



# COURSE OUTLINE

## MPT0204

Prepared: George Parsons    Approved: Corey Meunier

<b>Course Code: Title</b>	MPT0204: MOBILE REFRIGERATION
<b>Program Number: Name</b>	1120: COMMUNITY INTEGRATN
<b>Department:</b>	C.I.C.E.
<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>Essential Employability Skills (EES):</b>	<p>#1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</p> <p>#2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>#3. Execute mathematical operations accurately.</p> <p>#4. Apply a systematic approach to solve problems.</p> <p>#5. Use a variety of thinking skills to anticipate and solve problems.</p> <p>#6. Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>#7. Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>#8. Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>#9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>#10. Manage the use of time and other resources to complete projects.</p> <p>#11. Take responsibility for ones own actions, decisions, and consequences.</p>
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp;</b>	EVALUATION PROCESS/GRADING SYSTEM:



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### Assessment Requirements:

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

### Course Outcomes and Learning Objectives:

Upon successful completion of this course, the CICE student, with the assistance of a Learning Specialist will acquire varying levels of skill development relevant to the following learning outcomes:

#### 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



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- 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
- 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



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- 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
- 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



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

#### **CICE Modifications:**

#### **Preparation and Participation**

1. A Learning Specialist will attend class with the student(s) to assist with inclusion in the class and to take notes.
2. Students will receive support in and outside of the classroom (i.e. tutoring, assistance with homework and assignments, preparation for exams, tests and quizzes.)
3. Study notes will be geared to test content and style which will match with modified learning outcomes.
4. Although the Learning Specialist may not attend all classes with the student(s), support will always be available. When the Learning Specialist does attend classes he/she will remain as



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inconspicuous as possible.

**A.** Further modifications may be required as needed as the semester progresses based on individual student(s) abilities and must be discussed with and agreed upon by the instructor.

**B. Tests may be modified in the following ways:**

1. Tests, which require essay answers, may be modified to short answers.
2. Short answer questions may be changed to multiple choice or the question may be simplified so the answer will reflect a basic understanding.
3. Tests, which use fill in the blank format, may be modified to include a few choices for each question, or a list of choices for all questions. This will allow the student to match or use visual clues.
4. Tests in the T/F or multiple choice format may be modified by rewording or clarifying statements into layman's or simplified terms. Multiple choice questions may have a reduced number of choices.

**C. Tests will be written in CICE office with assistance from a Learning Specialist.**

***The Learning Specialist may:***

1. Read the test question to the student.
2. Paraphrase the test question without revealing any key words or definitions.
3. Transcribe the student's verbal answer.
4. Test length may be reduced and time allowed to complete test may be increased.

**D. Assignments may be modified in the following ways:**

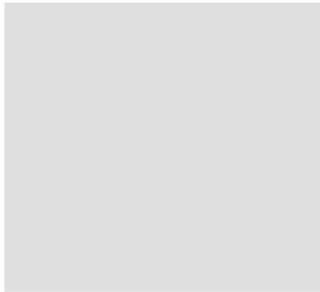
1. Assignments may be modified by reducing the amount of information required while maintaining general concepts.
2. Some assignments may be eliminated depending on the number of assignments required in the particular course.

***The Learning Specialist may:***

1. Use a question/answer format instead of essay/research format
2. Propose a reduction in the number of references required for an assignment
3. Assist with groups to ensure that student comprehends his/her role within the group
4. Require an extension on due dates due to the fact that some students may require additional time to process information



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- 5. Formally summarize articles and assigned readings to isolate main points for the student
- 6. Use questioning techniques and paraphrasing to assist in student comprehension of an assignment

**E. Evaluation:**

Is reflective of modified learning outcomes.

**NOTE:** Due to the possibility of documented medical issues, CICE students may require alternate methods of evaluation to be able to acquire and demonstrate the modified learning outcomes

**Date:**

Wednesday, September 6, 2017



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