

ISET-2230: FLUID POWER AND CONTROL SYSTEMS

Cuyahoga Community College

Viewing: ISET-2230 : Fluid Power and Control Systems

Board of Trustees:

May 2026

Academic Term:

Fall 2026

Subject Code

ISET - Integrated Systems Engineering

Course Number:

2230

Title:

Fluid Power and Control Systems

Catalog Description:

Provides a comprehensive introduction to the principles, components, and applications of fluid power systems, with a strong emphasis on the integration of hydraulic, pneumatic, and electrical controls. Comprehend how to read, interpret, and create industry-standard circuit schematics for both fluid and electrical systems. Hydraulic pumps, actuators, and control valves, as well as the fundamentals of pressure, flow, and fluid maintenance are explained. Culmination in practical, hands-on projects that design, build, and troubleshoot complex electro-fluid power circuits to solve real-world automation tasks.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

ISET-2200 Motor Controls

Outcomes

Course Outcome(s):

Analyze foundational fluid power concepts.

Objective(s):

1. Identify and explain the function of fundamental fluid power components, including pumps, valves, and actuators.
2. Explain the principles of pressure, flow, and fluid maintenance, and their impact on system performance.
3. Apply foundational formulas to calculate force, area, and pressure in hydraulic circuits.

Course Outcome(s):

Develop fluid power and electrical schematics.

Objective(s):

1. Interpret industry-standard schematic symbols for hydraulic, pneumatic, and electrical components.
2. Create functional fluid power circuit schematics for a variety of tasks.
3. Develop electrical control schematics using relay logic to operate fluid power systems.

Course Outcome(s):

Construct practical fluid power circuits.

Objective(s):

1. Construct basic hydraulic and pneumatic circuits on a training unit based on schematic diagrams.
 2. Test the operational integrity of constructed circuits using pressure gauges and flowmeters.
 3. Troubleshoot common faults and inefficiencies in fluid power circuits by applying diagnostic procedures.
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Course Outcome(s):

Design integrated electro-fluid power systems.

Objective(s):

1. Design and simulate complex electro-fluid power systems.
 2. Integrate electrical control logic with fluid power components to solve specific automation problems.
 3. Demonstrate the successful creation and operation of several complex projects given only a sequence of operation, showcasing the ability to design, and build a complete fluid power system.
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Methods of Evaluation:

Homework

Labs

Quiz

Tests

Final Lab

Final Exam

Course Content Outline:

Fluid Power System Principles

Hydraulic System Fundamentals

Pumps

Actuators

Directional Control Valves

Flow Control

Pneumatic Systems

Pressure Control

Hydraulic Fluid maintenance

Pneumatic System Fluid Fundamentals

Pneumatic System Compression and Control

Pneumatic System Conditioning

Hydraulic Speed Control

Pressure Control Circuits

Electro Pneumatic Control

Electrical Control Systems

Electro-Fluid power circuits

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen

(14) days after the first day of instruction. Please submit requests for accommodations at this link: [https://portal2.tri-c.edu/ReligiousAccommodation/Religious Accommodation Form](https://portal2.tri-c.edu/ReligiousAccommodation/ReligiousAccommodationForm). Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

<https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf>

Weekly Schedule

	Topics
Week 1	Analyze Foundational Fluid Power Concepts
Week 2	Analyze Foundational Fluid Power Concepts
Week 3	Analyze Foundational Fluid Power Concepts
Week 4	Analyze Foundational Fluid Power Concepts
Week 5	Develop Fluid Power and Electrical Schematics
Week 6	Develop Fluid Power and Electrical Schematics
Week 7	Develop Fluid Power and Electrical Schematics
Week 8	Develop Fluid Power and Electrical Schematics
Week 9	Construct Practical Fluid Power Circuits
Week 10	Construct Practical Fluid Power Circuits
Week 11	Construct Practical Fluid Power Circuits
Week 12	Construct Practical Fluid Power Circuits
Week 13	Design Integrated Electro-Fluid Power Systems
Week 14	Design Integrated Electro-Fluid Power Systems
Week 15	Design Integrated Electro-Fluid Power Systems
Week 16	Design Integrated Electro-Fluid Power Systems

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings

Patrick J. Kettle. *Fluid Power Systems*.

Resources for the Instructor

Patrick J. Kettle. *Fluid Power Systems*. 3rd. Orlando Park Il: American Technical Publishers, 2024.

James R. Daines. *Fluid Power*. 2nd. Tinely Park Il: Goodheart and Wilcox, 2024.

James L. Johnson. *Introduction to Fluid power*. 1st. Independence Ky: Cengage, 2024.

Galal Rable. *Fluid Power*. 1st. Columbus Oh: Mcgraw Hill, 2020.

Anthony Esposito. *Fluid Power with Applications*. 7th. London Eng: Pearson, 2022.
