APSM 172B: PROPORTIONAL BALANCING

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2022
Units:	2
Hours:	24 lecture, 16 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 ratio of tolerance as used in HVAC system balancing.
- A successful student will be able to perform a proportion balance on a class/lab HVAC system simulator.

Description

Students will learn and practice the proportional balancing method to adjust air and water flows in commercial HVAC systems.

Course Objectives

The student will be able to:

1. Define common proportion balancing terms
2. Calculate ratio of tolerance
3. Calculate percentage of design
4. Determine the key outlet
5. Perform a proportion balance on classroom simulator
6. Perform a proportion balance on a single zone constant volume HVAC system
7. Perform a proportion balance on a VAV zone branch
8. Perform a proportion balance on a hydronics water board

Course Content

1. Define common proportion balancing terms
   a. Define design flow rates from a mechanical drawing and schedule (Lec and Lab)
   b. Define actual flow rate (Lec and Lab)
   c. Define design tolerance (Lec and Lab)
2. Calculate ratio of tolerance
   a. Calculate ratio of tolerance from design tolerance (Lec and Lab)
3. Calculate percentage of design
   a. Calculate percentage of design for system totals (Lec and Lab)
   b. Calculate percentage of design for individual outlets (Lec and Lab)
4. Determine the key outlet
   a. Determine key outlet using percentage of design (Lec and Lab)
5. Perform a proportion balance on classroom simulator
   a. Successfully complete a proportion balance using simulator (Lec and Lab)
6. Perform a proportion balance on a single zone constant volume HVAC system
   a. Successfully complete a proportion balance on a single zone constant volume HVAC system in lab (Lab)
7. Perform a proportion balance on a VAV zone branch
   a. Successfully complete a proportion balance on a VAV zone branch in lab (Lab)
8. Perform a proportion balance on a hydronics water board
   a. Determine flow through a calibrated balance valve (Lec and Lab)
   b. Perform a proportion balance on a hydronics water board in lab (Lab)

Lab Content

1. Successfully complete a proportion balance on a single zone constant volume HVAC system
2. Successfully complete a proportion balance on a VAV zone branch
3. Perform a proportion balance on a hydronics water board

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
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. Testing, Adjusting & Balancing of Environment Systems. 2003.

This is the standard sheet metal textbook and workbook used for this course. Although it may not be within five years of the required published date, it is the most current book 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, chapter on hydronic balancing
2. Sample writing assignment: Determine design flow rates from a mechanical drawing and schedule

Discipline(s)

Sheet Metal