APSM 181A: BUILDING AUTOMATION & CONTROLS 4

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	2
Hours:	18 lecture, 22 laboratory per quarter (40 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Description

Students will gain an overview of building automation and controls used in HVAC systems. Students will develop an understanding of DDC controllers, including prints and sequence of operations, using theory and hands-on application as it applies to building automation controls in an HVAC system.

Course Objectives

The student will be able to:

1. Describe closed loop and open loop control
2. Identify common control features offered through direct digital control (DDC)
3. List common applications for DDC systems
4. Describe how inputs and outputs are used in common DDC system applications
5. Describe supervisory control
6. Explain how job prints and a written sequence of operation provide needed information for programming
7. Describe some of the ways laptops may be connected to controllers

Course Content

1. Describe closed loop and open loop control
    a. The student will understand how a direct digital control (DDC) strategy is a control strategy in which a building automation system performs closed loop temperature, humidity, or pressure control
2. Identify common control features offered through direct digital control (DDC). DDC features determine exactly how a particular energy-using device in a building is controlled
    a. The student will be able to list common applications for DDC systems
3. Describe how inputs and outputs are used in common DDC system applications
    a. The student will be able to explain temperature sensor and airflow switch to control heating elements and an air conditioning compressor
4. Describe supervisory control
    a. The student will be able to describe supervisory control as a programmable software method used to control the energy-consuming functions of a commercial building
5. Explain how job prints and a written sequence of operation provide needed information for programming
    a. The student will be able to explain how a technician needs to have the proper resources available to be able to create, modify, and troubleshoot controller programming properly
6. Describe some of the ways laptop computers may be connected to controllers
    a. The student will gain an understanding of how connecting a laptop computer to the BAS field controller through a variety of interface cables and connection methods

Lab Content

Students will connect a laptop computer to an operational electronic control panel.

Special Facilities and/or Equipment

1. Laboratory with sheet metal service tools and sample system components
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:

Results of written quizzes and tests
Responses in class discussions
Comprehensive final project
Demonstration of assigned skills to acceptable level per instructor

Method(s) of Instruction

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

Lecture
Discussion
Demonstration
Lab assignments followed by discussion

Representative Text(s) and Other Materials

International Training Institute for the Sheet Metal and Air Conditioning Industry. Electrical Theory. 2017.

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting and Balancing. 2017.

Auvil, Ronnie J.. HVAC Control Systems. 2017.

These are the standard sheet metal textbooks/workbooks used for this course. Although one or more may not be within five years of the required

published date, they are the most current books used when teaching this course.

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

1. Sample reading assignment: From the textbook, read assigned sections on DDC controls
2. Sample writing assignment: Compose a list of electronic components and their function in the building control system

Discipline(s)

Sheet Metal