

## Heating, Ventilation, Air Conditioning and Refrigeration Technician

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### Program Description:

Students prepare for certified entry-level employment in the heating, ventilation, air conditioning, and refrigeration industry. The technical skills acquired in this program may be applied in areas such as air conditioning, systems controls, energy management systems, heating and ventilation technicians, and sales. For those individuals already in the HVAC/R trade, customized training to upgrade skills is also provided, as well as applicable sustainable construction practices. The program also provides extended learning opportunities for persons previously or currently employed in related professions.

For program costs and fees refer to the catalog TUITION AND FEES PAGE.

### Program Learning Outcomes:

1. Follow safe working practice.
2. Apply the principles and strategies used for the installation of air condition systems, heat pump systems, electric furnace, fossil fuel furnace, and system controls.
3. Apply the principles and strategies used to troubleshoot and service air condition systems, heat pump systems, electric furnaces, hydronic systems, fossil fuel furnace, and system controls.
4. Interpret and apply codes, regulations and contract documents
5. Recognize components and design principles used in air distribution systems.
6. Use mathematical skills to solve problems in electrical, heating, and air conditioning systems.
7. Apply troubleshooting skills to diagnose and repair the following: air distribution, electrical, heating systems, hydronic systems, cooling systems, and system controls.
8. Use tools and equipment required for repairing, testing, and installation of air conditioning systems, heat pump systems, hydronic systems, electric furnace, fossil fuel furnace, and system controls
9. Perform basic business, employability and customer service skills as related to the HVA/C-R industry
10. Complete AHRI Industry Heating and Cooling Competency Exam (ICE exam).
11. Handle refrigerant by completing EPA Section 608 Type II Technician Certification.
12. Apply the basic principles of energy management

### HVAC/R Technician-Sheet Metal AAS –option B (109 credits)

#### Required Courses

Quarter 1	HVAC150	Introduction to Tools and Fasteners	1
	HVAC151	OSHA 30-hour Construction Industry Outreach Training Program	4
	HVAC152	Basic First Aid and CPR	1
	HVAC153	Basic Electricity, Magnetism	2
	HVAC154	Types of Electrical Motors and Applications	4
	HVAC155	Motor Controls & Troubleshooting	4 3

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Quarter 2	HVAC156	Theory of Heat	4 2	
	HVAC157	Introduction to Automatic Controls, Troubleshooting	3	
	HVAC158	Indoor Air Quality, Advanced Controls	3	
	HVAC159	Electric & Oil Heat	3 4	
	HVAC160	Gas & Hydronic Heat	3	
Quarter 3	HVAC161	Refrigeration, Oil Chemistry, Management, Recovery	3 2	
	HVAC162	EPA 608 Universal, Leak Detection, System Evacuation	2 3	
	HVAC163	Tubing Piping and Brazing	3 2	
	HVAC164	System Charging	4	
	HVAC165	Refrigeration System Components	3 5	
Quarter 4	HVAC251	Load Calculations, Duct Design, Air Balance	4	
	HVAC260	Operating Cond, Intro to Drafting	4	
	HVAC 206	Basic Metal Working	2	
	HVAC 207	Basic Layout and Patterns	2	
	HVAC 208	Fabrication Practices	2	
	HVAC 209	Air Balance and Duct Sizing	2	
	<del>HVAC252</del>	<del>GAS PIPING</del>	<del>4</del>	
	<del>HVAC253</del>	<del>COMMISSIONING, DUCT TESTING</del>	<del>3</del>	
	Quarter 5	HVAC261	Special Refrigeration Systems	4
		HVAC262	Heat Pump Systems and GEO	4
HVAC263		Domestic Appliances	4	
HVAC264		Commercial Refrig Sys & Troubleshooting	4	
Quarter 6	HVAC265	Comfort, Psychrometrics & Energy Auditing	5 4	
	HVAC266	Troubleshooting	5	
	HVAC267	Chilled Water Systems	3	
	HVAC268	Operating, Maint, Troubleshooting Chilled Water	4	

