

# APSM 159B: AIRFLOW & PSYCHROMETRICS FOR TAB

## 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 psychrometric and its importance in the HVAC industry.
- A successful student will be able to measure and determine values on a psychrometric chart.

## Description

Students will gain an overview of the purpose for commercial HVAC systems, the main characteristics of psychrometrics and methods to measure airflow in HVAC systems.

## Course Objectives

The student will be able to:

1. Describe the purpose of commercial HVAC systems
2. Identify the components in a commercial HVAC system
3. Define psychrometrics and its importance in the HVAC industry
4. Measure and determine values on a psychrometric chart
5. Measure common pressures in an HVAC system
6. Measure airflow in HVAC systems using various instruments

## Course Content

1. Describe the purpose of commercial HVAC systems (Lec)
2. Identify the components in a commercial HVAC system
  - a. Describe the usage and purpose of components in commercial HVAC systems (Lec and Lab)
  - b. Describe the importance of ventilation rates (Lec and Lab)
  - c. Determine the ventilation rates of various types of buildings (Lec and Lab)
3. Define psychrometrics and its importance in the HVAC industry
  - a. Describe the weight and volume of standard air (Lec and Lab)
  - b. Define wet bulb, dry bulb, relative humidity, and dew point (Lec and Lab)

4. Measure and determine values on a psychrometric chart
  - a. Determine wet bulb, dry bulb, relative humidity, dew point, enthalpy, and grains of moisture using a psychrometric chart (Lec and Lab)
  - b. Measure dry bulb and wet bulb temperatures using a psychrometer (Lec and Lab)
  - c. Determine relative humidity using a psychrometer and hygrometer (Lec and Lab)
5. Measure common pressures in an HVAC system
  - a. Describe the usage and application of a manometer, digital micro manometer, and magnetically linked gauge (Lec and Lab)
  - b. Identify a pitot tube, static probe, airfoil probe, velocity probe and velocity grid (Lec and Lab)
  - c. Describe the use of a pitot tube, static probe, airfoil probe, velocity probe and velocity grid (Lec and Lab)
  - d. Properly calculate average velocity using a pitot tube and manometer (Lec and Lab)
6. Measure airflow in HVAC systems using various instruments
  - a. Properly perform a pitot tube rectangular duct traverse (Lec and Lab)
  - b. Properly perform a pitot tube round duct traverse (Lec and Lab)
  - c. Properly measure airflows using a total capture flow hood (Lec and Lab)
  - d. Define and calculate an Ak factor (Lec and Lab)
  - e. Determine airflow using a rotating vane anemometer and thermal anemometer (Lec and Lab)

## Lab Content

1. Demonstrate the proper use of the psychrometer to determine dry bulb temperature, wet bulb temperature and relative humidity

## Special Facilities and/or Equipment

1. Laboratory with sheet metal service tools
2. Sheet metal test and balance tools and sample system components
3. Personal protective equipment
4. 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/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, "Psychrometrics" unit
2. Sample writing assignment: Provide written definitions for the following terms: psychrometrics, dry bulb, wet bulb, relative humidity, enthalpy

## **Discipline(s)**

Sheet Metal or Air Conditioning, Refrigeration, Heating