

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: Engine Systems

CODE NO. : TCT712 **APP Level:** TWO

PROGRAM: Truck & Coach Technician – Level 2

AUTHOR: George Parsons

DATE: August 2016 **PREVIOUS OUTLINE DATED:** May 2016

APPROVED: *“Corey Meunier”*
CHAIR

TOTAL CREDITS: FIVE

PREREQUISITE(S): Commercial Vehicle Common

HOURS/WEEK: 40 hours total during 8 week period

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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:

Fundamentals of Medium/Heavy Duty Diesel Engines

Jones & Bartlett Learning CDX Automotive – ISBN: 978-1-284-06705-7

Hand-out and additional materials may be supplied by the instructor as required.

Sault College and SAE approved safety glasses and steel toe work boots required for shop activities, including coveralls.

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:

70% Theory Testing
 10% Theory Assignments
 20% Shop Assignments

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.

**COURSE OUTLINE ADDENDUM**

1. **Course Outline Amendments:**
The faculty member reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.
2. **Retention of Course Outlines:**
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

3. Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Key Dates Calendar for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio. Student Services can provide information regarding the Prior Learning Assessment and Recognition policy or it can be viewed on the student portal.

Substitute course information is available in the Registrar's office.

4. Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. In addition announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more is available. Go to <https://my.saultcollege.ca>.

5. Communication:

The College considers **Desire2Learn (D2L)** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

6. Accessibility Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with the Accessibility Services office. Call Ext. 2703 or email studentsupport@saultcollege.ca so that support services can be arranged for you.

7. Audio and Video Recording Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. Students with disabilities who require audio or visual recording devices in the classroom as an accommodation will receive approval from their counsellor once the Audio and Video Recording Devices in the Classroom Policy has been reviewed by the student. Recorded classroom instruction will be used only for individual academic use and will not be used for any other purpose. Recordings may only be used for individual study of materials presented during class and may not be published or distributed. Intentional misuse of audio and video recordings or intentional misrepresentation when requesting the use of a device for recording shall constitute a violation of this policy and laws protecting intellectual property.
8. Academic Dishonesty:
Students should refer to the definition of “academic dishonesty” in the *Student Code of Conduct*. Students who engage in academic dishonesty will be issued a sanction under the Student Code of Conduct which could lead to and include expulsion from the course/program. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, students must use a documentation format for referencing source material.
9. Tuition Default:
Students who have defaulted on the payment of tuition) as of the first week of November (fall semester courses), first week of March (winter semester courses) or first week of June (summer semester courses) will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.