

El Paso Community College

Syllabus

Part II

Official Course Description

SUBJECT AREA	<u>Industrial Manufacturing</u>
COURSE RUBRIC AND NUMBER	<u>INMT 2345</u>
COURSE TITLE	<u>Industrial Troubleshooting</u>
COURSE CREDIT HOURS	<u>3 2 :</u> Credits Lec Lab

I. Catalog 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. **(2:2). Lab fee.**

II. Course Objectives

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

A. Safety

1. Demonstrate safety principles in the workplace, including lock-out/tag-out and hazardous materials handling.
2. Perform safety and environmental assessments.
3. Identify unsafe conditions and take corrective action.
4. Suggest processes and procedures that support safety of work environment.
5. Fulfill safety and health requirements for maintenance, installation and repair.
6. Monitor safe equipment and operator performance.
7. Utilize effective, safety-enhancing workplace practices.

B. Troubleshooting Process

1. Study the introduction to troubleshooting.
2. Discuss troubleshooting techniques.
3. Identify aids to troubleshooting.
4. Utilize schematics and diagrams.
5. Examine and solve mechanical and electrical problems.

C. Mechanical Troubleshooting

1. Define the terms associated with fasteners, including threads, and taps and dies.
2. Explain mechanical power transmission, including belts and sheaves, chains and sprockets, and gears and gearboxes.
3. Examine bearing installation and removal as well as bearing failures, and demonstrate the usage of bearing pullers and vibration meter.
4. Discuss the fundamentals of coupled shaft alignment, and demonstrate how to correctly use the dial indicator, dial caliper, feeler gauge, and laser shaft alignment.

5. Explain basic terms that are used when referring to lubrication.
 6. Monitor indicators to ensure correct operations.
- D. Electrical Troubleshooting
1. Explain electrical measurements in series and parallel circuits when there is an open or short circuit.
 2. Examine test equipment, including digital multimeter, clamp-on ammeter, and megohmmeter.
 3. Demonstrate how to properly replace electrical components such as motor starters, control relays, and different input and output devices including proximity switches.
 4. Demonstrate how to use the infrared camera to troubleshoot electrical systems.
- E. Fluid Power Troubleshooting
1. Explain different troubleshooting techniques.
 2. Identify what causes heat and leakage, and explain the damaging effects.
 3. Discuss contamination in a hydraulic system, and the importance of good preventive maintenance routines.
 4. Examine component faults such as pumps, actuators, relief valves, flow control, and pilot operated directional control valves.
 5. Discuss some of the common problems that may be encountered while troubleshooting a pump and a compressor.
 6. Explain the proper installation of 120 VAC and 24 VDC solenoid valves.

III. THECB Learning Outcomes (WECM)

Upon successful completion of this course, students will:

1. Demonstrate various troubleshooting techniques.
2. Troubleshoot hydraulic and pneumatic systems.
3. Troubleshoot electrical mechanical drive systems using schematics and diagrams.

IV. Evaluation

Students must demonstrate the knowledge and skills stated in the objectives in order to complete the course. Exams, quizzes, and lab assignments will be determined by the instructor.

The final grade report will be based on the percentage of the total points earned.

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

Students should be able to compute their grade average anytime during the course. Missed assignments and make-up tests will be given at the discretion of the instructor.

V. Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6-Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit, and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.

VII. Title IX and Sex Discrimination

Title 9 (20 U.S.C. 1681 & 34 C.F.R. Part 106) states the following "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any educational program or activity receiving Federal financial assistance." The Violence Against Women Act (VAWA) prohibits stalking, date violence, sexual violence, and domestic violence for all students, employees and visitors (male and female). If you have any concerns related to discrimination, harassment, or assault (of any type) you can contact the Assistant to the Vice President for Student and Enrollment Services at 915-831-2655. Employees can call the Manager of Employee Relations at 915-831-6458. Reports of sexual assault/violence may also be reported to EPCC Police at 915-831-2200.