SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	SUSPENSION, STEERING AND BRAKES III		
CODE NO. :	AST805	**SEMESTER:**	LEVEL 3
PROGRAM:	AUTOMOTIVE SERVICE TECHNICIAN		
AUTHOR:	STEPHEN KENT		
DATE:	JAN 2011	**PREVIOUS OUTLINE DATED:**	N/A

APPROVED:

"Corey Meunier"
CHAIR

TOTAL CREDITS:

PREREQUISITE(S):

HOURS/WEEK:

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School of Technology & Skilled Trades
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I. COURSE DESCRIPTION: This course was designed to provide the student with the ability to perform suspension inspection and a proper four-wheel alignment. The student will also be introduced to power and antilock braking systems. They will use scan tools to diagnose antilock brake system fault codes and perform system analysis using lab scopes and digital meters.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. Perform suspension and steering analysis following manufacturers recommendations.

Potential Elements of the Performance:

- Measure trim height.
- Inspect ball joints.
- Test shocks and struts.
- Explain steering linkage inspection.
- Check tire wear patterns and compare to vehicle faults found.

2. Measure the four wheel alignment of a vehicle and compare results to manufacturers specifications.

Potential Elements of the Performance:

- Define and explain the effects of the following alignment related angles , camber, caster, toe, SAI, included angle, thrust angle and set back.
- Illustrate the above mentioned angles.
- Observe and perform alignment machine set up, mount instrumentation and measure vehicle.

3. Diagnose common vehicle steering and alignment problems.

Potential Elements of the Performance:

- Explain causes for vehicles to pull to one side.
- Define vehicle instability.
- Outline vehicle wander.
- Describe bump steer and memory steer.
- Explain the causes of excessive body lean.

4. Describe the function, construction and operating principles of power assisted brake systems.

Potential Elements of the Performance:

- Compare and contrast vacuum-assisted power brakes to

hydro boost and electro hydraulic types.
- Calculate boost assist using force, pressure and area.

5. Test power brake systems following manufacturers recommendations.

Potential Elements of the Performance:
- Perform a visual inspection
- Explain operational tests for vacuum assist , hydro boost and electro hydraulic.

6. Describe the purpose, fundamentals, construction and operation of anti-lock brake and traction control systems.

Potential Elements of the Performance:
- Explain velocity and acceleration.
- Compare and contrast wheel skid to wheel lock.
- Outline tire coefficient of friction pertaining to stopping and acceleration.
- Describe predetermined deceleration and accelerations rates. Explain accumulator and pump operation.
- Describe wheel speed sensor location and operation.
- Compare and contrast one, two, three and four channel systems.
- Outline the differences between integrated and none integrated systems.
- Explain hydraulic modulation.
- Outline the effects of using different sized tires.

III. TOPICS:

1. PERFORM SUSPENSION AND STEERING ANALYSIS FOLLOWING MANUFACTURERS RECOMMENDATIONS.
2. MEASURE THE FOUR WHEEL ALIGNMENT OF A VEHICLE AND COMPARE RESULTS TO MANUFACTURERS SPECIFICATIONS.
3. DIAGNOSE COMMON VEHICLE STEERING AND ALIGNMENT PROBLEMS.
4. DESCRIBE THE FUNCTION, CONSTRUCTION AND OPERATING PRINCIPLES OF POWER ASSISTED BRAKE SYSTEMS.
5. TEST POWER BRAKE SYSTEMS FOLLOWING MANUFACTURERS RECOMMENDATIONS.
6. DESCRIBE THE PURPOSE AND FUNDAMENTALS OF ANTI-LOCK BRAKE AND TRACTION CONTROL SYSTEMS.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

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

*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	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.

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.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.