COURSE OUTLINE: MPT204 - MOBILE REFRIGERATION

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Course Code: Title	MPT204: MOBILE REFRIGERATION
Program Number: Name	4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Academic Year:	2024-2025
Course Description:	Upon successful completion, the student will be able to understand the principles of operation, diagnosis and repair Truck and Coach, Automotive, and Heavy Duty Equipment, heating, ventilation and air conditioning systems. (HVAC) Students will be required to follow proper safety procedures when performing the above tasks according to both Sault College Motive Power Department Standards and Vehicle Manufacturers safety regulations and specifications.
Total Credits:	4
Hours/Week:	7
Total Hours:	49
Prerequisites:	MPF103
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4044 - MOT POWER ADV REPAIR** VLO 1 Analyse, diagnose, and solve various motive power system problems by using problem-solving and critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships. VLO 2 Diagnose and repair climate control systems in compliance with manufacturer's recommendations. VLO 7 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. VLO 8 Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems. VLO 10 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards. VLO 11 Use information technology and computer skills to support work in a motive power environment. VLO 16 Complete all assigned work in compliance with occupational, health, safety, and environmental law; established policies and procedures; codes and regulations; and in accordance with ethical principles.
Essential Employability Skills (EES) addressed in	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.

this course:	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	EVALUATION PROCESS/GRADING SYSTEM: The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated: Classroom 35% of the final grade is comprised of term tests Assignments 10% of the final grade is comprised of a number of technical reports Shop 45% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude Employability Skills 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player. (Student will be given notice of test and assignment dates in advance) Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 59% 1.00 F (Fail)49% and below 0.00 CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar`s office. W Student has withdrawn from the course without academic penalty.

Books and Required Resources:

Heavy Duty Truck Systems by Bennett
Publisher: Cengage Learning Edition: 7th

Automotive Technology: A Systems Approach by Erjavec
Publisher: Nelson Education Edition: 4th Canadian Edition

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Explain the purpose and fundamentals of HVAC theory.	1.1 thermodynamics 1.2 heat transfer 1.3 climate control systems 1.4 temperature and relative humidity relationship 1.5 change of state, latent and sensible heat 1.6 properties of refrigerants 1.7 gas laws, temperature, pressure and volume 1.8 storage 1.9 purchasing 1.10 recovery 1.11 disposal 1.12 legal Issues 1.13 environmental effects of refrigerant
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Identify the functions, construction, composition, types, styles and application of Truck and Coach, Automotive and Heavy Equipment HVAC theory and reefer systems.	2.1 climate control systems 2.2 reefer circuit components 2.3 heating and ventilation 2.4 electronic controls 2.5 mechanical 2.6 cycling clutch systems 2.7 orifice tube 2.8 expansion valve 2.9 identify types of refrigerants 2.10 OEM Recommended 2.11 alternate 2.12 lubricants 2.13 system control devices 2.14 zone control 2.15 flow control valves 2.16 system protection devices 2.17 low temperature / pressure 2.18 high temperature / pressure 2.19 expansion valves and orifice tubes 2.20 clutch controls 2.21 condensers 2.22 receiver dryer 2.23 accumulator-dryer 2.24 evaporator 2.25 heater cores compressors 2.26 axial recirculating 2.27 radial 2.28 variable displacement 2.29 hoses, lines and fittings

	2.30 van insulation requirements
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Describe the principle(s) of operation of Truck and Coach, Automotive and Heavy Equipment HVAC systems.	3.1 heating system operation 3.2 AC system operation 3.3 climate control 3.4 temperature controls 3.5 airflow management 3.6 characteristics of refrigerants 3.7 characteristics of lubricants 3.8 system protection devices 3.9 low and high-pressure cutout 3.10 low charge protection 3.11 low pressure cycling control 3.12 compressor cycle 3.13 cycling clutch 3.14 variable displacement 3.15 reefer system operation 3.16 cryogenic systems
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Perform inspection, testing and diagnostic procedures on Truck and Coach, Automotive and Heavy Equipment HVAC systems.	4.1 identify the location of system components and controls 4.2 complete an A\C performance test on assigned vehicle or equipment 4.3 evaluate the operation of the heating system 4.4 identify A\C system refrigerant types 4.5 scan electronic climate control systems for data and codes 4.6 test for refrigerant and coolant leaks 4.7 test system for operating pressure and control functions 4.8 outline service requirements of various refrigerants
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5. Recommend reconditioning or repairs following manufacturer`s procedures on Truck and Coach, Automotive and Heavy Equipment HVAC systems.	5.1 outline procedures required for removing and replacing HVAC system components 5.2 perform drive belt adjustments 5.3 demonstrate recovery, recycling, evacuation and recharging procedures

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Employability Skills	10%
Shop practical	45%
Theory Assignments	10%
Theory Tests	35%

Date: August 9, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.