**Electives:**

HVAC291	Practical Applications	1-18
HVAC292	Independent Projects I	1-5
HVAC293	Independent Projects II	5
HVAC296	Work-Based Learning Experience	1-13

**General Education Requirements**Communications 5 credits required

ENGL175	
ENGL&101	ENGLISH COMPOSITION I

Humanities/Social Sciences/Natural Sciences/Other 5 credits required

BIOL&160	GENERAL BIOLOGY
BIOL&175	HUMAN BIOLOGY WITH LAB
BIOL&241	ANATOMY & PHYSIOLOGY I
BIOL&242	HUMAN A&P II
BIOL&260	MICROBIOLOGY
CHEM&121	INTRODUCTION CHEMISTRY
CHEM&131	INTRODUCTION TO ORGANIC/BIOCHEMISTRY
CMST&102	INTRO TO MASS MEDIA
CMST&152	INTERCULTURAL COMMUNICATION
CMST&210	INTERPERSONAL COMMUNICATION
CMST&220	PUBLIC SPEAKING
ECON&201	MICROECONOMICS
NUTR&101	INTRO TO NUTRITION
POLS&101	INTRO TO POLITICAL SCIENCE
PSYC&100	GENERAL PSYCHOLOGY
PSYC&200	LIFESPAN PSYCHOLOGY
SOC&101	INTRO TO SOCIOLOGY

Quantitative 5 credits required

MATH172	APPLIED BUSINESS MATH
MATH&141	PRECALCULUS I

MATH&142	PRECALCULUS II
MATH&146	INTRODUCTION TO STATISTICS
MATH&151	CALUCLUS I
MATH&152	CALCULUS II

Note: See a Career Advisor prior to choosing courses that meet general education requirements

## HVAC/R Technician-Welding AAS –Option A (109 106 credits)

### Required Courses

Quarter 1	HVAC150	Introduction to Tools and Fasteners	1
	HVAC151	OSHA 30-hour Construction Industry Outreach Training Program	4
Quarter 1	HVAC152	Basic First Aid and CPR	1
	HVAC153	Basic Electricity, Magnetism	2
	HVAC154	Types of Electrical Motors and Applications	4
	HVAC155	Motor Controls & Troubleshooting	4 3
	HVAC156	Theory of Heat	4 2
Quarter 2	HVAC157	Introduction to Automatic Controls, Troubleshooting 3	
	HVAC158	Indoor Air Quality, Advanced Controls	3
	HVAC159	Electric & Oil Heat	3 4
	HVAC160	Gas & Hydronic Heat	3
	HVAC161	Refrigeration, Oil Chemistry, Management, Recovery	3 2
Quarter 3	HVAC162	EPA 608 Universal, Leak Detection, System Evacuation	2 3
	HVAC163	Tubing Piping and Brazing	3 2
	HVAC164	System Charging	4
	HVAC165	Refrigeration System Components	3 5
	HVAC251	Load Calculations, Duct Design, Air Balance	4
Quarter 4	HVAC260	Operating Cond, Intro to Drafting	4
	WBAS101	Welding Basics	8
Quarter 5	HVAC261	Special Refrigeration Systems	4
	HVAC262	Heat Pump Systems and GEO	4
	HVAC263	Domestic Appliances	4

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	HVAC264	Commercial Refrig Sys & Troubleshooting	4
Quarter 6	HVAC265	Comfort, Psychrometrics & Energy Auditing	5 4
	HVAC266	Troubleshooting	3 5
	HVAC267	Chilled Water Systems	3
	HVAC268	Operating, Maint, Troubleshooting Chilled Water	4

### Electives:

HVAC291	Practical Applications	1-18
HVAC292	Independent Projects I	1-5
HVAC293	Independent Projects II	5
HVAC296	Work-Based Learning Experience	1-13

