



**Program of Study Scope & Sequence
with
Certification Outcomes**

(HVAC/Steamfitting)

(HVAC/Steamfitting CIP#47-0201)

Task #	Task Description	Level/ Marking Pd	Career Path CIP/Soc (Maintenance and repair workers) 49-9071	Career Path CIP/Soc (Plumbers ,Pipefitter s,Steamfitt ers) 47-2152	Career Path CIP/Soc (Boilerm aker) 47-2011	Certification to test for (Epa 608, Epa 609, Osha 10/30, Ladder Certification.)
100	Introduction to HVAC/R	1.1	X	X	X	
101	Identify HVAC/R systems.	1.1	X	X	X	
102	Locate career opportunities in the HVAC/R profession.	1.4	X	X	X	
103	Demonstrate the duties and responsibilities of an HVAC Technician.	1.1	X	X	X	
	RESERVED (104)					
105	Use customer service skills to communicate information to the client	1.4	X	X	X	

200	Basic Safety	1.1	X	X	X	
	RESERVED (201-202)					
203	Identify and use personal protection equipment.	1.1	X	X	X	
204	Apply OSHA regulations to identify hazards and measure to prevent job site accidents from occurring.	1.2	X	X	X	X 1.1
205	Use stepladders, extension ladders, and scaffolding.	1.4	X	X	X	X 1.1
300	Tools for HVAC/R	1.1	X	X	X	
301	Identify, use, and maintain basic hand tools use in the trade.	1.1	X	X	X	
302	Identify, use, and maintain basic power tools used in the trade.	1.1	X	X	X	
400	Blueprint Reading	2.1	X	X	X	
401	Compare types of blueprint plans.	2.1	X	X	X	
402	Read and interpret blueprint plans.	2.2	X	X	X	
500	Piping Practices	1.4	X	X	X	
501	Identify piping materials.	1.1	X	X	X	
502	Select, measure, cut, ream, swage, and flare piping and tubing projects.	1.4	X	X	X	
503	Cut, ream, thread, and assemble steel piping projects and pressure test.	1.1	X	X	X	
504	Assemble non-metallic pipe and fittings and pressure test.	1.4	X	X	X	
505	Assemble copper tubing projects and pressure	1.4	X	X		

	test.					
506	Solder copper tubing.	1.4	X	X	X	
507	Braze ACR tubing.	1.4	X	X	X	
	RESERVED (508-509)					
510	Assemble corrugated stainless steel gas tubing (CSST) projects.	2.1	X	X		
	RESERVED (511)					
600	Basic Electricity	1.2	X	X		
601	Explain the basic concepts of electricity.	1.2	X	X		
602	Calculate basic electrical quantities using Ohm's law.	1.2	X	X		
603	Explain how magnetism is used in different HVAC components.	2.4	X	X		
604	Implement safe electrical practices.	1.2	X	X	X	
605	Interpret and draw various types of electrical schematics and symbols.	1.2	X	X		
606	Practice industry standard wiring techniques.	1.2	X	X	X	
607	Analyze components of energized and de-energized circuits using the appropriate test meters and instrumentation.	1.2	X	X		
608	Wire series circuit, parallel circuit, and series/parallel circuit.	1.2	X	X		
609	Size and install electric disconnect, circuit breakers, and fuses.	2.3	X	X		
610	Classify and test various types of capacitors.	2.2	X	X		

611	Identify electrical motors and their applications.	2.4	X	X		
612	Differentiate between motor control protection and start devices.	2.4	X	X		
613	Apply relevant electrical codes.	4.1	X	X	X	
614	Determine transformers rating and their applications.	2.4	X	X		
	RESERVED (615)					
700	Introduction to Cooling	2.1	X	X		X 1.3
701	Measure temperature and pressure of a cooling system.	2.1	X	X		
702	Calculate superheat and subcooling	2.1	X	X		
703	Locate and describe components of the basic refrigeration cycle.	1.4	X	X		
704	Evaluate refrigerants using temperature and pressure charts for various refrigerants.	1.4	X	X		
705	Analyze and test the operations of various compressors.	2.2	X	X		
706	Analyze and test the operations of various condensers.	2.4	X	X		
707	Analyze and test the operations of various evaporators.	2.4	X	X		
708	Analyze, test and adjust the operations of various metering devices.	2.4	X	X		
709	Identify secondary components used in the air conditioning and refrigeration industry.	3.1	X	X		
710	Evaluate effects of airflow on cooling system	2.3	X	X		

