

ISET-1320: FUNDAMENTALS OF FLUID POWER

Cuyahoga Community College

Viewing: ISET-1320 : Fundamentals of Fluid Power

Board of Trustees:

2006-05-25

Academic Term:

Fall 2018

Subject Code

ISET - Integrated Systems Engineering

Course Number:

1320

Title:

Fundamentals of Fluid Power

Catalog Description:

Principles of power transmission are presented and contrasted with other means of transmission. Includes laws and principles of fluid power transmission, units of pressure and flow, plumbing materials and sizing, pressure losses through piping, and the uses of vacuum and vacuum applications. Extensive guided instruction and practice provided.

Credit Hour(s):

2

Lecture Hour(s):

1

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

ISET-1300 Mechanical/Electrical Print Reading.

Outcomes

Course Outcome(s):

A. Install, maintain & repair hydraulic and pneumatic systems.

Objective(s):

1. Apply hydraulic power principles.
2. Identify types of valves.
3. Interpret schematic, symbols, and drawings.
4. Apply circuit design.
5. Identify and apply pressure relief valves.
6. Recognize and apply 3 way, 4 way, and 5 way valves.
7. Calculate volume and pressure.
8. Apply Pascal and Bernoulli's laws defining fluid and pneumatic power.
9. Calculate volume, pressure, and loss.
10. Identify proper plumbing materials.
11. Identify fluid power cylinders.
12. Identify proper cylinder applications.
13. Calculate cylinder size for pressure applications.
14. Recognize and apply control valves.

Course Outcome(s):

C. Select appropriate hydraulic fluids for various applications.

Objective(s):

1. 1. Identify types of fluids that are flammable or not.
 2. 2. Apply petroleum base fluids.
 3. 3. Apply bio-degradable
 4. 4. Identify synthetic fluids.
 5. 5. Identify contaminants and repercussions from contaminants.
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Course Outcome(s):

- D. Select, install and repair pump for fluid systems.

Objective(s):

1. 1. Calculate air compressors load (power calculation)
 2. 2. Recognize displacement pumps.
 3. 3. Identify proper pump applications.
 4. 4. Explain mounting, alignment, and coupling.
 5. 5. Apply filtering components to circuits.
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Course Outcome(s):

- E. Apply troubleshooting procedures.

Objective(s):

1. 1. Interpret control circuit diagrams.
 2. 2. Identify improper pump operations (rotation, cavitations, unloading).
 3. 3. Recognize and test for pump and circuitry leakage.
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Course Outcome(s):

- F. Comply with OSHA safety standards for installing, maintaining, and repairing hydraulic pneumatic systems.

Objective(s):

1. 1. Employ lock-out/tag-out.
 2. 2. Identify safety procedures.
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Methods of Evaluation:

1. Completion of homework assignment.
2. Written quizzes covering homework and in class demonstrations.
3. Class discussion participation.
4. Demonstration of application of theories and methods.
5. Final exam.

Course Content Outline:

1. CONCEPTS
 - a. Safe operating procedures
 - b. Pascal's Law
 - c. Bernoulli Law
 - d. Characteristics of fluid
 - e. Fluid power principles
 - f. Electric motors
 - g. Control circuits (electric, fluid, and air)
 - h. Cylinder types and applications for fluid and air
 - i. Valve types and applications
 - j. Pump types and applications
 - k. Pump nomenclature
 - l. Hydraulic circuits
 - m. Flowcharts
 - n. Plumbing materials and applications
 - o. Hand Tools
 - p. Mechanical drives

- q. Pump impellers
 - r. Instrumentation
 - s. Installations
 - t. Troubleshooting
 - u. Print reading
2. SKILLS
- a. Safe handling of hydraulic fluids
 - b. Create troubleshooting Flowchart
 - c. Install, test, repair piping systems
 - d. Mount and align pumps
 - e. Calculate cylinder size and pressure
 - f. Calculate compressor loads
 - g. Interpret fluid systems drawings and schematics
 - h. Troubleshooting (fundamentals)
 - i. Reliability Centered Maintenance Applications
 - j. Component applications
 - k. Customer Service
3. ISSUES
- a. Relate theory to practical applications
 - b. Identifying quality manufactures
 - c. Industry Networking
 - d. Communication
 - e. Reading control circuit diagrams

Resources

Charles S. Hedges, ed. *Industrial Fluid Power*. 3rd ed. Womack Educational Publishing, Dallas, TX, 2002.

Green, Denis and Gosse, Jonathan F. *Industrial Maintenance*. 2nd ed. American Technical Publishers, Homewood, Ill., 2000.

Esposito, Anthony. *Fluid Power with Applications*. 6th. Prentice Hall, Upper Saddle, New Jersey, 2003.

Resources Other

1. Amatrol Software

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