COURSE OUTLINE: MPT235 - SUSPENSION SYSTEMS

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Course Code: Title	MPT235: SUSPENSION SYSTEMS
Program Number: Name	4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Academic Year:	2024-2025
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.
Total Credits:	3
Hours/Week:	6
Total Hours:	42
Prerequisites:	MPF103, MPF120, MPF129
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4044 - MOT POWER ADV REPAIR** VLO 1 Analyse, diagnose, and solve various motive power system problems by using problem-solving and critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships. VLO 6 Diagnose and repair suspension, steering, and brake components and systems in compliance with manufacturer's recommendations. VLO 7 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. VLO 8 Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems. VLO 9 Apply knowledge of hydraulics and pneumatics to the testing and analysis of motive power systems and subsystems. VLO 10 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards. VLO 11 Use information technology and computer skills to support work in a motive power environment. VLO 16 Complete all assigned work in compliance with occupational, health, safety, and environmental law; established policies and procedures; codes and regulations; and in accordance with ethical principles.

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 3	Execute mathematical operations accurately.
	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

A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.

Other Course Evaluation & Assessment Requirements:

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.

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:

Heavy Duty Truck Systems by Bennett
Publisher: Cengage Edition: 7th ed

Automotive Technology: A Systems Approach by Erjavec
Publisher: Cengage Edition: 4th Canadian Edition

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
Explain the construction and operating principles of solid and independent suspension system components.	• 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
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Dismantle, test, inspect and diagnose suspension system components.	• 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
Course Outcome 3	**Learning Objectives for Course Outcome 3**
Explain the construction, operating principles, testing and servicing of manual and power steering systems.	• 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
Course Outcome 4	**Learning Objectives for Course Outcome 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.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	10%
Employability Skills	10%
Shop	45%
Theory Tests	35%

Date: November 12, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.