SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: SUSPENSION, STEERING & BRAKES II

CODE NO. : ASM2040 **SEMESTER:** 3

PROGRAM: AUTOMOTIVE TECHNICIAN – SERVICE & MANAGEMENT

AUTHOR: STEPHEN KENT

DATE: AUGUST 2002 **PREVIOUS OUTLINE DATED: N/A** JUNE 99

APPROVED:

_____ _____

DEAN **DATE**

TOTAL CREDITS: 3

PREREQUISITE(S): ASM1160

LENGTH OF COURSE: 15 Weeks

I. COURSE DESCRIPTION:

In this course the student 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

LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE CONTINUED…….

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

SUSPENSION, STEERING & BRAKES II ASM2040

COURSE NAME COURSE NUMBER

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

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, assignment and shop evaluations weighed as indicated:
Classroom – 60% of the final grade is comprised of term tests
Assignment – 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 in postsecondary courses:

Grade	Definition	Grade Point Equivalent
A+	90 – 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
R (Repeat)	59% or below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field placement or non-graded subject areas.	
X	A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see *Policies & Procedures Manual - Deferred Grades and Make-up*).	
NR	Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.	

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 instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493, 717, or 491 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.

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.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

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.