

# APSM 181B: BUILDING AUTOMATION & CONTROLS 5

## 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 the retrofit process within a control system as they apply to building automation controls in a HVAC system.

## Course Objectives

The student will be able to:

- Explain the purpose of a retrofit
- List and describe common stages in the retrofit process
- Explain the function and operation of alarm monitoring
- Describe how building automation systems can facilitate a preventive maintenance program and make building documentation available
- Identify advantages of data trending
- Describe how building automation systems can facilitate a preventive maintenance program and make building documentation available
- Identify common functions of building system graphics software

## Course Content

- Explain the purpose of a retrofit
  - Explain the key reasons that a retrofit of a control system would be advantageous
- List and describe common stages in the retrofit process
  - State and explain the efficient process involved to perform a retrofit of a control system
- Explain the function and operation of alarm monitoring
  - Explain the points of alarm and how these points are monitored and tripped into alarm mode in a control system
- Describe how building automation systems can facilitate a preventive maintenance program and make building documentation available
  - Explain how reports are generated within a building automation system that can identify operations and time frames for inspection
- Identify advantages of data trending

- By reviewing data generated through the building automation system, building efficiencies can be developed
- Summarize the benefits of energy efficiency
    - Explain how a building automation system can benefit the owner through lower energy costs
  - Identify common functions of building system graphics software
    - List and explain the graphics software used in building automation systems

## Lab Content

Students will retrofit an existing operational electronic control panel.

## Special Facilities and/or Equipment

- Laboratory with sheet metal service tools and sample system components
- Personal protective equipment
- 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

- Sample reading assignment: From the textbook, read assigned sections on DDC controls

- b. Sample writing assignment: Compose a list of electronic components and their function in the building control system

## **Discipline(s)**

Sheet Metal