SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	Internal Combustion Engines 1		
CODE NO. :	MPF101	**SEMESTER:**	ONE
PROGRAM:	Motive Power Technician – Advanced Repair Motive Power Fundamentals – Automotive Repair Motive Power Fundamentals – Heavy Equipment & Truck Repair		
AUTHOR:	George Parsons 2015		
DATE:	September 2015	**PREVIOUS OUTLINE DATED:**	September 2014
APPROVED:	*"Corey Meunier"*		
	CHAIR		**DATE**
TOTAL CREDITS:	FIVE		
PREREQUISITE(S):	MPF 103		
HOURS/WEEK:	10 hours		

I. COURSE DESCRIPTION:

The internal combustion engine course has been designed to give the student a sound working knowledge of the construction, operating principles, testing and servicing of internal combustion engine assemblies. It will also give them the opportunity to dismantle short block assemblies for testing and inspection. Engine lubrication and cooling system construction and testing methods will also be discussed. An introduction to seals, sealant and gaskets will be given with their proper uses.

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.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Explain the construction, operating principles, testing and disassembly of internal combustion gasoline and diesel engines.

Potential Elements of the Performance:

- Explain the operational cycles of two and four stroke engines
- Calculate engine displacement
- Dismantle, inspect, test and assemble engine short block assemblies
- Measure cylinders to determine taper and out-of-round.
- Explain the construction and composition of cylinder blocks, crankshafts and cylinder heads.
- Demonstrate cylinder ridge removal and engine cleaning.
- Measure warpage, crankshaft wear, bearing wear, camshaft wear and piston wear using manufacturer specifications and precision measuring equipment.

2. Inspect and test engine lubrication systems.

Potential Elements of the Performance:

- Test engine oil pressure and compare to specification.
- Explain the construction and operation of crescent and gear pump
- Check engine oil levels and condition
- Change engine oil and filter as per manufactures procedure
- Reset engine oil life reminders
- Outline oil sampling and testing procedures

3. Identify, test and inspect gasoline and diesel engine cooling systems.

Potential Elements of the Performance:

- Compare & contrast liquid cooled versus air-cooled engines.
- Explain the effects of pressure on the boiling point of water.
- Describe cleaning and flushing the cooling systems taking into account proper handling and disposal of antifreeze.
- Test coolant freeze protection.
- Test PH levels of antifreeze
- Explain the necessity of coolant additives for diesel engines
- Inspect hoses and coolant pipes
- Perform coolant system pressure tests

4. Identify the proper seals, sealant and gaskets used in motive power engines.

Potential Elements of the Performance:

- Describe the proper seal, sealant and gasket selection process.
- Discuss proper removal and installation practices for seals, sealant and gaskets.
- Explain the construction and operating principles of seals, sealant and gaskets.

5. Identify, test and inspect accessory drive belts and pulleys.

Potential Elements of the Performance:

- Inspect drive belts and pulleys
- Inspect belt tensioners
- Remove and install belts
- Check belt alignment
- Access belt routing diagrams

III. TOPICS:

1. Construction, operating principles, testing and disassembly of internal combustion engines.
2. Inspection and testing of lubrication systems.
3. Construction and testing of cooling systems.
4. Identification of seals, sealant and gaskets.
5. Accessory drive belts and pulleys.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Title: Medium/Heavy Duty Truck Engines, Fuel & Computerized Management Systems
Edition: 4th ed.,
Author: Bennett
Publisher: Thomson Nelson Learning Canada

Title: Automotive Technology: A Systems Approach
Edition: 3rd Canadian Ed.
Author: Erjavec
Publisher: Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory in the Shop:

- CSA approved steel toe boots (high top)
- CSA approved safety glasses
- Approved coveralls

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 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.

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

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
in the classrooms or shop areas during class time.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.