

**COURSE OUTLINE**

**Course:** 22222 ADVANCED AIR CONDITIONING AND HEATING

**Total Course Hours:** 185.00

**CBEDS Title:** AIR CONDITIONING AND HEATING

**CBEDS #:** 5516

**Job Title(s):**

Air Conditioning and Heating technician

**Prerequisites:**

Students need prior knowledge of HVAC/R to take this course or have completed Air Conditioning/Heating ROP course.

**Course Description:**

This course provides advanced training in Heating Ventilation Air Conditioning and Refrigeration (HVAC/R) and electrical. Instruction covers welding for air conditioning, heat pumps, air properties, motors, air distribution and mechanical refrigeration. Integrated throughout the course are academic and career technical standards. Students need prior knowledge of HVAC/R to take this course or have completed Air Conditioning/Heating ROP course. Students who complete this course will be qualified to take the EPA 608 certification exam. 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

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|-------|-------|----------|---|--|
| 5.00  |       | <b>1</b> | <b><u>ORIENTATION</u></b>                                 | <ul style="list-style-type: none"> <li>A Identifies and discusses course objectives and competencies.</li> <li>B Discusses ROP Student Outcomes.</li> <li>C Explains class attendance and behavior objectives.</li> </ul>  |
| 5.00  | 5.00  | <b>2</b> | <b><u>HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT</u></b> | <ul style="list-style-type: none"> <li>A Describes accident procedure.</li> <li>B Demonstrates appropriate safety practices (e.g. bending, lifting, etc.).</li> <li>C Demonstrates knowledge of classroom procedures and drills (e.g. earthquake, fire and emergency).</li> </ul>  |
| 5.00  | 5.00  | <b>3</b> | <b><u>ETHICS AND LEGAL RESPONSIBILITIES</u></b>           | <ul style="list-style-type: none"> <li>A Defines sexual harassment and discusses tactics for handling harassment situations.</li> <li>B Applies appropriate workplace behavior and standards.</li> </ul>   |
| 10.00 | 20.00 | <b>4</b> | <b><u>LEADERSHIP AND TEAMWORK</u></b>                     | <ul style="list-style-type: none"> <li>A Describes the characteristics and benefits of teamwork and leadership.</li> <li>B Demonstrates ability to make appropriate decisions.</li> <li>C Works well with others and gives/takes constructive criticism.</li> </ul>  |
|       |       | <b>5</b> | <b><u>CAREER PLANNING</u></b>                             | <ul style="list-style-type: none"> <li>A Prepares a finished, professional portfolio showing the best work that has been completed during the class.</li> <li>B Locates job opportunities through the use of want-ads and placement agencies.</li> <li>C Visits at least one facility related to area of training and observes jobs performed.</li> <li>D Completes a job application correctly.</li> <li>E Prepares for and critiques a simulated employment interview.</li> <li>F Discusses employee benefits and rights as related to the specific occupational job area including gender equity and equal opportunity.</li> <li>G Identifies acceptable procedures to leave a job.</li> <li>H Applies for a scholarship.</li> <li>I Completes a professional resume.</li> <li>J Demonstrates appropriate personal grooming and dress.</li> </ul> |

Hours	
Class	OJT

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|-------|-------|-----------|--|--|
| 10.00 | 10.00 | <b>6</b>  | <b><u>COMMUNICATION</u></b>                              | <ul style="list-style-type: none"> <li>A Uses effective workplace conversation.</li> <li>B Reads and interprets written information and directions.</li> <li>C Practices various forms of written communication appropriate to the occupation.</li> </ul>  |
|       |       | <b>7</b>  | <b><u>STUDENT OUTCOMES</u></b>                           | <ul style="list-style-type: none"> <li>A Demonstrates Occupational Specific, Communication and Critical Thinking Skills</li> <li>B Demonstrates Responsible Work Ethics</li> <li>C Demonstrates Career/Employment Literacy</li> <li>D Demonstrates Effective Use of Technology</li> </ul>  |
| 22.00 |       | <b>8</b>  | <b><u>PREVENTIVE MAINTENANCE</u></b>                     | <ul style="list-style-type: none"> <li>A Disconnects power supply and verifies.</li> <li>B Inspects and replaces return air filter.</li> <li>C Inspects and cleans blower.</li> <li>D Inspects and cleans evaporator coil.</li> <li>E Inspects and cleans oil motor bearings.</li> <li>F Inspects and lubricates blower bearings.</li> <li>G Checks evaporator and refrigerant lines for leaks.</li> <li>H Checks refrigerant charge.</li> <li>I Checks and records fan operation.</li> </ul>  |
| 22.00 |       | <b>9</b>  | <b><u>EVACUATE AIR CONDITIONING SYSTEM</u></b>           | <ul style="list-style-type: none"> <li>A Installs manifold and gages.</li> <li>B Recovers refrigerant.</li> <li>C Evacuates system to desired micron reading.</li> </ul>   |
| 22.00 |       | <b>10</b> | <b><u>RECHARGE SYSTEM BY WEIGHING-IN REFRIGERANT</u></b> | <ul style="list-style-type: none"> <li>A Installs manifold and gages.</li> <li>B Evacuates system according to manufacturers specifications.</li> <li>C Confirms refrigerant type.</li> <li>D Connects refrigerant type.</li> <li>E Purifies charging hose.</li> <li>F Charges system to name plate specifications.</li> <li>G Retests for leaks and completes operations.</li> <li>H The above items will work toward obtaining an EPA certificate.</li> </ul>  |
| 22.00 |       | <b>11</b> | <b><u>ELECTRIC MOTORS</u></b>                            | <ul style="list-style-type: none"> <li>A Explains electric motor theory (i.e., magnetism, electromotive force, etc.).</li> <li>B Explains operation and application of capacitor start induction run motor (CSIR).</li> <li>C Explains operation and application of capacitor start run motor (CSCR).</li> <li>D Explains operation and application of electronically controlled motor (ECM).</li> <li>E Explains operation and application of multi-speed motor.</li> <li>F Explains operation and application of permanent split capacitor.</li> <li>G Explains operation and application of shaded pole.</li> <li>H Explains operation and application of split-phase motor (RSIR).</li> <li>I Explains operation and application of three-phase motor.</li> <li>J Explains operation and application of variable-speed motor.</li> <li>K Describes starting components associated with single-phase and three-phase motors.</li> <li>L Explains the significance of power factor.</li> <li>M Demonstrates proper use of testing equipment for motors.</li> <li>N Demonstrates physical conditions of motors, bearings and rotors.</li> </ul> |

Hours	
Class	OJT

22222 ADVANCED AIR CONDITIONING AND HEATING

22.00	
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**12 HEATING**

- A The learner demonstrates knowledge of heat pump and electric heat strips.
- B The learner demonstrates knowledge of gas heating, furnaces and boilers.
- C The learner demonstrates knowledge of water treatment.

**TOTAL HOURS**

Class	OJT	Course
145.00	40.00	185.00