

COURSE OUTLINE**Course:** 70255 AIR CONDITIONING AND HEATING**Total Course Hours:** 180.00**CBEDS Title:** AIR CONDITIONING AND HEATING**CBEDS #:** 5516**Job Title(s):**

Heating and air conditioning technician

Prerequisites:**Course Description:**

This course provides entry-level training in Heating Ventilation Air Conditioning and Refrigeration (HVAC/R). Instruction covers technical math for air conditioning, HVAC/R fundamentals, best HVAC/R installation practices and EPA (Environmental Protection Agency) regulations related to HVAC. Students should have mechanical aptitude. Students need no prior knowledge of HVAC/R to take this course. Integrated throughout the course are Academic and CTE standards, which include safety, communication, technology, ethics, career planning and other employability skills.

Hours	
Class	OJT

Occupational Competencies

1-7 on the Course Outline are generic to all BVROP courses and include the BVROP Student Outcomes

3.00		1 <u>ORIENTATION</u>
		A Identifies and discusses course objectives and competencies.
		B Discusses ROP Student Outcomes.
		C Explains class attendance and behavior objectives.
3.00		2 <u>HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT</u>
		A Describes accident procedure.
		B Demonstrates appropriate safety practices (e.g. bending, lifting, etc.).
		C Demonstrates knowledge of classroom procedures and drills (e.g. earthquake, fire and emergency).
3.00		3 <u>ETHICS AND LEGAL RESPONSIBILITIES</u>
		A Defines sexual harassment and discusses tactics for handling harassment situations.
		B Applies appropriate workplace behavior and standards.
3.00		4 <u>LEADERSHIP AND TEAMWORK</u>
		A Describes the characteristics and benefits of teamwork and leadership.
		B Demonstrates ability to make appropriate decisions.
		C Works well with others and gives/takes constructive criticism.
15.00		5 <u>CAREER PLANNING</u>
		A Prepares a finished, professional portfolio showing the best work that has been completed during the class.
		B Locates job opportunities through the use of want-ads and placement agencies.
		C Visits at least one facility related to area of training and observes jobs performed.
		D Completes a job application correctly.
		E Prepares for and critiques a simulated employment interview.
		F Discusses employee benefits and rights as related to the specific occupational job area including gender equity and equal opportunity.
		G Identifies acceptable procedures to leave a job.
		H Applies for a scholarship.
		I Completes a professional resume.
		J Demonstrates appropriate personal grooming and dress.

Hours	
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3.00	6	<u>COMMUNICATION</u>	<p>A Uses effective workplace conversation.</p> <p>B Reads and interprets written information and directions.</p> <p>C Practices various forms of written communication appropriate to the occupation.</p>
5.00	7	<u>STUDENT OUTCOMES</u>	<p>A Demonstrates Occupational Specific, Communication and Critical Thinking Skills</p> <p>B Demonstrates Responsible Work Ethics</p> <p>C Demonstrates Career/Employment Literacy</p> <p>D Demonstrates Effective Use of Technology</p>
20.00	8	<u>FUNDAMENTAL CONCEPTS OF AIR CONDITIONING HUMAN COMFORT</u>	<p>A Explains the effects of temperature on human comfort, humidity, air circulation, air filtration and sound level on human comfort.</p>
25.00	9	<u>FUNDAMENTAL CONCEPTS OF REFRIGERATION</u>	<p>A Identifies the principles of refrigeration.</p> <p>B Defines between sensible and latent heat.</p> <p>C Defines energy and identifies the different types of energy.</p> <p>D Explains the principles of heat conversion.</p> <p>E Defines heat.</p> <p>F Explains the principle methods of heat transfer.</p> <p>G Explains heat absorption.</p> <p>H Explains heat rejection.</p> <p>I Compares the function of the evaporator, condenser, compressor, piping, and metering device in a refrigeration circuit.</p> <p>J Compares various refrigerants and their applications.</p> <p>K Identifies different types of refrigerant cycles.</p> <p>L Measures and records temperature and pressure of refrigerant.</p> <p>M Calculates and records refrigerant volume.</p> <p>N Analyzes temperature, pressure, and volume relationship.</p> <p>O Measures and records the saturation temperature of refrigerant.</p> <p>P Measures and records superheat.</p> <p>Q Measures and records sub-cooling.</p>
20.00	10	<u>BASIC SHOP PRACTICES AND TOOLS</u>	<p>A Identifies the compatibility of various alloys, fluxes and materials.</p> <p>B Cleans tubing and fittings in preparation for brazing.</p> <p>C Joins materials with silver brazing alloy.</p> <p>D Demonstrates established procedures for using tools designed to loosen and tighten fasteners (e.g., open-end wrench, box wrench, adjustable wrench, torque wrench, screwdrivers).</p> <p>E Demonstrates established procedures for using gripping and holding tools (e.g. pliers, pipe wrenches).</p> <p>F Demonstrates established procedures for using cutting tools (e.g. ball pen, soft-faced, and claw hammers; punches)</p> <p>G Demonstrates established procedures for using sharpening tools (e.g. file).</p> <p>H Demonstrates proper use of vacuum pump.</p> <p>I Demonstrates proper use of electronic leak detector.</p> <p>J Demonstrates proper use of thermometer.</p> <p>K Demonstrates proper use of fin comb.</p> <p>L Demonstrates proper use of piercing valves.</p> <p>M Demonstrates proper use of refrigerant recovery station.</p> <p>N Demonstrates proper use of refrigerant charging station.</p>

Hours	
Class	OJT

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| 20.00 | |
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- 11 PREVENTIVE MAINTENANCE**
- A Disconnects power supply and verifies.
 - B Inspects and replaces return air filter.
 - C Inspects and cleans blower.
 - D Inspects and cleans evaporator coil.
 - E Inspects and cleans oil motor bearings.
 - F Inspects and lubricates blower bearings.
 - G Checks evaporator and refrigerant lines for leaks.
 - H Checks refrigerant charge.
 - I Checks and records fan operation.

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| 30.00 | |
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- 12 FUNDAMENTALS OF BASIC ELECTRICITY**
- A Defines watts, ohms, volts, and amps.
 - B Defines and compares single and three-phase voltage and current.
 - C Identifies types of electrical loads (i.e., capacitive, inductive, and resistive).
 - D Analyzes applications of magnetism in electricity.
 - E Applies magnetic principles to electrical theory.
 - F Compares conducting and insulating materials.
 - G Identifies principles of solid-state switching devices.
 - H Wiring diagrams.

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| 25.00 | |
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- 13 APPLY CONCEPTS OF BASIC ELECTRICITY**
- A Demonstrates proper use of an Ammeter, Ohmmeter and Voltmeter
 - B Uses Ohms Law to solve circuit problems and calculates circuit loads.
 - C Uses appropriate meters to check basic electrical components.
 - D Determines the electrical characteristics of both series and parallel circuits.
 - E Demonstrates proper use of test for testing the above items.

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| 5.00 | |
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- 14 TROUBLESHOOTING**
- A Identifies reasons why machine doesn't cool and/or heat.
 - B Identifies problem of evaporator icing up.
 - C Identifies incorrect pressures.
 - D Identifies main power source.
 - E Identifies control voltage.
 - F Identifies compressor failure.
 - G Identifies slow motor speeds.
 - H Identifies thermostat and correct wiring.
 - I Identifies different type of thermostats.

TOTAL HOURS

Class	OJT	Course
180.00	0.00	180.00