

I. COURSE DESCRIPTION:

Engine Systems is designed to provide the proper maintenance and repair procedures for students working on Trucks, Tractor-Trailers, Busses, and Commercial On Road Equipment. In this course students will learn about the different types of Diesel and Gasoline engines used and the essential components and differences of overhead camshaft and valve train as well as the in block camshaft and valve train arrangements, The cylinder block and components such as the crankshaft, cylinder liners, pistons and ring assemblies and connecting rods styles will also be discussed and examined. Proper maintenance and testing procedures will be taught to the students enabling them to perform routine service and adjustments. The students will also be shown and taught the machine shop repair procedures for renewal of the cylinder head, valve train and the cylinder block components. Emphasis will be put on diagnostic procedures for determining the specific problems associated with the cylinder head, valve train and cylinder block components of the diesel engine.

This course also explores the theory and operation of gasoline and alternate fuel types of engines used in the Commercial On Road Vehicle market used for in town delivery vehicles and transit purposes.

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 cylinder heads, in block camshafts valve trains and overhead camshafts and valve train components.
2. Explain the theory and operation for valve timing for the intake and exhaust valves in relationship to piston position in the 2 stroke and 4 stroke combustion cycle engines.
3. Define the difference in operation between Naturally Aspirated and Turbo or super charged Diesel combustion engine related components.
4. Perform proper diagnostic procedures to determine the condition and operation of the cylinder head, camshaft and valve train components.
5. Perform minor tune up adjustments and service procedures to the valve train components according to manufacturers' service manuals specifications and procedures in a safe working manner.

6. Safely perform the proper overhaul and renewal procedures to the cylinder head and valve train components according to manufacturers' service manuals and procedures.
7. Explain the purpose construction and operation of the various components within the cylinder block.
8. Perform inspection, measuring and testing of crankshafts, engine bearings, piston and ring assemblies, cylinder liners and block assemblies.

III. TOPICS:

1. Diesel engine and Gasoline engine combustion theory
2. Cylinder head casting and configurations
3. Valve train components and construction and operation
4. Valve train diagnosis, maintenance and service adjustments
5. Valve train overhaul and machining principals
6. Cylinder block construction and design
7. Crankshafts, engine bearings, piston/ring assemblies, connecting rods, and cylinder liner assemblies
8. Testing, inspection, service and repair of engine block and internal components

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	30 %
Shop work and Assignments	20 %

This evaluation can change depending on the emphasis placed on each of the above testing procedures during the course and **students** will be **given notification** of the changes by the **Instructor** prior to testing.

The following semester grades will be assigned to students:

Grade	Definition	<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 only be granted admission at the Instructors discretion.

VII. COURSE OUTLINE ADDENDUM:

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