



# COURSE OUTLINE

## MPT204

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Prepared: George Parsons    Approved: Corey Meunier

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|---|---|
| <b>Course Code: Title</b>   | MPT204: MOBILE REFRIGERATION  |
| <b>Program Number: Name</b>   | 4044: MOT POWER ADV REPAIR  |
| <b>Department:</b>  | MOTIVE POWER  |
| <b>Semester/Term:</b>   | 17F   |
| <b>Course Description:</b>  | <p>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)</p> <p>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.</p>   |
| <b>Total Credits:</b>   | 4   |
| <b>Hours/Week:</b>  | 7   |
| <b>Total Hours:</b>   | 56  |
| <b>Prerequisites:</b>   | MPF103  |
| <b>Vocational Learning Outcomes (VLO's):</b><br><br>Please refer to program web page for a complete listing of program outcomes where applicable. | <p>#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.</p> <p>#2. Diagnose and repair climate control systems in compliance with manufacturer's recommendations.</p> <p>#3. Diagnose and repair engine systems in compliance with manufacturer's recommendations.</p> <p>#4. Diagnose and repair electrical, electronic, personal safety, and emission components and systems in compliance with manufacturer's recommendations.</p> <p>#7. Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices.</p> <p>#8. Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems.</p> <p>#10. Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.</p> <p>#11. Use information technology and computer skills to support work in a motive power environment.</p> |
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### Essential Employability Skills (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.
- #2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.
- #3. Execute mathematical operations accurately.
- #4. Apply a systematic approach to solve problems.
- #5. Use a variety of thinking skills to anticipate and solve problems.
- #6. Locate, select, organize, and document information using appropriate technology and information systems.
- #7. Analyze, evaluate, and apply relevant information from a variety of sources.
- #8. Show respect for the diverse opinions, values, belief systems, and contributions of others.
- #9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
- #10. Manage the use of time and other resources to complete projects.
- #11. Take responsibility for ones own actions, decisions, and consequences.

### Course Evaluation:

Passing Grade: 50%, D

### 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)

### Evaluation Process and Grading System:

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

### Books and Required Resources:

Heavy Duty Truck Systems by Bennett  
Publisher: Cengage Learning Edition: 6th



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### Course Outcomes and Learning Objectives:

#### Course Outcome 1.

Explain the purpose and fundamentals of HVAC theory.

#### Learning Objectives 1.

Potential Elements of the Performance:

- thermodynamics
- heat transfer
- climate control systems
- temperature and relative humidity relationship
- change of state, latent and sensible heat
- properties of refrigerants
- gas laws, temperature, pressure and volume
- storage
- purchasing
- recovery
- disposal
- legal issues
- environmental effects of refrigerant

#### Course Outcome 2.

Identify the functions, construction, composition, types, styles and application of Truck and Coach, Automotive and Heavy Equipment HVAC theory and reefer systems.

#### Learning Objectives 2.

Potential Elements of the Performance:

- climate control systems
- reefer circuit components
- heating and ventilation
- electronic controls
- mechanical
- cycling clutch systems



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- orifice tube
- expansion valve
- identify types of refrigerants
- OEM Recommended
- alternate
- lubricants
- system control devices
- zone control
- flow control valves
- system protection devices
- low temperature / pressure
- high temperature / pressure
- expansion valves and orifice tubes
- clutch controls
- condensers
- receiver dryer
- accumulator-dryer
- evaporator
- heater cores compressors
- axial recirculating
- radial
- variable displacement
- hoses, lines and fittings
- van insulation requirements

### Course Outcome 3.

Describe the principle(s) of operation of Truck and Coach, Automotive and Heavy Equipment HVAC systems.

### Learning Objectives 3.

Potential Elements of the Performance:

- heating system operation
- AC system operation
- climate control
- temperature controls
- airflow management
- characteristics of refrigerants





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- characteristics of lubricants
- system protection devices
- low and high-pressure cutout
- low charge protection
- low pressure cycling control
- compressor cycle
- cycling clutch
- variable displacement
- reefer system operation
- cryogenic systems

### Course Outcome 4.

Perform inspection, testing and diagnostic procedures on Truck and Coach, Automotive and Heavy Equipment HVAC systems.

### Learning Objectives 4.

Potential Elements of the Performance:

- identify the location of system components and controls
- complete an A/C performance test on assigned vehicle or equipment
- evaluate the operation of the heating system
- identify A/C system refrigerant types
- scan electronic climate control systems for data and codes
- test for refrigerant and coolant leaks
- test system for operating pressure and control functions
- outline service requirements of various refrigerants

### Course Outcome 5.

Recommend reconditioning or repairs following manufacturers' procedures on Truck and Coach, Automotive and Heavy Equipment HVAC systems.

### Learning Objectives 5.

Potential Elements of the Performance:

- outline procedures required for removing and replacing HVAC



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system components

- perform drive belt adjustments
- demonstrate recovery, recycling, evacuation and recharging procedures

**Date:**

Friday, September 1, 2017

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