

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



CICE COURSE OUTLINE

COURSE TITLE: Suspension Systems

CODE NO. : MPT235

SEMESTER: Winter

MODIFIED CODE: MPT0235

PROGRAM: Motive Power Technician – Advanced Repair

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MODIFIED BY: Rachel Valois, Learning Specialist, CICE Program

DATE: Jan. 2012 **PREVIOUS OUTLINE DATED:** Jan. 2011

APPROVED: “Angelique Lemay” Jan. 2012

***Dean, School of Community Services
and Interdisciplinary Studies***

DATE

TOTAL CREDITS: 3

PREREQUISITE(S): MPF103/0103 & MPF120/0120

HOURS/WEEK:

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I. **COURSE DESCRIPTION:** In this course, you will focus on the construction, repair and diagnosis of motive power suspension systems. Common sources of vehicle vibration related to suspension, driveline and tires will be outlined at this time. An introduction to power steering systems and wheel alignment will also be covered. You will also perform tire and rim safety inspections following Ministry Standards, along with performance of wheel balance and the reading of tire wear patterns.

II. **LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:** Upon successful completion of this course, the CICE student, along with the assistance of a Learning Specialist, will demonstrate the basic ability to:

1. ***Outline the construction and operating principles of solid and independent suspension system components.***

Potential Elements of the Performance:

- Explore independent suspension systems, short-long arm, twin I beam, McPherson strut and modified strut
- Evaluate the effectiveness of gas shocks vs. hydraulic
- Identify load and non-load-carrying ball joints
- Identify four types of springs
- Outline radius and strut rods

2. ***Dismantle, test and inspect (or assist with) suspension system components.***

Potential Elements of the Performance:

- Inspect control arm bushings
- Measure vehicle ride height
- Test shock absorbers
- Remove and replace McPherson struts
- Remove and replace truck springs
- Measure king pins for proper operation
- Measure ball joint play using prescribed measuring equipment

3. ***Outline the construction, operating principles, testing and servicing of manual and power steering systems.***

Potential Elements of the Performance:

- Adjust (assist with) rack and pinion steering gear mesh load.
- Assist with servicing manual steering gears.
- Identify power steering pumps, power racks, integral gear boxes, control valves, lines and hoses
- Discuss the operation of power steering pumps, power gear boxes and control valves
- Assist with testing and inspecting power steering pump for pressure and flow

- Explore power steering system operation using prescribed tools & equipment

4. *Discuss the purpose and application of alignment angles and measurements.*

Potential Elements of the Performance:

- Outline the need for wheel alignment
- Identify alignment angles, camber, caster, toe, S.A.I., included angle, set back and thrust angle
- Compare alignment types, geometric center line, 2 wheel thrust line and total 4 wheel
- Observe and evaluate the measurement of a vehicle
- Outline the set up procedure of a 4 wheel alignment machine
- Identify 4 methods of adjusting alignment angles, shims, eccentrics, strut rod and slots
- Assist with manually measuring truck tracking

III. TOPICS:

1. Outline the construction and operating principles of solid and independent suspension system components.
2. Dismantle, test and inspect suspension system components.
3. Outline the construction, operating principles, testing and servicing of manual and power steering systems.
4. Discuss the purpose and application of alignment angles and measurements.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Title: Heavy Duty Truck Systems

Edition: 4th ed., 12959#

Author: Bennett

Publisher: Thomson Nelson Learning Canada

Title: Automotive Technology: A Systems Approach/AST Test Prep

Edition: 06 ed., 17810#

Author: Erjavec

Publisher: Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory for entry to the shop:

- shop coat or coveralls
- CSA approved steel toe boots (high top)
- CSA approved safety glasses

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 – 40% of the final grade is comprised of term tests
- Assignments – 10% of the final grade is comprised of a number of technical reports
- Shop – 50% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude

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

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	
A	80 – 89%	4.00
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.	

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.

**Cell phones are not allowed to be on
in the classrooms or shop areas.**

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.