HMI202 Heat Transfer – Course Plan

Week	**Outcomes**	Format	Hrs	Topic/Content	Readings	Assignment	Assessment	Resources
1	1	Lecture	3	***Protect self and others:*** Demonstrate an understanding of safety as it relates to furnaces, wood/electric combination furnaces and air conditioning systems. Identify proper Personal Protective Equipment as it relates to his/her personal safety. Explain hazards associated with and relating to the different types of heating systems. Understand products of combustion in occupied spaces. Describe operating temperature ranges of equipment. Identify unsafe situations / conditions relating to heating equipment (e.g. clearance from combustibles)	Chap. 1			Calculators, green tag safety boots, safety glasses Text book ***Refrigeration and Air Conditioning: An Introduction to HVAC, 4/E.*** Instructor handouts / training materials B149.1-10 Code Book
2	1,2	Lecture	3	***Demonstrate an understanding of the Natural Gas and Propane Codes as they apply to heating equipment.*** Describe OBC requirements for the HVAC industry. Understand Ontario Regulation 219/01, Ontario Regulation 215/01, Ontario Regulation 212/01, and Ontario Regulation 211/01 made under the Technical Standards and Safety Act, 2000. Identify with the various Ontario Regulations that pertain to the heating industry. Identify the locations in the code book where specific regulations are found. Explain safety contraventions related to home heating systems: conditions of natural gas lines, venting and furnace	B149.1-10 Natural Gas and Propane Installation Code		**Quiz 1**	As above.

3,4	3,4	Lecture	3 3	***Demonstrate an understanding of the basic principles of heat transfer as they apply to residential heating and cooling equipment.*** Describe temperature, heat, matter, molecular motion, work and energy. Understand the principles of conduction, radiation, convection, and evaporation. Explain the above principles and relate them to the condition of existing heating and cooling equipment. ***Demonstrate an understanding of the concepts on how "on demand hot water tanks" operate.*** Apply concepts of heat transfer to this operation: - identify the condition of heat exchangers. - compare this to hot water heating systems.	Chap. 2 Instructor handouts	Assign. # 1	**Quiz 2**	As above.
5,6	4	Lecture	3 3	***Recognize the components of heating and cooling equipment.*** Explain the functions of various components that are vital to system operations and efficiencies. Identify the process to evaluate age and relative condition of HVAC equipment. ***Describe the differences between heating and cooling equipment.*** Apply: Determine the positive / negative attributes of different types of heating and cooling equipment (e.g. hot water heating, wood/electric combination furnaces, wood stoves, forced air heating, geothermal, etc.)	Chap. 2 Instructor handouts		**Quiz 3**	As above.

7	4	Lecture	3	***Demonstrate an understanding of electrical fundamentals as it relates to the heating and cooling systems.*** Identify the condition of wiring for various heating and cooling equipment and describe how they have been wired. Identify wiring alterations that (may) have been made to equipment.	Chap. 3		**Test # 1**	As above.
8	4	Lecture	3	***Identify and understand the ducting system for the heating or cooling appliance.*** 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.	Chap. 5	Assign. # 2	**Quiz # 4**	As above.
9	5	Lecture	3	***Explain the basic principles of operation for the heating source.*** Understand the vital components and operation of furnaces: vent motors, indoor blower motors, heat exchangers. Understand the operating components of heat pump operations.	Instructor handouts			As above.
10	5	Lecture	3	***Explain the basic principles of operation for an air conditioning system.*** Review critical components of a cooling system. Explain the: evaporator coil (refrigerant characteristic) condenser coil (refrigerant characteristic) Understand conditions that affect heat transfer in a negative or positive way and recognize each situation.	Chap. 4		**Quiz # 5**	As above.

11	5	Lecture	3	***Identify conditions that decrease the operating efficiency of a heating system.*** Examine the in-depth operation of a fuel burning appliance and its components. Use the temperature values attained when checking heat transfer efficiencies. Understand that temperature differences are critical to the efficient operation of the unit.	Chap. 5			As above.
12	5	Lecture	3	***Identify conditions that negatively affect the operation of the air conditioning system.*** Explain where to take temperature readings and transfer resultant values into an efficiency rating for how the system is functioning.	Chap. 4		**Quiz # 6**	As above.
13	6	Lecture	3	***Demonstrate basic knowledge of the operation of a Heat Recovery system.*** Understand, through in depth schematics, the operation of an HRV, applying principles of heat transfer and using a cross sectional view of a functioning unit. Recognize various air pollutants such as asbestos, mould and other allergens Understand the function of different types of air filters such as: hepa, pleated, and electronic air filters.	*Readings here?*			As above.
14,15	6	Lecture	3	***Understand how an incorrectly installed HRV system can be harmful to the indoor air quality; describe how to properly design a complete residential system.*** Describe possible options, then design properly installed HRV, furnace and air conditioning systems, understanding the different ways an installation can function properly and properly sizing the system(s) to the application.	Chap. 5	Assign. # 3	**Quiz # 7**	As above.

		Lecture	3	***Understand that poorly installed equipment can increases hydro cost substantially.*** A detailed explanation of how poorly installed equipment increases hydro costs.	Instructor handouts		**Test # 1**	
16	7	Lecture	3	***Understand how refrigerants work in an air conditioning system.*** Temperature readings at various locations along the piping joining the evaporator and condenser of an air conditioning system. Review concepts and entertain questions.	Chap. 2		**Quiz # 8**	As above.