

APSM 181C: BUILDING AUTOMATION & CONTROLS 6

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 identifying and troubleshooting common problems within a control system as they apply to building automation controls in a HVAC system.

Course Objectives

The student will be able to:

1. Identify common considerations for troubleshooting building automation systems
2. Describe common problems that can occur at the human-computer interface (HCI) level
3. Describe field controllers
4. Identify problems that can occur with field inputs
5. Identify problems that can occur with field outputs
6. Explain how to perform inspections to prevent problems with mechanical equipment
7. Identify common problems that can occur at the mechanical equipment level
8. Explain the main tenets of building automation system (BAS) interoperability
9. Define BACnet and explain BACnet standard objects and properties

Course Content

1. Identify common considerations for troubleshooting building automation systems
 - a. List and explain steps taken when troubleshooting issues are encountered within a system
2. Describe common problems that can occur at the human-computer interface (HCI) level
 - a. List and identify most issues encountered when using an interface
3. Describe field controllers
 - a. Explain the types and operations of field controllers

4. Identify problems that can occur with field inputs
 - a. List and identify the most common problems operating field controllers
5. Identify problems that can occur with field outputs
 - a. List and identify the most common problems identified with field outputs
6. Explain how to perform inspections to prevent problems with mechanical equipment
 - a. Explain systematic inspections of equipment
7. Identify common problems that can occur at the mechanical equipment level
 - a. Identify mechanical equipment failures
8. Explain the main tenets of building automation system (BAS) interoperability
 - a. List BAS failures
9. Define BACnet and explain BACnet standard objects and properties
 - a. State and explain BACnet, BACnet equipment and modes of operation

Lab Content

Students will identify and troubleshoot common problems within 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