# PHCC Academy of San Diego – HVAC Training Program
# Entry-Level HVAC Service Tech Certificate

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## OBJECTIVES

- Be proficient and confident to perform residential and light commercial maintenances and basic troubleshooting.
- Identify components and sequence of operation in various systems.
- Identify industry tools and safely and confidently demonstrate proper use and form for each.

## COURSE OUTLINE

### Module 1 – What is HVAC?

- Types of systems and their purpose
- Air delivery – the "V" in HVAC
- To bring comfort to conditioned spaces

### Module 2 – HVAC Safety

- Personal protection – gloves, eye protection, ladder safety, jewelry, proper clothing, extreme heat environments, safe electrical practices, lock out tag out, fire safety
- Materials and chemicals that you can encounter; MSDS
- Phosgene is your enemy

### Module 3 – System Controls

- Thermostats
- Power supplies; different voltages
- Control voltage vs. live voltage; load voltages
- Circuit/control boards
- Transformers

### Module 4 – HVAC Tools of the Trade

- Basic tools needed
- Why these tools are needed
- How to use them correctly

### Module 5 – Gas Furnaces/Air Handlers

- Types of furnaces
- Single stage; Two-stage

- Motors – V-speed vs. PSC
- Electric heat
- Air handlers
- Component identification
- Sequence of Operation
- Condensate for condensing furnaces
- Make/Model/Serial – What are you looking at?
- Proper gas pressures – 90%, 80%, 70%
- Propane natural gas

## Module 6 – Air Conditioning

- System components
- Compressor, evaporator coil, condenser coil, metering device
- Refrigerant cycle; Removing heat/humidity from a conditioned space
- Condensate, condensate, condensate, termination and proper installation
- Subcool vs. superheat calculation
- Proper pressure; PT charts
- Proper voltages
- Proper airflow
- Make/Model/Serial – What are you looking at?

## Module 7 – Heat Pumps

- System components
- What does the heat pump do?
- Refrigerant cycle and charging; Understanding pressures
- Defrost cycle
- Air flow
- Heat transfer
- Ducting and airflow / Ductulator
- Duct sizing and CFM and velocity
- What is the return and supply?
- Static pressures; their importance; design pressures
- Proper temp splits and temp rises

## Midterm Review / Overview

- What we have learned so far
- Midterm Exam
- Is there anything you would like to go more in depth about?
- Lab test

## Module 8 – Low Voltage

- What is it for? What does it control?

- Where does it go?
- What is neutral? What is common?
- Low voltage components
- Wiring diagrams and component identification
- Ladder diagrams
- Measuring low voltage valves – min., max.
- Millivolts
- Low voltage protection
- Transformers

## Module 9 – High Voltage

- Safety practices – lock out tag out, Is power on or off?
- How to confirm power is off
- Discharging capacitors / measuring caps
- Component identification
- Make/Model/Serial – Data plate understanding
- Amp draws
- Single -phase / 3-phase
- 208/230; 460 volts; 120
- Transformers
- Fuses

## Module 10 – Troubleshooting Scenarios

- Ask customer questions – What is it doing? What is it not doing?
- Do I have power?
- Where did my sequence of operation stop?
- Is my airflow correct? Is my filter clean?
- Common failures
- Caps
- Charging
- Filters
- Flame sensor
- Fuses/breaker

## Module 11 – Brazing

- Good fit and proper clearance
- Cleaning the metals
- Fluxing the parts
- Assemble for brazing
- Cleaning the brazed joint

## Module 12 – Customer Service