

Course Code: MFX 151

Course Title: Basic Hydraulics II

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 47.0303

Repeatability: 0

Credit Hours

Catalog Notation: 0.5-1-1

Credit Hour Distribution:

Lecture: 0.5

Lab: 1

Clinical: 0

Total: 1

General Course Information

Catalog Description

Introduction to hydraulic power use and application; development of skills and knowledge needed to apply hydraulics in modern industry. Key topics and skills in how to connect hydraulic circuits, hydraulic cylinders and valves (including needle valves), and a wide array of hydraulic applications.

General Course Objectives

Students develop skills and knowledge needed to apply hydraulics in modern industry.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement into CCS 098	Placement into MAT 059

Prerequisites

None

Methods of Evaluation

5 quizzes.

Instructional Materials and Additional Supplies

Amatrol Course Code

Course Content

General Learning Outcomes (GLOs)

- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Absolute vs. Gauge Pressure	1. Describe two methods of representing hydraulic pressure. 2. Convert between absolute pressure and gauge hydraulic pressure. 3. Describe how oil flows on the suction side of the pump.	0.5	1	0
Relief Valves	1. Describe the function of a relief valve and give an application. 2. Describe the operation of a direct-acting relief valve and give its schematic symbol. 3. Describe how a relief valve is used for system protection. 4. Connect a relief valve in a circuit to limit pressure in the system. 5. Describe how a relief valve is used for speed control assistance.	0.5	1	0
Check Valves	1. Describe the function of a check valve and give an application. 2. Describe the operation of three types of check valves and give their schematic symbol. 3. Design a circuit to provide bypass flow.	0.5	1	0
Flow Control Valves	1. Describe the function of the flow control valve and give an application. 2. Describe the operation of a flow control valve and give its schematic symbol. 3. Connect and adjust a flow control valve to control speed of an actuator. 4. Describe the effect of actuator load changes on flow control valve operation.	0.5	1	0
Meter-In and Meter-Out Circuits	1. Describe the operation of a meter-in flow control circuit and give an application. 2. Connect and operate a meter-in flow control circuit. 3. Describe the operation of a meter-out flow control circuit and give an application. 4. Connect and operate a meter-out flow control circuit.	0.5	1	0
Flow Control Circuit Design	1. Define independent speed control and give an application. 2. Design an independent speed control circuit. 3. Explain how speed control valves can be used to provide multiple speeds. 4. Design a two-speed actuator circuit.	0.5	1	0
Flow Rate vs. Cylinder Speed	1. Describe how to calculate the extend speed of a hydraulic cylinder. 2. Calculate the extend speed of a hydraulic cylinder given its size and a flow rate. 3. Describe how to calculate the retract speed of a cylinder. 4. Calculate the retract speed of a cylinder given its size and a flow rate. 5. Describe how to calculate the stroke time of a cylinder. 6. Calculate the cylinder stroke time given its size and a flow rate.	0.5	1	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Sequence Valves	1. Describe the function of a pressure sequence valve and give an application. 2. Describe the operation of a sequence valve and give its schematic symbol. 3. Connect and adjust the pressure setting of a sequence valve. 4. Connect and operate a pressure sequence circuit.	0.5	2	0
Sequence Valve Applications	1. Describe the function of a bypass check valve in a sequence valve circuit. 2. Describe the operation of an integral check valve and give its schematic symbol. 3. Design a pressure sequence circuit. 4. Describe the function of a two-sequence valve control circuit. 5. Design a two-sequence valve control circuit. 6. Explain why a sequence valve is externally drained.	1.5	2	0
Pressure Reducing Valves	1. Describe the function of a pressure reducing valve and give an application. 2. Describe the operation of a PRV and give its schematic symbol. 3. Connect and adjust the pressure setting of a PRV. 4. Connect and operate a reduced pressure circuit.	1	2	0
PRV Applications	1. Describe the function of a PRV's bypass check valve. 2. Design a hydraulic circuit that uses a pressure reducing valve. 3. Explain why a PRV is externally drained.	1	2	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
7.5	15	0