### General Education Requirements

#### Communications

5 credits required

ENGL175

ENGL&amp;101 ENGLISH COMPOSITION I

#### Humanities/Social Sciences/Natural Sciences/Other 5 credits required

BIOL&amp;160 GENERAL BIOLOGY

BIOL&amp;175 HUMAN BIOLOGY WITH LAB

BIOL&amp;241 ANATOMY &amp; PHYSIOLOGY I

BIOL&amp;242 HUMAN A&amp;P II

BIOL&amp;260 MICROBIOLOGY

CHEM&amp;121 INTRODUCTION CHEMISTRY

CHEM&amp;131 INTRODUCTION TO ORGANIC/BIOCHEMISTRY

CMST&amp;102 INTRO TO MASS MEDIA

CMST&amp;152 INTERCULTURAL COMMUNICATION

CMST&amp;210 INTERPERSONAL COMMUNICATION

CMST&amp;220 PUBLIC SPEAKING

ECON&amp;201 MICROECONOMICS

NUTR&amp;101 INTRO TO NUTRITION

POLS&amp;101 INTRO TO POLITICAL SCIENCE

PSYC&100	GENERAL PSYCHOLOGY
PSYC&200	LIFESPAN PSYCHOLOGY
SOC&101	INTRO TO SOCIOLOGY

Quantitative

5 credits required

MATH172	APPLIED BUSINESS MATH
MATH&141	PRECALCULUS I
MATH&142	PRECALCULUS II
MATH&146	INTRODUCTION TO STATISTICS
MATH&151	CALUCLUS I
MATH&152	CALCULUS II

Note: See a Career Advisor prior to choosing courses that meet general education requirements

## HVAC/R Support Technician Certificate of Completion (99 97credits)

### Required Courses

Quarter 1	<del>HVAC150</del>	<del>Introduction to Tools and Fasteners</del>	<del>1</del>
	HVAC151	OSHA 30-hour Construction Industry Outreach Training Program	4
	HVAC152	Basic First Aid and CPR	1
	HVAC153	Basic Electricity, Magnetism	2
	HVAC154	Types of Electrical Motors and Applications	4
	HVAC155	Motor Controls & Troubleshooting	4 3
Quarter 2	HVAC156	Theory of Heat	4 2
	HVAC157	Introduction to Automatic Controls, Troubleshooting 3	
	HVAC158	Indoor Air Quality, Advanced Controls	3
	HVAC159	Electric & Oil Heat	3 4
	HVAC160	Gas & Hydronic Heat	3
Quarter 3	HVAC161	Refrigeration, Oil Chemistry, Management, Recovery	3 2
	HVAC162	EPA 608 Universal, Leak Detection, System Evacuation	2 3
	HVAC163	Tubing Piping and Brazing	3 2
	HVAC164	System Charging	4

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	HVAC165	Refrigeration System Components	3 5
Quarter 4	HVAC251	Load Calculations, Duct Design, Air Balance	4
	HVAC260	Operating Cond, Intro to Drafting	4
	<del>WBAS101</del>	<del>Welding Basics</del>	<del>8</del>
Quarter 5	HVAC261	Special Refrigeration Systems	4
	HVAC262	Heat Pump Systems and GEO	4
	HVAC263	Domestic Appliances	4
	HVAC264	Commercial Refrig Sys & Troubleshooting	4
Quarter 6	HVAC265	Comfort, Psychrometrics & Energy Auditing	5 4
	HVAC266	Troubleshooting	3 5
	HVAC267	Chilled Water Systems	3
	HVAC268	Operating, Maint, Troubleshooting Chilled Water	4

### Electives:

HVAC291	Practical Applications	1-18
HVAC292	Independent Projects I	1-5
HVAC293	Independent Projects II	5
HVAC296	Work-Based Learning Experience	1-13
WBAS101	Welding Basics	8

### General Education Requirements

Communications	5 credits required
99 100 level	
Humanities/Social Sciences/Natural Sciences/Other	5 credits required
99 100 level	
Quantitative	5 credits required
99 100 level	

Note: See a Career Advisor prior to choosing courses that meet general education requirements