



COURSE OUTLINE

MPT232

Prepared: Sylvain Belanger Approved:

Course Code: Title	MPT232: DIESEL ALTERNATE/CONVENT. FUEL EMISSIONS
Program Number: Name	4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Semester/Term:	17F
Course Description:	In this course, you will learn operating principles, trouble shooting and servicing techniques used in diesel fuel systems and subsystems. The course will focus on current past and present fuel systems .It will also explore more environmentally friendly green alternate fuels. Emission control systems will be studied focusing on pollutants and their effect on the environment.
Total Credits:	3
Hours/Week:	3
Total Hours:	24
Prerequisites:	MPF103, MPF124
Vocational Learning Outcomes (VLO's): Please refer to program web page for a complete listing of program outcomes where applicable.	<p>4044 - MOT POWER ADV REPAIR</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>#4. Diagnose and repair electrical, electronic, personal safety, and emission components and 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>#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 environment.</p>
Essential Employability Skills (EES):	<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>

- #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.

General Education Themes: Science and Technology

Course Evaluation: Passing Grade: 50%, D

Other Course Evaluation & Assessment Requirements: 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 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
shop and employability	45%
theory testing	55%

Books and Required Resources:

medium/heavy duty truck engines,fuels and computerized management systems by Sean Bennett
 Publisher: cengage

Course Outcomes and Learning Objectives:

Course Outcome 1.

Describe, identify and test the components in a hydro-mechanical port helix injection system.

Learning Objectives 1.

List and describe the components required to supply and control the air and fuel requirements to the engine for startup, idle, rated speed, deceleration, high idle and emission conditions.
 Describe the component and function of the low pressure supply system.
 List and describe the operation of the components of the high pressure injection system.
 Test the low pressure supply system.

Diagnose faulty mechanical injectors
Remove, install and time a port helix injection pump
Inspect the timing advance mechanism of a inline mechanical injection pump.

Course Outcome 2.

Differentiate the differences in operation of inlet metering and sleeve metering types of rotary diesel injection pumps and the differences in components.

Learning Objectives 2.

Potential Elements of the Performance:

Describe the difference in operation between the inlet metering pump and the sleeve metering injection pump.

Test the supply system on a rotary injection pump

Remove, install and time a rotary injection pump to an engine.

Course Outcome 3.

Define the role of computer controlled electronic diesel fuel injection systems and perform diagnostic procedures.

Learning Objectives 3.

Potential Elements of the Performance:

Identify the differences between partial authority and full authority electronic engine management systems.

Describe the construction and operation of input and output devices.

Describe how an ECM processes inputs and uses programmed data to generate outputs.

Utilize electronic service tools to extract data

Diagnose system codes.

Capture a vehicle data log and analyze results.

Course Outcome 4.

Describe, identify and test Diesel Fuel Injection Nozzles

Learning Objectives 4.

Potential Elements of the Performance:

Describe the principal of operation and purpose of hydro-mechanical injectors

Describe the principles of operation of electro-hydraulic, electronic unit injector and piezoelectric injectors.

Remove and bench test (pop) a hydraulic injector nozzle and reinstall.

Perform a balance test on electronic injectors using the electronic test tool and manufactures software program.

Remove and replace a mechanical injector.

Diagnose a faulty injector.

Course Outcome 5.

Describe, identify and test Diesel Engine Emission Systems and Regulations

Learning Objectives 5.

Define the types of emission produced by diesel engine combustion.

List the components used to reduce and control the output of emissions

List the limit for output of oxides of nitrogen (NOX) according to government regulations.

Describe the method of testing for particulate matter on the diesel engine.

Perform a SAE J1667 opacity smoke test procedure and correlate test failures to an engine or management malfunction.

Outline the operating principals of EGR valves, diesel particulate filters and catalytic converters.

Course Outcome 6.

Describe, identify and test Diesel Engine Governors

Learning Objectives 6.

Define the function of the diesel engine governor

Identify the different types of engine governors

Describe the operation of a Variable speed governor, a limiting speed governor and a isochronous governor.

Diagnose the symptoms of a faulty governor.

Date:

Monday, December 18, 2017

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