COURSE OUTLINE: MPF0124 - FUEL SYSTEMS - CICE

Prepared: Stephen Kent
Approved: Martha Irwin, Chair, Community Services and Interdisciplinary Studies

Course Code: Title	MPF0124: FUEL SYSTEMS FOR CICE
Program Number: Name	1120: COMMUNITY INTEGRATN
Department:	C.I.C.E.
Semesters/Terms:	18F
Course Description:	In this course, you will learn the construction, operating principles, testing and service techniques used in fuel systems including, fuel pumps, tanks , lines sub-systems intakes and exhaust. You will also be introduced to electronic gasoline fuel injection and diesel fuel injection systems including electronic diesel fuel injection systems. Students will be required to follow proper safety procedures when performing the above tasks according to both Sault College Motive Power Department Standards and Vehicle Manufacturers safety regulations and specifications.
Total Credits:	5
Hours/Week:	7
Total Hours:	49
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D
Other Course Evaluation & Assessment Requirements:	V. EVALUATION PROCESS/GRADING SYSTEM: The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated: Classroom 35% of the final grade is comprised of term tests

Assignments 10% of the final grade is comprised of a number of technical reports
Shop 45% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude

Employability Skills 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player.

(Student will be given notice of test and assignment dates in advance)

NOTE: All assignments will be in typed format. NO hand written assignments will be accepted.

The following semester grades will be assigned to students:

Grade
Definition Grade Point Equivalent
A+ 90 100% 4.00
A 80 89%
B 70 - 79% 3.00
C 60 - 69% 2.00
D 50 59% 1.00
F (Fail)49% and below 0.00

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.

Books and Required Resources:

Automotive Technology: A Systems Approach by Erjavec
Publisher: Thomson Nelson Learning Canada Edition: 3rd Canadian

Medium/Heavy Duty Truck Engines, Fuel and Computerized Management Systems by Bennet
Publisher: Cengage Learning Edition: 5th edition

Course Outcomes and Learning Objectives:

Upon successful completion of this course, the CICE student, with the assistance of a Learning Specialist will acquire varying levels of skill development relevant to the following learning outcomes:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
Describe function composition and properties of fuels.	Potential Elements of the Performance: Gasoline fuel volatility octane rating additives hydrocarbons atomization heat energy / BTUs Check alcohol content Diesel fuel volatility cetane number

	viscosity additives Sulfur content, etc. Alternate fuels LPG LNG E85 Ethanol Bio diesel CNG
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Explain the combustion principles of fuels.	Potential Elements of the Performance: Describe: oxidation reactions products of combustion HC CO CO2 NOX Particulates Measure exhaust emissions, gas and diesel thermal expansion and contraction air fuel ratios atomization / vaporization detonation pre-ignition
Course Outcome 3	**Learning Objectives for Course Outcome 3**
Define the purpose construction and operation of internal and external delivery components.	Potential Elements of the Performance: Describe fuel delivery components Identify all components attached to the fuel tank
Course Outcome 4	**Learning Objectives for Course Outcome 4**
Identify inspect and test fuel delivery sub system and emission components	Potential Elements of the Performance: Replace primary and secondary fuel filters on a diesel engine. Describe why we use different types of fuel filters and causes of defective filters Remove a fuel tank from a vehicle replacing a fuel pump. Fabricate, repair and replace fuel lines Test a fuel tank sending unit and the dash gauge manually and with a scan tool Perform fuel pressure testing on gasoline and diesel fuel injected engines. Operate fuel pump with scan tool Identify evaporative emission components
Course Outcome 5	**Learning Objectives for Course Outcome 5**
Intake and exhaust	Potential Elements of the Performance: Explain the purpose and fundamentals, inspect and test intake and exhaust systems: volumetric efficiency scavenging manifold vacuum, boost and exhaust back pressure

	Boyles Law, Charles Law, and Bernoullis Theorem Identify and inspect exhaust system components including the catalytic convertors Identify SCR and DPF components Identify EGR system components Identify secondary air components
Course Outcome 6	**Learning Objectives for Course Outcome 6**
Fuel injection introduction	Potential Elements of the Performance: Identify fuel injection system types and the components of gas and diesel engines. Identify primary fuel metering sensing devices Access an OBDII Fuel related trouble code using scan tools as related to fuel system diagnosis. Access fuel system data with applicable scan tools and lap tops.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight	Course Outcome Assessed
Assignments	10%	
Employability Skills	10%	
shop	45%	
Theory Tests	35%	

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. Further modifications may be required as needed as the semester progresses based on individual student(s) abilities and must be discussed with and agreed upon by the instructor.

B. 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.

C. 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. **D. 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 **E. Evaluation:** Is reflective of modified learning outcomes. **NOTE:** Due to the possibility of documented medical issues, CICE students may require alternate methods of evaluation to be able to acquire and demonstrate the modified learning outcomes
Date:	December 14, 2018
	Please refer to the course outline addendum on the Learning Management System for further information.