APSM 157B: HVAC ENERGY CODES & STANDARDS

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	2.5
Hours:	35 lecture, 5 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 (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- A successful student will be able to calculate the % efficiency of a furnace from nameplate information.
- A successful student will be able to research CA Title 24 MECH Forms through the California Energy Commission website.

Description

Students are introduced to the California mechanical code, Building Energy Use Index, Title 24, and "Green" LEED construction, with particular attention to the role of HVAC service in energy conservation.

Course Objectives

The student will be able to:

1. Demonstrate an understanding of green construction and energy conservation as it applies to the HVAC industry in California
2. Perform basic energy usage calculations
3. Identify common energy and resource losses in HVAC systems
4. Explain the LEED rating system, and how it involves HVAC maintenance over the life of the building
5. Be aware of and research California Title 24 HVAC requirements

Course Content

1. Demonstrate an understanding of green construction and energy conservation as it applies to the HVAC industry in California (Lec & Lab)
   a. Explain the importance of green technology for world energy production and current and future energy demands (Lec)
   b. Describe green responsibilities in HVAC, service, industrial, and architectural sheet metal work (Lec)
   c. Follow green practices on the job (Lab)
2. Perform basic energy usage calculations
   a. Evaluate a utility bill and calculate energy costs (Lec)
   b. Define material heat conductivity and resistance, and climate characteristics as used in heat and cooling load calculations (Lec & Lab)
   c. Read HVAC equipment nameplates and determine their energy effectiveness (Lec & Lab)
3. Identify common energy and resource losses and solutions in HVAC systems
   a. Losses: duct leakage, restricted air flow, heat transfer, dirty filters, refrigerant charge (Lec & Lab)
   b. Solutions: sealing and insulation, system adjustments to conditions, maintenance (Lec & Lab)
4. Explain the LEED rating system, and how it involves HVAC maintenance over the life of the building (Lec)
   a. Be familiar with the need for and purpose of a total building energy audit (Lec)
   b. Explain the LEED point system and demonstrate its use in the sheet metal industry (Lec & Lab)
5. Be aware of and research California Title 24 HVAC requirements
   a. Definition of Title 24 and California Energy Code (Lec)
   b. Introduction to HERS Residential (Lec & Lab)
   c. Introduction to Commercial MECH form verifications (Lec & Lab)
   d. Update on changing requirements (Lec & Lab)

Lab Content

1. Practice examples of duct sealing and insulation
2. Research and calculate heat transfer for assigned construction materials in the lab

Special Facilities and/or Equipment

1. Laboratory with sheet metal service 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:

Results of written quizzes and tests
Responses in class discussions
Comprehensive written final examination
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. Energy Audit Manual, Total HVAC Systems, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). 2010.

International Training Institute. Energy Audit Manual, Total Building, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). 2010.

International Training Institute. Energy Audit Manual, Energy Audit Manual, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). 2010.

International Training Institute. Green/LEED Construction for the Sheet Metal Industry, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). 2010.

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: Unit 6, Renewable Energy and LEED
2. Sample writing assignment: Complete the "knowledge check" review questions on page 194 regarding renewable energy and LEED

Discipline(s)

Sheet Metal or Air Conditioning, Refrigeration, Heating