

# APSM 178B: GREEN CONSTRUCTION & LEED CERTIFICATION FOR HVAC

## Foothill College Course Outline of Record

Heading	Value
<b>Effective Term:</b>	Summer 2022
<b>Units:</b>	2.5
<b>Hours:</b>	32 lecture, 8 laboratory per quarter (40 total per quarter)
<b>Prerequisite:</b>	Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	None
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- A successful student will be able to describe the impact of green building on the jobsite.
- A successful student will be able to discuss Energy Efficiency programs available for buildings, including LEED.

## Description

Students will gain an overview of "Green Construction" principles and techniques used in the HVAC industry. Students will identify various methods of energy conservation and generation in high performance buildings.

## Course Objectives

The student will be able to:

1. Define sustainability and the triple bottom line
2. Describe the role of green building in relation to environmental needs
3. Describe the impact of green building on the jobsite
4. Describe the responsibilities of contractors in green building
5. Discuss California Green Building Code
6. Discuss energy conservation in high performance buildings
7. Define and calculate Energy Use Index for building
8. Discuss energy efficiency programs available for buildings
9. Discuss energy generation and conservation technologies

## Course Content

1. Define sustainability and the triple bottom line
  - a. Describe the principles of building sustainability (Lec)
  - b. Describe the concept of a triple bottom line in building sustainability (Lec)
2. Describe the role of green building in relation to environmental needs

- a. Describe the environmental issues impacted by building sustainability (Lec)
  - b. Describe the human issues impacted by building sustainability (Lec)
3. Describe the impact of green building on the jobsite
    - a. Describe the costs impacts associated with green building (Lec)
    - b. Describe the environmental benefits associated with green building (Lec)
    - c. Describe the economic benefits and opportunities associated with green building (Lec)
  4. Describe the responsibilities of contractors in green building
    - a. Discuss the role of contractors in construction waste management (Lec and Lab)
    - b. Discuss the role of contractors in construction indoor air quality (Lec and Lab)
    - c. Describe construction activity pollution prevention (Lec and Lab)
    - d. Describe need and benefit of commissioning and retro-commissioning (Lec and Lab)
    - e. Discuss interaction of LEED and commissioning (Lec and Lab)
  5. Discuss California Green Building Code
    - a. Describe the purpose of California's Green Building Code (Lec)
    - b. Identify sections of the California Green Building Code that impact the HVAC industry (Lec)
  6. Discuss energy conservation in high performance buildings
    - a. Define a building performance benchmark (Lec and Lab)
    - b. Discuss strategies to reduce building energy load (Lec and Lab)
    - c. Discuss impacts and methods of using high performance mechanical systems (Lec and Lab)
  7. Define and calculate Energy Use Index for building
    - a. Define the term Energy Use Index (Lec and Lab)
    - b. Calculate an Energy Use Index to ASHRAE 105 standards (Lec and Lab)
  8. Discuss energy efficiency programs available for buildings
    - a. Discuss programs that promote energy efficiency and sustainability in buildings (Lec and Lab)
  9. Discuss energy generation and conservation technologies
    - a. Discuss methods of energy generation and conservation to achieve energy usage goals (Lec)

## Lab Content

1. Measure heat conductivity of construction material samples

## Special Facilities and/or Equipment

1. Laboratory with sheet metal test and balance 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 written final examination

Comprehensive final project

## 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. Green/LEED Construction for the Sheet Metal Industry. 2010.

American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 105-2014 Standard Methods of Determining, Expressing and Comparing Building Energy Performance and Greenhouse Gas Emissions. 2014.

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, section on LEED energy scoring and ratings
2. Sample writing assignment: Calculate an Energy Use Index to ASHRAE 105 standards

## Discipline(s)

Sheet Metal