SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	Internal Combustion Engines II		
CODE NO. :	MPT203	**SEMESTER:**	THREE
PROGRAM:	Motive Power Technician – Advanced Repair		
AUTHOR:	Stephen Kent		
DATE:	September 2013	**PREVIOUS OUTLINE DATED:**	September 2012

APPROVED: *"Corey Meunier"*

CHAIR **DATE**

TOTAL CREDITS:	FOUR
PREREQUISITE(S):	MPF101 & MPF103
HOURS/WEEK:	EIGHT

For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610

I. COURSE DESCRIPTION:

In this course, you will be exposed to common machine shop and reconditioning operations for engine crankshafts, connecting rods, cylinder block and cylinder heads. You will have a sound understanding of engine lubrication and cooling system diagnosis. Emphasis will be placed on students acquiring practical skills for internal and external engine repair procedures such as: engine timing component replacement, valve train service, cylinder head and gasket repairs, cooling and lubrication system repair and engine accessory component diagnosis.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Discuss the purpose and fundamentals of camshaft and valve train assemblies

Potential Elements of the Performance:

- Define valve lead, lag, overlap, and duration.
- Explain the relationship of valves to position of pistons.
- Draw and interpret a valve timing events diagram.
- Describe lifters, solid, hydraulic and roller design
- Outline rocker arms and push rods
- Compare and contrast overhead valve to overhead camshaft design engines.

2. Describe the types styles and application of valve trains

Potential Elements of the Performance:

- Outline different types of drive mechanisms chains, belts, gears and sprockets.
- Explain purpose of manufacturing engines with overhead camshafts.
- Describe in block camshaft engine operation including push rods, lifters and rocker arms.

3. Perform recommended service operations.

Potential Elements of the Performance:

- Remove and install timing belts and chains
- Perform valve adjustment on a variety of styles
- Compression test
- Cylinder leakage test.
- Measure valve lift and duration
- Vacuum test
- Check gear and pump timing on Diesel engines

4. Describe common engine machine shop reconditioning equipment and procedures

Potential Elements of the Performance:

- Inspect component gasket surfaces for nicks, burrs and worpage.
- Outline proper gasket sealing techniques used in the motive power engine repair industry.

Observe the reconditioning operations for:

- Cylinder blocks
- Crankshafts
- Connecting rods
- Cylinder heads

5. Diagnose cooling systems.

Potential Elements of the Performance:

- Perform a leak test
- Test thermostat for opening temperature
- Test PH and freeze point
- Flush system
- Check for combustion signs in cooling system.
- Test and service SCA's in Diesel engines cooling systems.
- Have a clear understanding of the importance of testing PH & SCA's.

6. Diagnose lubrication systems.

Potential Elements of the Performance:

- Test oil pressure
- Check for oil contamination
- Check for leaks
- Describe proper leak testing techniques.
- Replace oil and filters
- Outline oil requirements, API ratings.

III. TOPICS:

1. Camshaft and valve train assemblies
2. Types of valve trains
3. Perform service operations
4. Common engine reconditioning techniques
5. Cooling system diagnosis
6. Lubrication system diagnosis

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Title: Heavy Duty Truck Systems
Edition: 5th ed.,
Author: Bennett
Publisher: Thomson Nelson Learning Canada
Title: Automotive Technology
Edition:2nd^{t} Canadian
Author: Erjavec
Publisher: Thomson Nelson Learning Canada

Pen, pencils, calculator, and 3-ring binder

The following items are mandatory for the Shop:

- Shop coat or coveralls
- CSA approved steel toe boots (high top)
- CSA approved safety glasses

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 – 50% of the final grade is comprised of term tests.
- Assignments – 10% of the final grade is comprised of a number of technical reports.
- Shop – 40% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude.

(Students will be given notice of test and assignment dates in advance)

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 been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

Cell phones are not allowed to be on in the classrooms or shop areas during class time.

VII. COURSE OUTLINE ADDENDUM:

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