APSM 177C: ENERGY AUDITING

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	2.5
Hours:	32 lecture, 8 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 define the process to conduct an energy audit.
- A successful student will be able to write a sample RFP and Energy audit report using ASHRAE 105 standard forms.

Description

Students will demonstrate the skills and knowledge to prepare and conduct a building energy audit to industry standards. Students will achieve the ICB Energy Audit Technician certification.

Course Objectives

The student will be able to:

1. Describe any energy and environmental impacts of conducting an energy audit
2. Define the process to conduct an energy audit
3. Discuss data that is required to gather for an energy audit
4. Discuss and identify the tools and equipment used to conduct an energy audit
5. Describe the three levels of audits under the ASHRAE 105 Standard
6. Describe and calculate an Energy Use Index
7. Describe and calculate an Energy Cost Index
8. Describe additional methods of building performance expressions and comparisons
9. Write a sample RFP and energy audit report using ASHRAE 105 Standard forms

Course Content

1. Describe any energy and environmental impacts of conducting an energy audit
    a. Discuss reasons for conducting an energy audit (Lec)
    b. Describe the impact that energy audits can have on the energy infrastructure and economy (Lec)
    c. Describe the impact that energy audits can have on the environment and the economy (Lec)
2. Define the process to conduct an energy audit
    a. Define the five steps in an energy audit: scope, walk through, preparation, audit, reporting (Lec and Lab)
3. Discuss data that is required to gather for an energy audit
    a. Describe the building characteristics that are gathered in an energy audit (Lec and Lab)
    b. Describe the HVAC system information that is gathered in an energy audit (Lec and Lab)
    c. Describe the energy use information that is gathered in an energy audit (Lec and Lab)
4. Discuss and identify the tools and equipment used to conduct an energy audit
    a. Discuss and identify the common tools and equipment that may be used to conduct building energy audits (Lec and Lab)
5. Describe the three levels of audits under the ASHRAE 105 Standard
    a. Describe the ASHRAE 105 Standard and addenda "a" and "b" (Lec)
    b. Describe the requirements of the three levels detailed in ASHRAE Standard 105 (Lec)
6. Describe and calculate an Energy Use Index
    a. Describe the Energy Use Index for a building (Lec and Lab)
    b. Calculate the Energy Use Index for a building (Lec and Lab)
7. Describe and calculate an Energy Cost Index
    a. Describe the Energy Cost Index for a building (Lec and Lab)
    b. Calculate the Energy Cost Index for a building (Lec and Lab)
8. Describe additional methods of building performance expressions and comparisons
    a. Describe additional methods to express building performance per the ASHRAE 105 Standard (Lec and Lab)
    b. Describe methods to compare building performance per the ASHRAE 105 Standard (Lec and Lab)
9. Write a sample RFP and energy audit report using ASHRAE 105 Standard forms
    a. Prepare a sample request for proposal for an energy audit (Lec and Lab)
    b. Prepare a sample energy audit report (Lec and Lab)

Lab Content

1. List and gather the HVAC system used in an energy audit, using measuring equipment and other resources

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
International Certification Board (ICB) Energy Audit Technician certification
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. Energy Audit Manual. 2010.

American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 105-2007 Standard Methods of Measuring, Expressing and Comparing Building Energy Performance. 2007.

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, sections regarding preparation of an energy audit
2. Sample writing assignments:
   a. Describe and calculate an Energy Use Index
   b. Prepare a sample request for proposal for an energy audit
   c. Prepare a sample energy audit report

Discipline(s)

Sheet Metal