

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



CICE COURSE OUTLINE

COURSE TITLE: Automotive Alternate & Conventional Fuel & Emissions

CODE NO. : MPT200 **SEMESTER:** Fall
MODIFIED CODE: MPT0200

PROGRAM: Motive Power Technician - Advanced Repair

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MODIFIED BY: Rachel Valois, Learning Specialist, CICE Program

DATE: Sept. 2011 **PREVIOUS OUTLINE DATED:** Sept. 2010

APPROVED: "Angelique Lemay" Sept/11

*Dean, School of Community Services
and Interdisciplinary Studies*

DATE

TOTAL CREDITS: 3

PREREQUISITE(S):

HOURS/WEEK: 6

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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 CICE student, along with the assistance of the Learning Specialist, will demonstrate the basic ability to:

1. *Discuss the construction, operation, types, styles and application of gasoline fuel injection systems*Potential Elements of the Performance:

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

2. *Assist in performing 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 or assist with testing procedures to isolate problems with fuel pumps, regulators, filters, tanks and lines
- Perform or assist with injector balance testing
- Outline testing procedures for fuel contamination

3. *Assist in performing diagnostic procedures on fuel injection electronic control systems*Potential Elements of the Performance:

- Assist in using scan tools and computer based diagnostic equipment to access generic OBDII functions and manufacture specific information
- Assist in reading, diagnosing and clearing OBDII trouble codes
- Assist in accessing and interpreting live data stream information
- Assist in accessing non continuously monitored test results
- Assist in using bi-directional communications to operate and test output devices

4. Identify and assist in testing emission control componentsPotential Elements of the Performance:

- Discuss the construction and operation of emission control systems
- Identify emission control devices
- Assist in using electronic test equipment to diagnose emission control system failures
- Perform or assist in performing exhaust emissions testing

5. Alternate fuelsPotential Elements of the Performance:

- Discuss fuel injection system requirements for E-85 flex fuel vehicles
- Outline the difference in fuel metering requirements for ethanol fuel blends
- Discuss 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:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
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.

CICE Modifications:**Preparation and Participation**

1. A Learning Specialist will attend class with the student(s) to assist with inclusion in the class and to take notes.
2. Students will receive support in and outside of the classroom (i.e. tutoring, assistance with homework and assignments, preparation for exams, tests and quizzes.)
3. Study notes will be geared to test content and style which will match with modified learning outcomes.
4. Although the Learning Specialist may not attend all classes with the student(s), support will always be available. When the Learning Specialist does attend classes he/she will remain as inconspicuous as possible.

A. Tests may be modified in the following ways:

1. Tests, which require essay answers, may be modified to short answers.
2. Short answer questions may be changed to multiple choice or the question may be simplified so the answer will reflect a basic understanding.
3. Tests, which use fill in the blank format, may be modified to include a few choices for each question, or a list of choices for all questions. This will allow the student to match or use visual clues.
4. Tests in the T/F or multiple choice format may be modified by rewording or clarifying statements into layman's or simplified terms. Multiple choice questions may have a reduced number of choices.

B. Tests will be written in CICE office with assistance from a Learning Specialist.***The Learning Specialist may:***

1. Read the test question to the student.
2. Paraphrase the test question without revealing any key words or definitions.
3. Transcribe the student's verbal answer.
4. Test length may be reduced and time allowed to complete test may be increased.

C. Assignments may be modified in the following ways:

1. Assignments may be modified by reducing the amount of information required while maintaining general concepts.
2. Some assignments may be eliminated depending on the number of assignments required in the particular course.

The Learning Specialist may:

1. Use a question/answer format instead of essay/research format
2. Propose a reduction in the number of references required for an assignment
3. Assist with groups to ensure that student comprehends his/her role within the group
4. Require an extension on due dates due to the fact that some students may require additional time to process information
5. Formally summarize articles and assigned readings to isolate main points for the student
6. Use questioning techniques and paraphrasing to assist in student comprehension of an assignment

D. Evaluation:

Is reflective of modified learning outcomes.