

I. COURSE DESCRIPTION:

This course will focus on developing the essential skills required to diagnose and repair gasoline electronic fuel injection and emission control systems. E-85 flex fuel systems will be compared to conventional gasoline systems, propane and natural gas fuel systems will be studied. Tailpipe emission testing will be performed, analyzed and compared to current legislated standards. You will use industry standard electronic and mechanical test equipment to diagnose simulated fuel injection and emission system faults.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. *Describe the construction, operation, types, styles and application of gasoline fuel injection systems*

Potential Elements of the Performance:

- Describe the construction and operation of fuel delivery systems
- Describe the purpose, construction and operation of primary fuel metering input and output devices
- Explain fuel metering modes of operation
- Describe OBDII modes and trouble code structure

2. *Perform diagnostic procedures on fuel delivery systems*

Potential Elements of the Performance:

- Identify and utilize appropriate personal protection and safety precautions when servicing automotive fuel systems
- Perform testing procedures to isolate problems with fuel pumps, regulators, filters, tanks and lines
- Perform injector balance testing
- Describe testing procedures for fuel contamination

3. *Perform diagnostic procedures on fuel injection electronic control systems*

Potential Elements of the Performance:

- Use scan tools and computer based diagnostic equipment to access generic OBDII functions and manufacture specific information
- Read, diagnose and clear OBDII trouble codes
- Access and interpret live data stream information
- Access non continuously monitored test results
- Use bi-directional communications to operate and test output devices

4. Identify and test emission control componentsPotential Elements of the Performance:

- Describe the construction and operation of emission control systems
- Identify emission control devices
- Use electronic test equipment to diagnose emission control system failures
- Perform exhaust emissions testing

5. Alternate fuelsPotential Elements of the Performance:

- Describe fuel injection system requirements for E-85 flex fuel vehicles
- Explain the difference in fuel metering requirements for ethanol fuel blends
- Describe the construction and operation of propane and natural gas fueled fuel systems

III. TOPICS:

1. Gasoline fuel injection systems
2. Fuel delivery system diagnosis and repair
3. Gasoline fuel injection diagnosis and repair
4. Emission control systems
5. Alternate fuels

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Title: Automotive Technology: A Systems Approach

Edition: 06 ed., 17810#

Author: Erjavec

V. EVALUATION PROCESS/GRADING SYSTEM:

Tests	60%
Assignments/presentations	10%
Practical labs (shop)	30%

Practical lab assessment will be based on:

- Attendance
- Employability skills
- Performance

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 not be granted admission to the room.

Testing:

If a student misses a test he/she must have a valid reason (i.e. medical or family emergency – documentation may be required). In addition, the instructor **must** be notified **prior** to the test sitting. If this procedure is not followed the student will receive a mark of zero on the test with no make-up option. Test “rewrites” will not be offered.

Protective Equipment:***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.
2. CSA Green Patch rating.

VII. COURSE OUTLINE ADDENDUM:

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

