SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE:	DIESEL FUEL/EMISSIONS SYSTEMS	
CODE NO. :	MPT232	TWO
PROGRAM:	MOTIVE POWER – ADVANCED REPAIR	
AUTHOR:	DERRICK SMITH	
DATE:	MAY 2011 **PREVIOUS OUTLINE DATED:**	
APPROVED:	*"Corey Meunier"* **CHAIR**	_____ **DATE**
TOTAL CREDITS:	THREE	
PREREQUISITE(S):	MPF103 and MPF124	
HOURS/WEEK:	8 WEEKS	

I. COURSE DESCRIPTION:

In this course, you will learn the construction, operation and testing of diesel fuel systems and sub systems. Mechanical fuel systems will be studied to aid in understanding basic fuel injection systems and their operation, as well as the latest in electronic fuel injection systems, testing and operation. Emission systems will be studied with emphasis on control and the relationship between the fuel system and the tailpipe emissions.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Describe and identify the components in a diesel fuel subsystem

Potential Elements of the Performance:

- List and describe the different types of fuel systems and how they relate to one another

2. Service primary and secondary fuel filters

Potential Elements of the Performance:

- Remove and replace diesel fuel filters.
- Prime the fuel system and have the ability to start the engine.

3. Define the role of electronic diesel fuel injection

Potential Elements of the Performance:

- Identify the differences between partial authority and full authority electronic engine management systems.
- Describe how an ECM processes inputs and uses programmed data to generate outputs.

4. Diesel Fuel Injection Nozzles

Potential Elements of the Performance:

- Identify the four different types of injector nozzles.
- Describe the hydraulic principles of operation of poppet, pintle, multi-orifii electrohydraulic, and piezoelectric nozzles.
- Remove and bench test (pop) a hydraulic injector nozzle and reinstall.

5. Biodiesel and alternate fuels

Potential Elements of the Performance:

- Describe the characteristics of biodiesel fuels.
- Identify some alternatives to diesel fuel that may be viable.

6. <u>Emissions</u>

<u>Potential Elements of the Performance</u>:

- Define photochemical smog and describe the conditions required to create it.
- Identify the compounds exhausted in engine end gases and identify those that are classified as noxious.
- Outline the operating principles of EGR, oxidation catalytic converters, reduction catalytic converters, and diesel particulate filters.
- Describe and perform the SAE J1667 opacity smoke test procedure and correlate test failures to an engine or management malfunction.

III. TOPICS:

1. Diesel Fuel Subsystems
2. Mechanical vs. Electronic Diesel Fuel Injection Systems
3. Diesel Fuel Injection Nozzles
4. Biodiesel
5. Alternate Fuel Systems
6. Diesel Fuel Emissions

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Medium, Heavy Duty Truck Engines, Fuel & Computerized Management Systems, 2nd Edition

The following items are mandatory for entrance to the Shop:

- *Shop coat or coveralls*
- *CSA approved safety boots (high top only)*
- *CSA approved safety glasses*
- *NO CELL PHONES*

Clip board/pens/pencils

V. EVALUATION PROCESS/GRADING SYSTEM:

60% In class testing
40% Shop Evaluation/Assignments

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.

VI. SPECIAL NOTES:

Attendance:
Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has enclosed, the learning process has begun. Late arrivers will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.