

HMI 214

HVAC

Week	Outcomes	Format	Hrs	Topic/Content	Readings	Assignment	Assessment	Resources
1	1,3	Lecture	3	Protect self and others:				Calculators,
				<u>Follow</u> shop safety rules and understand how				green tag
				practicing good housekeeping at all times				safety boots,
				prevents accidents				safety glasses
				Explain hazards associated with the different				Text book
				types of cooling systems.				Fundamentals
				<u>Comprehend</u> the safety procedures and Personal	Units 3, 23,			of HVAC/R
				Protective Equipment associated with the HVAC	26			
				industry.				Instructor
				Identify information on a Material Safety Data		End of chapter		handouts/
				Sheet		questions		training
				Describe the four classifications of fire				materials
				extinguishers				
				Identify unsafe situations and conditions.				
				<u>Understand</u> the fundamentals of the heating and				
				cooling systems, as well as, recognize the				
				environmental protection process of refrigerant				
				recovery systems				
2	1, 2	Lecture	1.5	Principles of Heat transfer and the effects these				As above
				have on a heating or cooling system:				
				<u>Understand</u> the principles of conduction,				
				radiation, convection, and evaporation.				
				Explain these principles and relate them to the			Formative	
				condition of heating and cooling equipment.				
				Identify, through observation and temperature	Section 2			
				readings, when equipment is functioning				
				properly.	Units 4-8			
		Lab	1.5	Take readings at strategic locations in the		Outline:	Observation	
				functioning cooling system and document		Project -	of students	
				findingsforanalysis		practical	inlab	
				<u>Understand</u> the differences between latent and		assignment #1		
				sensible heat as applied to a cooling system and		_		
				identify and calculate these values.				

3	2,4			Continuation of practical lab assignment #1			Observation	As above
		Lab	3	Lab project consists of taking temperature readings to understand that latent heat is removed from the house air and that the amount of condensation (drain) an air conditioner produces will be excessive.	Unit 23	Practical	of students in lab	
				Lab reports to be completed compiling the findings. Complete Practical Assignment #1.		assignment #1	Summary report of lab	
4	1,3	Lecture	2	Demonstrate the ability to identify the heating/cooling trade tools and meters Describe and explain the purpose of various	Section 3		Observation of students in lab	As above
				specialty tools such as: refrigeration gauges, flaring tools, vacuum pump, micron vacuum gauge, and electrical meters. <u>Understand</u> how voltage, current, and resistance are part of a heating or cooling system	Units 9-11 Unit 15, 27			
		Lab	1	<u>Practise</u> using these tools while performing work related tasks on the equipment in the lab: e.g. checking refrigeration pressures, superheat, and sub-cooling. Summarize their experiences in a report.			End of chapter questions	
5	3, 7	Test 1	2	Theory test #1 – 2 hrs	Test Units 1-11		Observation of students	As above
		Lab	1	Lab time 1 hr Continuation of Trade tools and meters: Demonstrate an understanding of electrical fundamentals as it relates to the heating and		Practical assignment #1 due	in lab Summative	
				<i>cooling systems.</i> <u>Identify</u> the condition of brittle and damaged wiring on various heating and cooling equipment and <u>comprehend</u> the amperage to wire size (gauge) ratio	Section 3, 5 Units 11-14	Test 1	Theory test 1	

6	4		3	Take amperage readings of a motor load safelyState the reasons why 208V appliances run atlower amperages than 110V appliancesIdentify wiring alterations that may have beenmade to equipment.Field tripLocation to be determined		Fieldtrip	As above
7	4	Lecture	2	Review and discuss the field trip.Understand the operation of an evaporator, condenser, compressor, and metering device.Take temperatures at various points along the piping of the air conditioner and explain what is happening to the physical state of the refrigerant.Explain thermodynamic terminology such as: British Thermal Unit, Joule and Watt. Become familiar with terminology related to the First and Second Laws of Thermodynamics.Describe what occurs during the latent heat of fusion and latent heat of vaporization.Lab - study the role that airflow and filter maintenance have on heating or cooling operations.Locate the high and low sides of an air conditioning systemPerform temperature readings at various locations to identify deficiencies.	Section 2 Units 17-22	Observation of students in lab End of chapter questions	As above
8	4, 5	Lecture	1	Explain the basic heat transfer principles of operation for the various heating and cooling sources.Identifyvarious energy sources and explain their operations with confidence.		Observation of students in lab Formative assessment	As above

		Lab	2	<u>Understand</u> the refrigeration principles and heat transfer concepts and use those ideas to describe one particular system to their client <u>Describe</u> and determine if unacceptable alterations have been made between the size of the duct system and the BTU capacity of the piece of equipment, including supply plenum of furnaces, return air drops and branch runs. <u>Lab</u> assignment: <u>Outline</u> the pros and cons for each application explained in week 10, explaining answers.	Section 4, 5 Unit 23, 27	Lab assignment		
9	4, 5, 6	Lab	3	Explain the basic principles of operation for air conditioning system components.Understand how a ductless split air conditioning system worksReview the differences between recovered, recycled, and reclaimed refrigerantExplain the concept called entropy, enthalpy and practice using a psychometric chart.Lab procedures to the equipment and understand what the results of the tests indicate.	Section 4, 5 Unit 18 Instructor handouts	Practical Assignment 2 given	Observation of students in lab	As above
10			3	Test #2 - 3 hours		Theory Test # 2	Summative	As above

11	6	Lecture	3	Review previous HMI 202 course materials		Formative	As above
				referring to the safe and successful ignition of		assessment	
				gas fired equipment.	Section 6		
				Examine the in-depth operation of a fuel burning			
				appliance and its components.	Unit 37-40	End of	
				Explain how the size of the furnace plenum, duct		chapter	
		Lab		system and return air duct affects the operating		question	
				efficiency of the equipment			
				<u>Understand</u> that temperature differences are			
				critical to the efficient operation of the unit.			
				Explain where to take temperature readings and			
				transfer resultant values into an efficiency rating			
				for how the system is functioning.			
				<u>Describe</u> the important role that a properly			
				installed humidifier has on a heating system and			
				the importance of dehumidification in the			
				summertime			

12	6	Lecture Lab	3	Describe the duties of a ventilation system and explain the primary function. Realize the variables that determine the size of a duct run and difference between static and velocity pressure of air Understand the purpose of a condensate trap on an evaporator. Know where to properly locate a thermostat Become familiar with the different kinds of ventilation fans state the concepts of how an HRV operates	Section 7 Unit 66-69 Instructor Handouts	Observation of students in lab End of chapter questions	As above Instructor handouts
13	6, 7	Lecture Lab	3	Identify the differences between Ground Source, air to air, and geo-thermal heat pumps Understand what the main components of heat pump systems are and be able to explain the operations Identify the roll a circulating pump serves in a geo-thermal heat pump Describe the main differences between styles of heat pumps. State the importance of a circulating pump Work on completing assignment #2 in the lab Review materials for upcoming test	Section 6 Unit 49-53	Observation End of chapter questions	As above
14		Test#3	3	Theory Test #3 - 3 hrs		Summative	Pencils, calculator, eraser
15	1-7	Lecture Lab	3	Review highlights from previous Learning Outcomes	Instructor Handouts		
16		Lecture	3	Question and answer session Class to evaluate my instruction by completing an evaluation Debrief of the semester		Formative	