

I. COURSE DESCRIPTION:

Engine Systems is designed to provide the proper maintenance and repair procedures for students working on Truck and Coach Commercial Vehicles and Equipment. This course will teach the students about the different types of diesel engine intake and exhaust systems and the components used to enhance and increase the efficiency of the engines combustion system. Students will learn about the purpose and operation of Turbochargers, Blowers, Engine Exhaust Brakes and Retarders and the effects that these systems have on engine performance. The students will also learn the cause and effect of engine combustion on the Lubrication, Cooling and Mechanical Systems of the engine and the need for constant maintenance of these vital systems. Proper testing and diagnostic procedures will be demonstrated and taught to enable the students to perform accurate and proper repairs to the above mentioned sub systems and components of the engine.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Define the purpose, construction and operation of diesel engine combustion system.
2. Explain the theory of operation of the Intake system and the different engine air superchargers, turbochargers and charge air coolers used on these engines.
3. Explain the theory & operation of the exhaust system and the different types of exhaust engine brakes and retarders used to enhance engine braking performance.
4. Perform proper diagnostic procedures for evaluating the operation of turbochargers and superchargers.
5. Perform proper and safe procedures to evaluate the condition and efficiency of the cooling systems and its components according to Manufacturers Procedures.
6. Perform proper diagnostic procedures to evaluate the condition and efficient operation of the lubrication system and its components according to Manufacturers Procedures

7. Safely perform the proper overhaul and renewal procedures to the engines internal components according to manufacturer's service manuals and procedures.
8. Perform Diesel Engine component failure analysis for upper cylinder head and valve train, cylinder block and crankshaft power components.
9. Setup and Perform a Diesel Engine Run-In and Test on all electrical gauges, coolant system and gauges and lubrication system and gauges. Check for fluid leaks and exhaust leaks.

III. TOPICS:

1. Diesel engine combustion theory
2. Diesel engine intake & exhaust system components and styles
3. Diesel engine cooling systems
4. Diesel engine lubrication systems
5. Diesel engine systems and component failure analysis
6. Diesel engine exhaust brakes and retarder systems
7. Diesel engine overhaul and repair procedures
8. Diesel engine Run-in and Testing
9. Leak tests for coolant and lubrication systems

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Text Books:

Heavy Duty Truck Systems, 5th ed.

Author: Bennett

Publisher: Thomson Nelson Learning Canada

Medium/Heavy Duty Truck Engines, Fuel and Computerized Management Systems, 4th Edition

Author: Sean Bennett

Pens, Pencils, Calculator and 3 Ring Binder

V. EVALUATION PROCESS/GRADING SYSTEM:

- 70% of theory testing.
- 10% shop assignments.
- 20% Practical tests.

Note: Students must take part in shop practical testing to receive credit for their work.

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.	

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.

VII. COURSE OUTLINE ADDENDUM:

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