COURSE OUTLINE: MPF124 - FUEL SYSTEMS

Prepared: Stephen Kent
Approved: Martha Irwin - Dean

Course Code: Title	MPF124: FUEL SYSTEMS
Program Number: Name	4041: AUTOMOTIVE REPAIR 4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Academic Year:	2025-2026
Course Description:	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. 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.
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: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4041 - AUTOMOTIVE REPAIR** 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. VLO 3 Identify, inspect, and test basic electrical, electronic, and emission components and systems in compliance with manufacturers recommendations. VLO 6 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. VLO 7 Use a variety of test equipment to assess basic electronic circuits, vehicle systems, and subsystems. VLO 9 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards. VLO 10 Use information technology and computer skills to access data concerning repair procedures and manufacturer's updates. **4044 - MOT POWER ADV REPAIR**

	VLO 4	Diagnose and repair electrical, electronic, personal safety, and emission components and systems in compliance with manufacturer's recommendations.
	VLO 7	Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices.
	VLO 8	Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems.
	VLO 10	Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.
	VLO 11	Use information technology and computer skills to support work in a motive power environment.
	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.
Essential Employability Skills (EES) addressed in this course:	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.
	EES 2	Respond to written, spoken, or visual messages in a manner that ensures effective communication.
	EES 4	Apply a systematic approach to solve problems.
	EES 5	Use a variety of thinking skills to anticipate and solve problems.
	EES 6	Locate, select, organize, and document information using appropriate technology and information systems.
	EES 7	Analyze, evaluate, and apply relevant information from a variety of sources.
	EES 9	Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.
	EES 10	Manage the use of time and other resources to complete projects.
	EES 11	Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.	
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
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 • volatility • octane rating • additives • hydrocarbons • atomization heat energy / BTU`s • Check alcohol content Diesel fuel • volatility • cetane number • viscosity • additives • Sulfur content, etc. Alternate fuels • LPG • LNG • E85 • Ethanol • Bio diesel • CNG
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Explain the combustion principles of fuels.	Describe: • oxidation reactions • products of combustion • HC • CO • CO2 • NOX • Particulates

	• 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.	• 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	• 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	Explain the purpose and fundamentals, inspect and test intake and exhaust systems: • 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 convertors • 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	• 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:	August 1, 2025	
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.	