



## COURSE OUTLINE: MPF124 - FUEL SYSTEMS

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<b>Course Code: Title</b>	MPF124: FUEL SYSTEMS
<b>Program Number: Name</b>	4041: AUTOMOTIVE REPAIR 4044: MOT POWER ADV REPAIR
<b>Department:</b>	MOTIVE POWER
<b>Semesters/Terms:</b>	18F
<b>Course Description:</b>	<p>In this course, you will learn the construction, operating principles, testing and service techniques used in fuel systems including, fuel pumps, tanks , lines sub-systems intakes and exhaust. You will also be introduced to electronic gasoline fuel injection and diesel fuel injection systems including electronic diesel fuel injection systems.</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>	5
<b>Hours/Week:</b>	7
<b>Total Hours:</b>	49
<b>Prerequisites:</b>	MPF103
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>This course is a pre-requisite for:</b>	MPT200, MPT232
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>  Please refer to program web page for a complete listing of program outcomes where applicable.	<p><b>4041 - AUTOMOTIVE REPAIR</b></p> <p>VLO 1 Identify basic motive power system problems by using critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships.</p> <p>VLO 3 Identify, inspect, and test basic electrical, electronic, and emission components and systems in compliance with manufacturers recommendations.</p> <p>VLO 6 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices.</p> <p>VLO 7 Use a variety of test equipment to assess basic electronic circuits, vehicle systems, and subsystems.</p> <p>VLO 9 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.</p> <p>VLO 10 Use information technology and computer skills to access data concerning repair procedures and manufacturer's updates.</p> <p><b>4044 - MOT POWER ADV REPAIR</b></p> <p>VLO 4 Diagnose and repair electrical, electronic, personal safety, and emission components and systems in compliance with manufacturer's recommendations.</p>



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	<p>VLO 7 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices.</p> <p>VLO 8 Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems.</p> <p>VLO 10 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.</p> <p>VLO 11 Use information technology and computer skills to support work in a motive power environment.</p> <p>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.</p>
<b>Essential Employability Skills (EES) addressed in this course:</b>	<p>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.</p> <p>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p>
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>V. EVALUATION PROCESS/GRADING SYSTEM:</p> <p>The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated:</p> <p>Classroom 35% of the final grade is comprised of term tests</p> <p>Assignments 10% of the final grade is comprised of a number of technical reports</p> <p>Shop 45% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude</p> <p>Employability Skills 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player.</p> <p>(Student will be given notice of test and assignment dates in advance)</p> <p>NOTE: All assignments will be in typed format. NO hand written assignments will be accepted.</p> <p>The following semester grades will be assigned to students:</p> <p>Grade Definition Grade Point Equivalent A+ 90 100% 4.00</p>



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:**

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	Learning Objectives for Course Outcome 1
Describe function composition and properties of fuels.	Gasoline fuel <ul style="list-style-type: none"> <li>• volatility</li> <li>• octane rating</li> <li>• additives</li> <li>• hydrocarbons</li> <li>• atomization heat energy / BTU's</li> <li>• Check alcohol content</li> </ul> Diesel fuel <ul style="list-style-type: none"> <li>• volatility</li> <li>• cetane number</li> <li>• viscosity</li> <li>• additives</li> <li>• Sulfur content, etc.</li> </ul> Alternate fuels <ul style="list-style-type: none"> <li>• LPG</li> <li>• LNG</li> <li>• E85</li> <li>• Ethanol</li> <li>• Bio diesel</li> <li>• CNG</li> </ul>
Course Outcome 2	Learning Objectives for Course Outcome 2
Explain the combustion principles of fuels.	Describe: <ul style="list-style-type: none"> <li>• oxidation reactions</li> <li>• products of combustion</li> <li>• HC</li> <li>• CO</li> <li>• CO2</li> <li>• NOX</li> <li>• Particulates</li> <li>• Measure exhaust emissions, gas and diesel</li> <li>• thermal expansion and contraction</li> <li>• air fuel ratios</li> </ul>

		<ul style="list-style-type: none"> <li>• atomization / vaporization</li> <li>• detonation</li> <li>• pre-ignition</li> </ul>
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>	
Define the purpose construction and operation of internal and external delivery components.	<ul style="list-style-type: none"> <li>• Describe fuel delivery components</li> <li>• Identify all components attached to the fuel tank</li> </ul>	
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>	
Identify inspect and test fuel delivery sub system and emission components	<ul style="list-style-type: none"> <li>• Replace primary and secondary fuel filters on a diesel engine.</li> <li>• Describe why we use different types of fuel filters and causes of defective filters</li> <li>• Remove a fuel tank from a vehicle replacing a fuel pump.</li> <li>• Fabricate, repair and replace fuel lines</li> <li>• Test a fuel tank sending unit and the dash gauge manually and with a scan tool</li> <li>• Perform fuel pressure testing on gasoline and diesel fuel injected engines.</li> <li>• Operate fuel pump with scan tool</li> <li>• Identify evaporative emission components</li> </ul>	
<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>	
Intake and exhaust	<p>Explain the purpose and fundamentals, inspect and test intake and exhaust systems:</p> <ul style="list-style-type: none"> <li>• volumetric efficiency</li> <li>• scavenging</li> <li>• manifold vacuum, boost and exhaust back pressure</li> <li>• Boyle's Law, Charles Law, and Bernoulli's Theorem</li> <li>• Identify and inspect exhaust system components including the catalytic convertors</li> <li>• Identify SCR and DPF components</li> <li>• Identify EGR system components</li> <li>• Identify secondary air components</li> </ul>	
<b>Course Outcome 6</b>	<b>Learning Objectives for Course Outcome 6</b>	
Fuel injection introduction	<ul style="list-style-type: none"> <li>• Identify fuel injection system types and the components of gas and diesel engines.</li> <li>• Identify primary fuel metering sensing devices</li> <li>• Access an OBDII Fuel related trouble code using scan tools as related to fuel system diagnosis.</li> <li>• Access fuel system data with applicable scan tools and lap tops.</li> </ul>	

**Evaluation Process and Grading System:**

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

**Date:**

August 22, 2018

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

