APPT 177: START, TEST & BALANCE I

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2024
Units:	5
Hours:	49 lecture, 50 laboratory per quarter (99 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Refrigeration & Air Conditioning Mechanical Service Apprenticeship Program.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Student Learning Outcomes

- A student will be able to demonstrate fluid control/air balance.
- A student will be able to apply psychometrics.

Description

This course provides students with an introduction to start, test and balance for fluid distribution. Ducting, cooling, fans, and air distribution is covered in the laboratory exercises.

Course Objectives

The student will be able to:

1. Recognize and classify fluid flow
2. Recognize duct systems and explain sizing
3. Recognize fans and explain fan laws
4. Explain air distribution
5. Explain psychrometrics

Course Content

1. Fluid flow
   a. Study of velocity in relationship to fluids
   b. Static control and fluid measurements
   c. Total pressure and performing pressure calculations
2. Duct systems and sizing
   a. Review of basic duct plans
   b. Sizing ducting based on air flow requirements
   c. Specifications of ducts
3. Fans and fan laws
   a. Review of air plenums
   b. Calculating cubic feet per minute (CFM)
   c. Fan sizing for commercial applications
4. Air distribution
   a. Proper layout of feeders
   b. Introduction of chillers
   c. Cubic feet per minute for air distributors
5. Psychrometrics
   a. Introduction to psychometrics
   b. Various forms of psychological measurement for the plumbing trade
   c. Types of measurements performed on heating, ventilation, and air conditioning (HVAC) systems

Lab Content

Students will work individually and in teams in the lab, which includes:

1. Testing the flow of fluid through a complete hydraulic system
2. Balancing out volume and pressure within the hydraulic system
3. Servicing a test and balance system

Special Facilities and/or Equipment

1. Laboratory with overhead projector
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:

Written examination
Hands-on demonstration
Chapter quizzes
Group and classroom participation

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Discussion
Laboratory
Demonstration

Representative Text(s) and Other Materials

United Association of Journeymen and Apprentices. Start, Test and Balance. 2018.

Texts older than five years may be utilized in this course as industry-standard texts.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Readings from the course textbook
   a. Start, Test and Balance: Theory and Practice, Chapter 1, pp. 6-17
   b. NJS-PAC Start, Test and Balance text on interpreting commissioning specifications

   c. Finish air balancing and distribution practices
   d. Introduction to hydronics and applications
2. Writing assignments are related to the assignments given in the laboratory and include:
   a. Prepare a diagram on refrigeration and air conditioning for a start, test and balance system
   b. Prepare a paper to discuss the meaning of psychrometrics
   c. South San Francisco field trip term paper on variable speed hot and chilled water systems at Genentech Corporation
   d. Lab manual entries per lab assignment

Discipline(s)

Air Conditioning, Refrigeration, Heating