	performance.					
711	Categorize and manipulate service valves.	2.1	X	X		
800	Introduction to Heating	1.3	X	X	X	
801	Describe the principles of combustion.	1.3	X	X	X	
802	Evaluate temperatures and pressures of various heating systems.	1.3	X	X	X	
803	Identify components and fuel properties of various heating systems.	4.1	X	X	X	
804	Perform maintenance on a gas furnace.	1.4	X	X	X	
	RESERVED (805)					
806	Identify oil heating equipment.	2.4	X	X	X	
807	Install and adjust oil, gas (condensing and non-condensing), and electric heating equipment.	4.1	X	X	X	
808	Perform maintenance on oil fired equipment.	4.1	X	X	X	
	RESERVED(809)					
810	Identify and size electric heating equipment.	4.1	X	X	X	
811	Install heating/air conditioning thermostats.	1.3	X	X	X	
	RESERVED(812)					
813	Perform combustion analysis on oil and gas fired equipment.	2.4	X	X		
814	Identify the sequence of operations of various warm air furnaces.	4.1	X	X	X	
900	Air Distribution Systems	1.2	X	X	X	

901	Identify and design different types of duct systems.	1.2	X	X	X	
902	Identify and describe the different types of duct system components.	1.2	X	X	X	
903	Test velocity, static pressure, temperature, humidity, and volume in a duct system.	3.1	X	X	X	
	RESERVED (904-905)					
906	Compare, identify, and fabricate using various duct materials.	4.1	X	X		
907	Perform basic installation practices, including duct sealing and leak testing.	4.2	X	X		
908	Identify and compare the application of air distribution secondary accessories to increase air quality and comfort.	4.2	X	X		
1000	Introduction to Hydronic Systems	4.1	X	X	X	
1001	Identify and compare various hot water heating system components, piping schemes and their applications.	4.3	X	X	X	
1002	Service and maintain hydronic systems.	4.4	X	X	X	
1100	Leak Detection, Evacuation, Recovery, and Charging	2.4	X	X		X
1101	Locate refrigerant leaks using common types of leak detectors.	3.4	X	X		X
1102	Perform refrigerant recovery.	3.1	X	X		X
1103	Perform system evacuation and dehydration.	3.4	X	X		X
1104	Determine when to charge liquid versus vapor.	2.1	X	X		X

1105	Weigh in correct system charge when appropriate.	4.1	X	X		X
1106	Charge systems using superheat method when appropriate, e.g., fixed restriction.	2.4	X	X		X
1107	Charge systems using subcooling method when appropriate, e.g., TXV,AXV	2.4	X	X		X
1108	Apply knowledge of EPA Section 608 regulations.	1.3	X	X		X
1109	Identify pump down applications and perform system pump down operations.	4.1	X	X		X
1110	Demonstrate industry-aligned procedures when handling existing and developing refrigerants. Such as CFCs, HCFCs,HFCs,HFOs, (A2Ls), HCs, and any others that may be implemented into industry.	4.1	X	X		X
1200	Troubleshooting Heating	3.1	X	X	X	
1201	Perform burner flame proving tests.	3.4	X	X	X	
1202	Troubleshoot gas heating equipment.	3.4	X	X	X	
1203	Troubleshoot oil fired equipment.	4.2	X	X	X	
1300	Troubleshooting Cooling	4.1	X	X		
1301	Identify control system components.	4.2	X	X	X	
1302	Troubleshoot and service cooling equipment.	4.1	X	X		
1303	Troubleshoot electrical components.	2.4	X	X	X	
1400	Heat Pumps	3.1	X	X		
1401	Explain heat pump modes of operation.	3.2	X	X		

1402	Identify and describe heat pump components.	3.2	X	X		
1403	Install heat pump systems.	2.4	X	X		
1500	Computer fundamentals	1.1	X	X	X	
	RESERVED(1501)					
1502	Utilize the internet for research.	1.1	X	X	X	
1503	Use HVAC computer and mobile applications.	4.4	X	X	X	