APSM 155B: AIR DISTRIBUTION & EFFICIENT DUCT DESIGN

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 describe characteristics of propeller and centrifugal blowers.
- A successful student will be able to perform an air balance on a sample duct system in laboratory conditions.

Description

Students develop an understanding of air flow characteristics and the proper design of duct systems.

Course Objectives

The student will be able to:

1. Understand the requirements for air distribution and balance
2. Understand the use of an air duct calculator and the formula for CFM = Volume (cu. ft.) x Area (sq. ft.) of duct
3. Demonstrate fan law calculations
4. Describe the basic function of zone controls
5. Calculate the requirements for and perform efficient duct design per industry standards
6. Perform the diagnostics for start-up

Course Content

1. Understand the requirements for air distribution and balance
   a. Describe the characteristics of propeller and centrifugal blowers (Lec)
   b. Describe common types of motors and drives (Lec)
   c. Explain what constitutes good air flow in a duct system (Lec)
2. Understand the use of an air duct calculator and the formula for CFM = Volume (cu. ft.) x Area (sq. ft.) of duct
   a. Demonstrate proper use of a duct calculator (Lec and Lab)
3. Demonstrate fan law calculations
   a. Perform fan law calculations to predict air flow with different variables (Lec and Lab)
4. Introduction to zone controls
   a. Explain different types of zone systems and how they modulate air flow (Lec and Lab)
5. Efficient duct design per industry standards
   a. Design duct system utilizing industry standards to optimize air flow for energy efficiency (Lec and Lab)
6. Diagnostics for start-up
   a. Demonstrate use of air measuring instruments (Lec and Lab)
   b. Plot air flow conditions on a friction chart (Lec and Lab)
   c. Perform an air balance of a system in the lab (Lec and Lab)

Lab Content

1. Demonstrate use of airflow measuring instruments
2. Perform an airflow balance of a duct system 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

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology, 8th ed.. 2016.

Auvil, Ronnie J.. HVAC Controls Systems, 4th ed.. 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 Refrigeration and Air Conditioning Technology textbook, Unit 37, "Air Distribution and Balance"
2. Sample writing assignment: Answer review questions related to assigned reading

Discipline(s)

Sheet Metal or Air Conditioning, Refrigeration, Heating