



COURSE OUTLINE: MPF124 - FUEL SYSTEMS

Prepared: Stephen Kent

Approved: Corey Meunier, Dean, Technology, Trades, and Apprenticeship

Course Code: Title	MPF124: FUEL SYSTEMS
Program Number: Name	4041: AUTOMOTIVE REPAIR 4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Academic Year:	2024-2025
Course Description:	<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>
Total Credits:	5
Hours/Week:	7
Total Hours:	49
Prerequisites:	MPF103
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	MPT200, MPT232
Vocational Learning Outcomes (VLO's) addressed in this course:	<p>4041 - AUTOMOTIVE REPAIR</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>4044 - MOT POWER ADV REPAIR</p>

Please refer to program web page for a complete listing of program outcomes where applicable.



	<p>VLO 4 Diagnose and repair electrical, electronic, personal safety, and emission components and systems in compliance with manufacturer's recommendations.</p> <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>
Essential Employability Skills (EES) addressed in this course:	<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>
Course Evaluation:	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>
Other Course Evaluation & Assessment Requirements:	<p>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</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>

The following semester grades will be assigned to students:

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

Books and Required Resources:

Automotive Technology: A Systems Approach by Erjavec
 Publisher: Cengage Learning Canada Edition: 4th Canadian

Medium/Heavy Duty Truck Engines, Fuel and Computerized Management Systems by Bennet
 Publisher: Cengage Learning Canada Edition: 6th 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"> • volatility • octane rating • additives • hydrocarbons • atomization heat energy / BTU's • Check alcohol content Diesel fuel <ul style="list-style-type: none"> • volatility • cetane number • viscosity • additives • Sulfur content, etc. Alternate fuels <ul style="list-style-type: none"> • LPG • LNG • E85 • Ethanol • Bio diesel • CNG
Course Outcome 2	Learning Objectives for Course Outcome 2
Explain the combustion principles of fuels.	Describe: <ul style="list-style-type: none"> • oxidation reactions • products of combustion • HC • CO • CO2 • NOX • Particulates



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

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight

	Assignments	10%
	Employability Skills	10%
	shop	45%
	Theory Tests	35%

Date: November 12, 2024

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