

I. COURSE DESCRIPTION:

In this course the students will focus on the construction, repair and diagnosis of suspension and brake systems. Common sources of vehicle vibration related to suspension, driveline, tires and brakes would be outlined at this time. An introduction to power steering systems and wheel alignment will also be covered. The student will 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 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 automotive springs
 - Outline radius and strut rods
2. Dismantle, test and inspect suspension system components.
Potential Elements of the Performance:
 - Inspect control arm bushings
 - Measure vehicle ride height
 - Test shock absorbers
 - Remove and replace McPherson struts
 - Clean, repack and adjust wheel bearings
 - Measure ball joint play using prescribed measuring equipment
3. Explain the construction, operating principles, testing and servicing of power steering systems.
Potential Elements of the Performance:
 - 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. Outline the construction, testing and servicing of tires and rims.
Potential Elements of the Performance:
 - Define hydro-planing
 - Explain static and dynamic wheel balance
 - Describe the construction of radial tires
 - Identify factors that offset tire wear
 - Perform tire and rim safety inspection
 - Rotate tires following manufacturers maintenance procedure
 - Repair tires using prescribed tools and supplies
 - Perform dynamic wheel balance using computer assisted balancer
5. 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
6. Explain the construction and operation of brake lines, cylinders, shoes, pads, drums, discs, combination valve and cables.
Potential Elements of the Performance:
 - Compare and contrast materials used to make brake pads and shoes
 - Analyze master cylinders, wheel cylinders and calipers to determine operation
 - Test combination valve with pressure gauges to check operation
 - Inspect brake lines and flex hoses
 - Analyze parking brake mechanisms to verify operation
 - Machine brake disc's and drums
 - Service calipers and drum brake assemblies and verify proper operation
7. Diagnose brake system faults following manufacturer procedures.
Potential Elements of the Performance:
 - Evaluate brake noises

- Solve brake drag and lock up problems
- Measure brake drums and rotors to determine sources of vibration
- Identify corrective actions as required

III. TOPICS:

1. Construction and operating principles of solid and independent suspension systems.
2. Dismantle, test and inspect suspension system components.
3. Construction, operating principles, testing and servicing of power steering systems.
4. Construction, testing and servicing of tires & rims.
5. Purpose and applications of alignment angles and measurement.
6. Construction and operation of brake system components.
7. Diagnosis of brake system faults.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Modern Automotive Technology – Text & Workbook

Pens, pencils, calculator, 3-ring binder

*shop coat or coveralls

*CSA approved steel toe boots (high top)

*CSA approved safety glasses

*these items mandatory for shop

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 – 60% of the final grade is comprised of term tests

Assignments – 10% of the final grade is comprised of a number of technical reports

Shop – 30% 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%	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:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

<include any other special notes appropriate to your course>

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.

