting | III. Pneumatics and safety |
| B. Discuss the safety required when troubleshooting equipment | A. Discuss what Pneumatic forces are |
| II. Hydraulics and safety | B. Discuss the dangers of Pneumatics |
| A. Discuss what Hydraulic forces are | C. Complete exercises on Pneumatics |
| B. Discuss the dangers of hydraulics | IV. Electrical systems and safety |
| | A. Discuss the types of Electrical Systems |

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INMT 2345
Course Syllabus

- B. Discuss the dangers in each system
- C. Complete exercises in electrical systems
- V. Electrical schematics
 - A. Discuss and Identify what schematics are
 - B. Demo the use of a schematic
 - C. Read and follow a schematic
- VI. Gears and safety
 - A. Discuss the use of Gears
 - B. Discuss the dangers of gears
 - C. Complete exercises on Gears
- VII. V-belt drives and safety
 - A. Discuss what V-belt drives are
 - B. Discuss the dangers of V-Belts
 - C. Complete exercises on V-Belts
- VIII. Flat belts and safety
 - A. Discuss what and how Flat belts work
 - B. Discuss the dangers of Flat belt
- IX. Pulleys and safety
 - A. Discuss what pulleys are and do
 - B. Discuss the dangers of Pulleys
 - C. Complete exercises on Pulleys
- X. Chain drives and safety
 - A. Discuss what chain drives are and how they work
 - B. Discuss the dangers of chain and sprocket drives
 - C. Complete exercises on Chain Drives
- XI. Couplings and safety
 - A. Discuss what couplings are and how they are used.
 - B. Discuss the dangers of using couplings
 - C. Complete exercises on Couplings

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>
Major test	75%
Class participation	25%
<i>Total</i>	<i>100%</i>

Course Requirements

1. AAS Degree Graduates must pass the NCCER Rigging Fundamentals Exam during this course for Graduation.
2. Developing Troubleshooting techniques
3. Practicing safety and Lock out / tag out

4. Practice the principles of preventive and predictive maintenance

Attendance Policy

1. Students in a 2 day class are allowed 2 unexcused absences.
2. An absence, excused or unexcused is counted 6 points off the final grade.
3. More than 2 unexcused absences can result in an “F” in the course.
4. Being tardy 3 times equals 1 absence. (2 points each)
5. Students in a 1 day class are allowed 1 unexcused absence.(12 points off the final grade)

Course Policies

1. **Students must possess and present LIT ID to attend class.**
2. No food, drinks, or use of tobacco products in class.
3. No foul or harsh language will be tolerated
4. Turn off all Cell Phones during lectures
5. Headphones may be worn only upon Instructor approval
6. Do not bring children to class.
7. 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.
8. 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.
9. Proper Dress. **Any intentional display of undergarments will not be tolerated and can result in the student being removed from the class. Pants will be worn belted at the waist as to allow the student to walk, climb, stoop and bend as required.** It is the student’s responsibility to dress for work as if in an industrial environment, long pants, shirts with sleeves, substantial footwear (full leather shoes or boots with heels, composition oil resistant soles, no sandals, flip flops, cloth shoes). Safety glasses and hard hats will be necessary as the class requires.
10. 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.

- f. Student usage of the internet will be monitored.
- g. Proper usage of the internet will be allowed. Used for classroom research or as directed.

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 <ul style="list-style-type: none">• Lecture• Lab: Practice	Handouts
2	Introduction to Troubleshooting <ul style="list-style-type: none">• Lecture• Lab: Practice• Test 1	Chapter 1
3	The Basic Toolbox <ul style="list-style-type: none">• Lecture• Lab: Practice	Chapter 3
4	Using Power Tools <ul style="list-style-type: none">• Lecture• Lab: Practice• Test 2	Chapter 4/5
5	Machinery and Equipment Inspection <ul style="list-style-type: none">• Lecture• Lab: Practice• Test 3	Chapter 9
6-8	Understanding Bearings <ul style="list-style-type: none">• Lecture• Lab: Practice• Test 4	Chapter 10
9/10	Application of Belts <ul style="list-style-type: none">• Lecture• Lab: Practice• Test 5	Chapters 13/14
11	Application of Chain Drives <ul style="list-style-type: none">• Lecture	Chapter 15

INMT 2345
Course Syllabus

Week	Topic	Reference
	<ul style="list-style-type: none">• Lab: Practice• Test 6	
12	Application of Gears <ul style="list-style-type: none">• Lecture• Lab: Practice• Test 7	Chapter16
13-16	Troubleshooting Mechanical Drives <ul style="list-style-type: none">• Lecture• Lab: Practice• Final Exam	

Contact Information:

Instructor: Mr. William C. (Bill) Holton
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Office Hours: 10:30 am -2:30 pm M-F