

APPRENTICESHIP - AIR CONDITIONING MECHANIC

Program Description

The Air Conditioning Mechanic program is offered in partnership with Sheet Metal Local 104 and Bay Area Training Fund. This 5-year apprenticeship program provides students with in-class instruction and paid on-the-job training with a sheet metal contractor, in the service sector of the sheet metal and heating, ventilating and air conditioning (HVAC) industry. The students will perform scheduled maintenance and troubleshoot system problems while dealing directly with a variety of customers. The students utilize understanding of refrigerant, electronic and pneumatic controls, filtration and duct systems to maintain safe and efficient system performance. Mechanics use test equipment to verify conditions, research manufacturer's data, and then adjust, repair and replace components as needed. Sheet Metal Air Conditioning Service Mechanics work on residential, light commercial and more often, complex commercial systems. Upgrade training is common in this occupation as more advanced and "greener" equipment is produced. Per California Code of Regulations, this program is limited to students admitted to the Sheet Metal Local 104 & Bay Area Industry Training Fund's Air Conditioning Mechanic Program.

The Associate in Science in Air Conditioning Mechanic degree builds upon the Certificate of Achievement in Air Conditioning Mechanic by adding requirements for general education courses. Upon completion of the program, students will be eligible to receive an Apprenticeship Completion Certificate from the California Division of Apprenticeship Standards (DAS). The graduates will be employable as HVAC Service Technician/Mechanic; HVAC Service Manager; HVAC Contractor; NATE Certified Air Conditioning Mechanic; Test, Adjust & Balancing Technician; Building Inspector; foreperson; estimator/detailer; contractor; instructor; project manager and other related occupations.

Learn more about the program on the [Apprenticeship website](#).

Program Learning Outcomes

- Students will be able to achieve EPA 608 and OSHA 30 Certifications.
- Students will be able to understand the different types, properties, and application of refrigerants.
- Students will be able to demonstrate the ability to measure, cut, bend, and make various types of tubing and piping connections.
- Students will be able to demonstrate the safe use of soldering and brazing equipment.
- Students will be able to explain functions of special components: filter driers, sight glass, suction line accumulator, liquid line receiver, hot gas bypass, ambient controls.
- Students will be able to explain the application and operational sequence of electric and gas heating.
- Students will be able to understand the different types of heat sources for hydronic heating (water, steam, geothermal/waste heat, solar).
- Students will be able to perform start-up, diagnosis, repair, and maintenance of cooling towers and pumps.
- Students will be able to demonstrate an understanding of green construction and energy conservation as it applies to the HVAC industry in California.

- Students will be able to explain the LEED rating system, and how it involves HVAC maintenance over the life of the building.

Career Opportunities

Upon completion of the Air Conditioning Mechanic program, students will be eligible to receive a Certificate of Achievement in Air Conditioning Mechanic from Foothill College and an Apprenticeship Completion Certificate from the California Division of Apprenticeship Standards (DAS). The graduates will be employable as HVAC Service Technician/Mechanic; HVAC Service Manager; HVAC Contractor; NATE Certified Air Conditioning Mechanic; Test, Adjust & Balancing Technician; Building Inspector; foreperson; estimator/detailer; contractor; instructor; project manager and other related occupations.

Award Type(s)

- AS = Associate in Science Degree
- CA = Certificate of Achievement

Units Required

- Major: 69
- Certificate(s): 83

Associate Degree Requirements

Code	Title	Units
English Proficiency		
Select one of the following:		
ENGL 1A	COMPOSITION & READING	5
ENGL 1AH	HONORS COMPOSITION & READING	5
ENGL 1S & ENGL 1T	INTEGRATED COMPOSITION & READING and INTEGRATED COMPOSITION & READING	8
ESLL 26	ADVANCED COMPOSITION & READING	5
or equivalent		
Mathematics Proficiency		
College-level math course at or above the level of Intermediate Algebra		

A minimum of 90 units is required¹ to include:

- Completion of one of the following general education patterns: Foothill General Education, CSU General Education Breadth Requirements or the Intersegmental General Education Transfer Curriculum (IGETC)
- Core courses (69 units)

¹ Additional elective course work may be necessary to meet the 90-unit minimum requirement for the associate degree.

Note: All courses pertaining to the major must be taken for a letter grade. In addition, a grade of "C" or better is required for all core courses used for the degree or certificate.

Core and Support Courses

Code	Title	Units
Core Courses		
APSM 122	SMQ-22 CODES & STANDARDS	3
APSM 151A	SERVICE INTRODUCTION & SAFETY	2.5
APSM 151B	ESSENTIAL HVAC SERVICE SKILLS	2.5

