

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**SAULT  
COLLEGE**

**COURSE OUTLINE**

**COURSE TITLE:** Suspension Systems

**CODE NO. :** MPT 235 **SEMESTER:** 4

**PROGRAM:** Motive Power Technician – Advanced Repair

**AUTHOR:** Stephen Kent

**DATE:** January 2016 **PREVIOUS OUTLINE DATED:** March 2015

**APPROVED:**

**Jan '17  
DATE**

*“Corey Meunier”*  
**CHAIR**

**TOTAL CREDITS:** 3

**PREREQUISITE(S):** MPF 103 MPF 120

**HOURS/WEEK:** 6

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**For additional information, please contact Corey Meunier, Chair**  
**School of Technology & Skilled Trades**  
**(705) 759-2554, Ext. 2610**

**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. Power steering systems and wheel alignment on trucks and cars will also be covered including diagnosis and repair.

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.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

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

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

Potential Elements of the Performance:

- Compare and contrast 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
- State four types of springs
- Identify radius arms and strut rods

**2. *Dismantle, test, inspect and diagnose suspension system components.***

Potential Elements of the Performance:

- Inspect control arm bushings
- Inspect torque rods and bushings
- Measure vehicle ride height
- Inspect and test shock absorbers
- Remove and replace McPherson struts
- Remove and replace truck springs
- Measure King Pins for maximum wear limits
- Remove and replace King Pins
- Measure ball joint play using prescribed measuring equipment
- Measure and adjust air ride height
- Measure Truck spring pins and bushing clearance
- Inspect for broken leaves

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

Potential Elements of the Performance:

- Adjust rack and pinion steering gear mesh load.
- Service manual steering gears.
- Identify power steering pumps, power racks, integral gear boxes, control valves, lines and hoses
- Describe the operation of power steering pumps, power gear boxes and control valves
- Test and inspect power steering pump for pressure and flow
- Analyze power steering system operation using prescribed tools & equipment

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

Potential Elements of the Performance:

- Outline the need for wheel alignment
- Define 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
- Explain the set up procedure of a 4 wheel alignment machine
- Describe 4 methods of adjusting alignment angles, shims, eccentrics, strut rod and slots
- Manually measure truck tracking
- Measure and adjust tandem axle scrub
- Check front axle setback
- Diagnose vehicle handling characteristics and alignment related tire wear.

**III. TOPICS:**

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

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

**Title:** Heavy Duty Truck Systems

**Edition:** 6th ed., 12959#

**Author:** Bennett

**Publisher:** Thomson Nelson Learning Canada

**Title:** Automotive Technology: A Systems Approach

**Edition:** 3<sup>rd</sup> Canadian Edition

**Author:** Erjavec

**Publisher:** Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory for entry to the shop:

- Approved 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 – 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:

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

**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.