



# COURSE OUTLINE

## MPT203

Prepared: Stephen Kent    Approved: Corey Meunier

<b>Course Code: Title</b>	MPT203: INTERNAL COMBUSTION ENGINES II
<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><b>COURSE DESCRIPTION:</b>                      In this course, you will be exposed to common machine shop and reconditioning operations for engine crankshafts, connecting rods, cylinder block and cylinder heads. You will have a sound understanding of engine lubrication and cooling system diagnosis. Emphasis will be placed on students acquiring practical skills for internal and external engine repair procedures such as: engine timing component replacement, valve train service, cylinder head and gasket repairs, cooling and lubrication system repair and engine accessory component diagnosis.</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>	8
<b>Total Hours:</b>	64
<b>Prerequisites:</b>	MPF101, MPF103
<p><b>Vocational Learning Outcomes (VLO's):</b></p> <p>Please refer to program web page for a complete listing of program outcomes where applicable.</p>	<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>#3. Diagnose and repair engine 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>#9. Apply knowledge of hydraulics and pneumatics to the testing and analysis of motive power 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</p>



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**Essential Employability Skills (EES):**

environment.

- #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:**

V. 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)

NOTE: All assignments will be in typed format. NO hand written assignments will be accepted.

The following semester grades will be assigned to students:

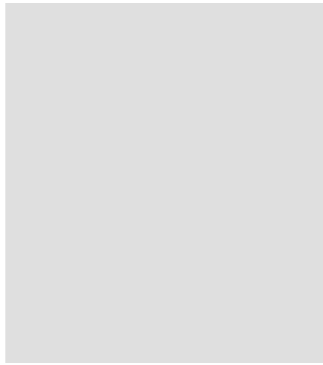
Grade  
 Definition Grade Point Equivalent



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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.

**Evaluation Process and Grading System:**

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

**Books and Required Resources:**

Automotive Technology: A Systems Approach by Erjavec  
 Publisher: Thomson Nelson Learning Canada Edition: 3rd Canadian  
  
 Medium/Heavy Duty Truck Engines, Fuel and Computerized Management Systems by Bennet  
 Publisher: Cengage Learning Edition: 5th edition

**Course Outcomes and Learning Objectives:**

### Course Outcome 1.

Discuss the purpose and fundamentals of camshaft and valve train assemblies

### Learning Objectives 1.

- Potential Elements of the Performance:
- Define valve lead, lag, overlap, and duration.
  - Explain the relationship of valves to position of pistons.



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- Draw and interpret a valve timing events diagram.
- Describe lifters, solid, hydraulic and roller design
- Outline rocker arms and push rods
- Compare and contrast overhead valve to overhead camshaft design engines.

### **Course Outcome 2.**

Describe the types styles and application of valve trains

### **Learning Objectives 2.**

Potential Elements of the Performance:

- Outline different types of drive mechanisms chains, belts, gears and sprockets.
- Explain purpose of manufacturing engines with overhead camshafts.
- Describe in block camshaft engine operation including push rods, lifters and rocker arms.

### **Course Outcome 3.**

Perform recommended service operations.

### **Learning Objectives 3.**

Potential Elements of the Performance:

- Remove and install timing belts and chains
- Perform valve adjustment on a variety of styles
- Compression test
- Cylinder leakage test.
- Measure valve lift and duration
- Vacuum test
- Check gear and pump timing on Diesel engines

### **Course Outcome 4.**

Describe common engine machine shop reconditioning equipment and procedures



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### **Learning Objectives 4.**

Potential Elements of the Performance:

- Inspect component gasket surfaces for nicks, burrs and worpage.
- Outline proper gasket sealing techniques used in the motive power engine repair industry.

Observe the reconditioning operations for:

- Cylinder blocks
- Crankshafts
- Connecting rods
- Cylinder heads

### **Course Outcome 5.**

Diagnose cooling systems.

### **Learning Objectives 5.**

Potential Elements of the Performance:

- Perform a leak test
- Test thermostat for opening temperature
- Test PH and freeze point
- Flush system
- Check for combustion signs in cooling system.
- Test and service SCA's in Diesel engines cooling systems.
- Have a clear understanding of the importance of testing PH & SCA's.

### **Course Outcome 6.**

Diagnose lubrication systems.

### **Learning Objectives 6.**

Potential Elements of the Performance:

- Test oil pressure
- Check for oil contamination



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- Check for leaks
- Describe proper leak testing techniques.
- Replace oil and filters
- Outline oil requirements, API ratings.

**Date:**

Friday, September 1, 2017



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