APSM 151C	HEAT, MATTER & ENERGY IN HVAC SYSTEMS	2.5	APSM 154A	REFRIGERATION IN AIR CONDITIONING	2
APSM 152A	PIPING, REFRIGERANT EVACUATION & RECOVERY	1.5	APSM 154B	GAS & ELECTRIC HEATING	2
APSM 152B	CHARGING REFRIGERANT SYSTEMS	2	APSM 154C	HYDRONIC HEATING	2
APSM 152C	INTRODUCTION TO ELECTRICITY	2.5	APSM 155A	SHEET METAL FABRICATION	1.5
APSM 153B	ELECTRIC MOTORS & MOTOR CONTROLS IN HVAC SYSTEMS	2.5	APSM 155C	MAINTAINING EFFICIENT OPERATION OF ELECTRIC COOLING & HEATING EQUIPMENT	2
APSM 154A	REFRIGERATION IN AIR CONDITIONING	2	APSM 156A	HEAT PUMP EFFICIENT OPERATION & SERVICE	2.5
APSM 154B	GAS & ELECTRIC HEATING	2	APSM 156B	COOLING TOWERS, PUMPS & PIPING	2.5
APSM 154C	HYDRONIC HEATING	2	APSM 156C	CHILLED WATER HVAC SYSTEMS & COMPONENTS	2.5
APSM 155A	SHEET METAL FABRICATION	1.5	APSM 157A	PLANS & SPECIFICATIONS FOR THE SERVICE TECHNICIAN	2.5
APSM 156A	HEAT PUMP EFFICIENT OPERATION & SERVICE	2.5	APSM 157B	HVAC ENERGY CODES & STANDARDS	2.5
APSM 156B	COOLING TOWERS, PUMPS & PIPING	2.5	APSM 157C	INDOOR AIR QUALITY & ENERGY EFFICIENCY	2.5
APSM 156C	CHILLED WATER HVAC SYSTEMS & COMPONENTS	2.5	APSM 158A	INTRODUCTION TO DIRECT DIGITAL HVAC CONTROLS	2
APSM 157A	PLANS & SPECIFICATIONS FOR THE SERVICE TECHNICIAN	2.5	APSM 158B	PNEUMATIC CONTROLS FOR HVAC SYSTEMS	2.5
APSM 157B	HVAC ENERGY CODES & STANDARDS	2.5	APSM 158C	INVERTER, VRF & HEAT RECOVERY TECHNOLOGY	2.5
APSM 158A	INTRODUCTION TO DIRECT DIGITAL HVAC CONTROLS	2	APSM 159B	AIRFLOW & PSYCHROMETRICS FOR TAB	2.5
APSM 158C	INVERTER, VRF & HEAT RECOVERY TECHNOLOGY	2.5	APSM 159C	TESTING ADJUSTING & BALANCING OF HVAC SYSTEMS	2
APSM 159B	AIRFLOW & PSYCHROMETRICS FOR TAB	2.5	APSM 172B	PROPORTIONAL BALANCING	2
APSM 172B	PROPORTIONAL BALANCING	2	APSM 173B	TEMPERATURE MEASUREMENTS, DUCT SYSTEMS & BASIC CONTROLS	2.5
APSM 173B	TEMPERATURE MEASUREMENTS, DUCT SYSTEMS & BASIC CONTROLS	2.5	APSM 173C	HVAC FANS, FAN LAWS & V-BELT DRIVES	2.5
APSM 173C	HVAC FANS, FAN LAWS & V-BELT DRIVES	2.5	APSM 174A	HYDRONIC SYSTEMS, PUMPS & HYDRONIC BALANCING	2.5
APSM 174A	HYDRONIC SYSTEMS, PUMPS & HYDRONIC BALANCING	2.5	APSM 175B	DDC CONTROLS & PROGRAMS	2
APSM 175B	DDC CONTROLS & PROGRAMS	2	APSM 177A	TITLE 24 MECHANICAL ACCEPTANCE TESTING	2.5
APSM 177A	TITLE 24 MECHANICAL ACCEPTANCE TESTING	2.5	APSM 177B	ADVANCED DDC CONTROLS/COMMISSIONING OF HVAC SYSTEMS	2
APSM 177B	ADVANCED DDC CONTROLS/COMMISSIONING OF HVAC SYSTEMS	2	APSM 177C	ENERGY AUDITING	2.5
APSM 177C	ENERGY AUDITING	2.5	APSM 178A	INDOOR AIR QUALITY	2
APSM 178A	INDOOR AIR QUALITY	2	APSM 178C	FOREMAN TRAINING/PROJECT MANAGEMENT FOR HVAC	2.5
APSM 178C	FOREMAN TRAINING/PROJECT MANAGEMENT FOR HVAC	2.5			
Total Units		69	Total Units		83

Certificate Requirements

Certificate of Achievement in Air Conditioning Mechanic

• Units: 83

Code	Title	Units
APSM 122	SMQ-22 CODES & STANDARDS	3
APSM 151A	SERVICE INTRODUCTION & SAFETY	2.5
APSM 151B	ESSENTIAL HVAC SERVICE SKILLS	2.5
APSM 151C	HEAT, MATTER & ENERGY IN HVAC SYSTEMS	2.5
APSM 152A	PIPING, REFRIGERANT EVACUATION & RECOVERY	1.5
APSM 152B	CHARGING REFRIGERANT SYSTEMS	2
APSM 152C	INTRODUCTION TO ELECTRICITY	2.5
APSM 153A	FIELD INSTALLATION FOR THE SERVICE TECHNICIAN	2.5
APSM 153B	ELECTRIC MOTORS & MOTOR CONTROLS IN HVAC SYSTEMS	2.5
APSM 153C	COMPONENTS OF THE REFRIGERANT CYCLE	2.5

Currently offered at: Bay Area Sheet Metal JAC.