

Course Information Form (CIF)

Course Code: PFT 215

Course Title: Pneumatic Controls and Hydraulics

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 46.0503

Repeatability: 0

Credit Hours

Catalog Notation: 2-3-3

Credit Hour Distribution:

Lecture: 2

Lab: 3

Clinical: 0

Total: 3

General Course Information

Catalog Description

Operation, application, installation, and servicing of pneumatic controls. Hydronic systems theory, installation, and equipment. Thermostats and master/submaster controls.

General Course Objectives

Students will be able to properly and safely install and service hydronic and pneumatic systems.

Minimum Placement Levels

English	Reading	Math
None	None	None

Prerequisites

Admission into the Plumbers and Pipefitters Apprenticeship program

Methods of Evaluation

The minimum evaluation methods include 3 written and 4 practical exams.

Instructional Materials and Additional Supplies

Pneumatic Controls, International Pipe Trades Joint Training Committee (IPTJTC), Inc., 2006.

Hydronic Heating and Cooling, International Pipe Trades Joint Training Committee, 2000.

Course Content

General Learning Outcomes (GLOs)

- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Introduction: a) Definition of Terms and b) Components of System	1. List the components of pneumatic control systems and the usual source of energy for them.	3	1	0
Controlled Devices: a) Automatic Valves, b) Automatic Dampers, and c) Automatic Actuator Operation	1. Describe the operation and function of different controlled devices.	3	1	0
Controllers: a) Measuring Devices, b) Controlling Elements, and c) Classification of Controllers	1. Name the two main elements of a controller; describe their function and operation.	2	1	0
Auxiliary Devices: a) Electric-pneumatic Relays, b) Pneumatic- electric Relays, and c) Pneumatic Relays	1. Identify three types of auxiliary devices; describe their operation.	2	1	0
Thermostats: a) Day- night Thermostats and b) Heating-cooling Thermostats	1. Compare and contrast the use and operation of the day-night and heating-cooling thermostats.	2	1	0
Master-submaster: a) Throttling Range, b) Direct Reset, and c) Reverse Reset	1. Describe the application and operation of master-submaster controls.	2	3	0
Transmitters and Receiver-controllers: a) Controlling Instruments and b) Sensing Devices	1. Describe the application and operation of the dual input receiver-controller.	2	2	0
Control Variables: a) Ventilation Control, b) Heating Control, c) Cooling Control, and d) Humidity Control	1. Review the application and operation of damper, heating coil, cooling, and humidity controls.	2	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Variable Air Volume: a) Terminal Units, b) Vortex Fan, and c) Static Pressure	1. Explain why variable air volume systems are used and their operation.	2	2	0
Year-around Air Conditioning: a) Single Zone Control Sequence, b) Multizone Control Sequence, and c) Auto Changeover	1. Describe the components and functions of a total air conditioning control system.	2	3	0
Installation and Service: a) Materials and Tools and b) Procedures	1. Apply tools and procedures to installation and service problems on total pneumatic systems.	2	6	0
Instrumentation: a) Introduction, b) Tubing Types, c) Tubing Installation, d) Measuring Instruments, e) Speed and Position Transmitters, f) Automatic Controllers, g) Pneumatic Controls, h) Fluid Controls, i) Electronic Controls, and j) Control Valve Accessories	1. Choose the appropriate tubing type based on environmental factors, effect of sunlight, exposure to corrosive material, and vibration. 2. Properly install instrument lines and associated equipment. 3. Measure pressure, flow, liquid level, density, temperature, or humidity using the appropriate instruments. 4. Explain the purpose of the position transmitter.	2	15	0
Conduit: a) Tools and Materials, b) Layout and Routing, and c) Lab - Bending	1. Explain routing, bending, and support requirements for installation of electrical metallic tubing conduit.	2	3	0
Hydronic Heating Systems: a) Theory and Installation, b) Equipment, c) Types of Systems, d) Controls, and e) Air	1. Explain hydronic heating systems: theory, installation, equipment control, and air.	2	3	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	45	0