

I. COURSE DESCRIPTION:

Engine Systems covers the basic engine fundamentals and operation associated with the internal combustion engines of the 2 stroke and 4 stroke cycles. Students will be able to identify and describe the external and internal working components of each type of engine and perform routine maintenance and repairs associated with various types of diesel engines used in the commercial vehicle and heavy equipment market. Students will perform maintenance and tests on the cooling systems, lubrication systems, intake and exhaust systems and the fuel systems of various types and models of diesel engines.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. **Define the fundamentals of internal combustion engines.**
2. **Identify and describe the components of the diesel engine cylinder head and valve train.**
3. **Identify and describe the construction theory and operation of the diesel engine cylinder block assemblies.**
4. **Define the purpose and fundamentals of the intake system the exhaust system and the accessory drive system associated with both the 4-stroke cycle diesel and the 2-stroke cycle diesel engine.**
5. **Describe the purpose, construction and operation of the lubrication system, the types of engine oils, the molecular structure of engine oils, and the importance of the API and the SAE ratings for engine oils.**
6. **Describe the purpose, construction and operation of the different types of cooling systems used for diesel engines. The students will also be able to describe the different types of coolants used for liquid cooled diesel engines, the environmental concerns around such coolants and precautions that should be taken for environmental and personal safety while handling these coolants.**
7. **Demonstrate proper engine lubrication service procedures for diesel engines used in commercial vehicles and equipment and**

perform engine oil pressure testing according to manufacturer specifications.

8. **Perform cooling system service on diesel engines to determine the condition and operation the coolant and the operation of the components of the cooling system according to manufacturer specifications.**

III. TOPICS:

1. ENGINE FUNDAMENTALS
2. DIESEL CYLINDER HEAD AND VALVE TRAIN
3. DIESEL ENGINE BLOCK ASSEMBLIES
4. DIESEL ENGINE INTAKE, EXHAUST AND ACCESSORY DRIVE SYSTEMS
5. DIESEL ENGINE LUBRICATION SYSTEMS
6. DIESEL ENGINE COOLANT AND COOLING SYSTEMS

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Hand outs provided by instructor as well as text books requested by department as per booklist.

V. EVALUATION PROCESS/GRADING SYSTEM:

Students will be tested on the material covered per apprenticeship curriculum by multiple choice questions, assignments, and practical tests. The weigh factor for each area of testing will be as follows:

Theory Tests	50 %
Practical Tests	40 %
Assignments	10 %

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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 only be granted admission to the room at the Instructors discretion.

Eye, Face and Foot Personal Protection Equipment (P.P.E):

Students are required to wear appropriate Personal Protection Equipment (P.P.E) in designated areas at all times. The designated areas for eye and foot protection in the Motive Power areas are: C1073 (Automotive), C1000, C1010, and C1040 (Truck/Coach and Heavy Equipment) and C1120 (Marine and Small Engines). Appropriate P.P.E must also be worn when facing hazards outside of these designated areas.

Minimum Eye Protection:

All protective eye wear shall meet the requirements of:

C.S.A. - Z94.3 or A.N.S.I. - Z87.1 +.

Approved safety glasses (lens and frames) shall have side protection such as wrap around design or fixed side shields.

Minimum Foot Protection:

1. Boot height- minimum 5 ½" uppers, measured from the top of the sole.
CSA Green Patch rating.

VII. COURSE OUTLINE ADDENDUM:

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