# APPT 175: DIRECT DIGITAL CONTROLS I

# **Foothill College Course Outline of Record**

Heading	Value
Effective Term:	Summer 2024
Units:	4.5
Hours:	36 lecture, 63 laboratory per quarter (99 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Refrigeration & Air Conditioning Mechanical Service Apprenticeship Program.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

### **Student Learning Outcomes**

· A student will be able to identify electric/pneumatic controls.

### Description

Third-year course of the Refrigeration and Air Conditioning Apprenticeship program. This course provides students with a working knowledge of controls, control theory, timing circuits, computerized control, and energy management systems.

# **Course Objectives**

The student will be able to:

- 1. Explain control theories
- 2. Recognize and classify electric/pneumatic controls
- 3. Recognize and explain energy management systems

## **Course Content**

- 1. Pneumatics/controls theory
  - a. Electric controls
    - i. 2-position
    - ii. Timed 2-position
    - iii. Floating
    - iv. Modulation
- 2. Electric controls
  - a. DDC
  - b. Computerized control
- 3. Energy management systems
  - a. Title 24 compliance
  - b. Energy efficiency

# Lab Content

Students will work individually and in teams on controls, timing circuits and building air handling systems in the lab, which includes:

- 1. Installation practices with tubing, tubing sizing, control tube soldering, and tube bending
- 2. Termination, fitting identification, control identification, and tool identification
- 3. Troubleshooting process for controls

#### **Special Facilities and/or Equipment**

- 1. Laboratory with pneumatic electrical tools
- 2. Personal protective equipment

3. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address

# Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Written examination Hands-on demonstration Chapter quizzes Group and classroom participation Punctuality

# Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture Discussion Laboratory Demonstration

### **Representative Text(s) and Other Materials**

. Introduction to Building Control Systems. 2014.

Texts older than five years that may be utilized in this course are industrystandard texts and are the most recent publication date.

#### Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- 1. Readings from the course textbook, <u>Introduction to Building Control</u> <u>Systems</u>
  - a. Section on safety
  - b. Recognize, maintain, operate, and troubleshoot pneumatic control systems
- 2. Writing assignments are related to the assignments given in the laboratory and include:
  - a. Writing an article on energy efficiency, Title 24, as it pertains to the plumbing industry
  - b. Developing a timing circuit, air handling circuit, and electronic diagram as part of the mid-term

- c. Handouts on sizing calculations for compressors and air dryers
- d. Assignments on the use of thermostats

# Discipline(s)

Air Conditioning, Refrigeration, Heating