SAULT COLLEGE

HMI 214 HVAC

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

		Lab	1.5	identify and calculate these values.				
3	2,4	Lab	3	Continuation of practical lab assignment #1 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. Lab reports to be completed compiling the findings. Complete Practical Assignment #1.	Unit 23	Practical assignment #1	Observation of students in lab Summary report of lab	As above
4	1,3	Lecture Lab	2 1	**Demonstrate the ability to identify the heating/cooling trade tools and meters** Describe and explain the purpose of various specialty tools such as: refrigeration gauges, flaring tools, vacuum pump, micron vacuum gauge, and electrical meters. Understand how voltage, current, and resistance are part of a heating or cooling system Practise 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.	Section 3 Units 9-11 Unit 15, 27		Observation of students in lab End of chapter questions	As above
5	3, 7	Test 1	2	***Theory test #1 – 2 hrs*** ***Lab time 1 hr*** ***Continuation of Trade tools and meters:*** ***Demonstrate an understanding of electrical fundamentals as it relates to the heating and***	Test-units 1-11	Practical assignment #1 due	Observation of students in lab Summative Theory test 1	As above

		Lab	1	***cooling systems.*** Identify the condition of brittle and damaged wiring on various heating and cooling equipment and comprehend the amperage to wire size (gauge) ratio Take amperage readings of a motor load safely State the reasons why 208V appliances run at lower amperages than 110V appliances Identify wiring alterations that may have been made to equipment.	Section 3, 5 Units 11-14	Test 1		
6	4		3	***Field trip*** ***Location to be determined***			Field trip	As above
7	4	Lecture Lab	1 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 system Perform 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 Lab	1 2	***Explain the basic heat transfer principles of operation for the various heating and cooling sources.*** Identify various energy sources and explain their operations with confidence. Understand the refrigeration principles and heat transfer concepts and use those ideas to describe one particular system to their client Describe 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. **Lab** assignment: Outline the pros and cons for each application explained in week 10, explaining answers.	Section 4, 5 Unit23, 27	Lab assignment	Observation of students in lab Formative assessment	As above
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 works Review the differences between recovered, recycled, and reclaimed refrigerant Explain the concept called entropy, enthalpy and practice using a psychometric chart. ***Lab - work continued:*** perform a variety of 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 Lab	3	***Review previous HMI 202 course materials referring to the safe and successful ignition of gas fired equipment.*** Examine the in-depth operation of a fuel burning appliance and its components. Explain how the size of the furnace plenum, duct system and return air duct affects the operating efficiency of the equipment Understand 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. Describe the important role that a properly installed humidifier has on a heating system and the importance of dehumidification in the summer time	Section 6 Unit 37-40		Formative assessment End of chapter question	As above

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	