

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: AER 1498

COURSE TITLE: Steering and Suspension

PREREQUISITE(S): AER 1081C

COREQUISITE(S): None

CREDIT HOURS: 4

CONTACT HOURS/WEEK: 6

CONTACT HOUR BREAKDOWN:

Lecture/Discussion: 4

Laboratory: 2

Other _____:

FACULTY WORKLOAD POINTS: 5

STANDARDIZED CLASS SIZE ALLOCATION: 24

COURSE DESCRIPTION:

This course is designed to teach entry-level skills in the service and repair of steering and suspension systems, power steering, wheels and tires. Students enrolled in Dealer Specific programs (GM ASEP and Ford MLR) will work with manufacturer supplied curriculum and vehicles. Both lecture and laboratory will be provided.

SUGGESTED TEXT(S): Automotive Steering, Suspension, and Alignment, 2003, Prentice Hall

IMPLEMENTATION DATE: Fall Term, 1991 (921)

REVIEW OR MODIFICATION DATE: Fall Term, 1993 (941)
 Fall Term, 1998
 Spring Term, 1998
 Fall Term, 2002 (20031)
 Fall Term 2005 (20061)
 Fall Term 2007 (20081)
 Fall Term, 2008 (20091)

COURSE TOPICS	<u>CONTACT HOURS PER TOPIC</u>
I. Introduction	3
A. Tools	
B. Safety	
II. Tires and Wheels / Wheels and Tires	21
A. Tire/Wheel Runout	
B. Tire/Wheel Assembly Service	
C. Wheel Balance	
III. Suspension Systems	29
A. Suspension System Component	
B. MacPherson Strut Suspension Component	
C. Independent Front Suspension	
D. General Front-Suspension Inspection	
E. Front-Suspension Component Servicing	
F. Rear-Suspension and Live-Axle Rear Suspension Systems	
G. Semi-Independent Suspension	
H. Independent Suspension	
I. Electronically Controlled Suspension	
J. Active Suspension and Sonar Surface Sensing	
IV. Steering Systems and Wheel Alignment	37
A. Manual Steering Systems and Their Components	
B. Manual Steering Service Procedures	
C. Power Steering	
D. Power Steering Diagnosis	
E. Power Steering Pumps	
F. Four-Wheel Steering Systems	
G. Principles of Wheel Alignment	
H. Alignment Procedures	
I. Rear Alignment	
J. Four-Wheel Drive Vehicle Alignment	

PROGRAM TITLE: Automotive Service Management Technology

COURSE TITLE: Steering and Suspension

CIP NUMBER: 0615.080300

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

01.0 DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE MECHANICS -- The student will be able to:

- 01.01 Apply shop safety rules and procedures.
- 01.02 Use and maintain hand tools such as screwdrivers, special application pliers, hammers, chisels, punches, special application wrenches and sockets, files, hacksaws, bench vises and "C" clamps.
- 01.03 Demonstrate use of precision measuring tools.
- 01.04 Use and install fasteners such as screws and bolts, key screw extractors, helicoil inserts and thread cutting taps and dies.
- 01.05 Use and maintain power tools such as drills, bench grinders, drill presses, hydraulic presses, impact wrenches, air chisels, parts washers, hydraulic jacks and vehicle hoists.
- 01.06 Apply basic math skills.
- 01.07 Use and apply metric and English measurement skills.
- 01.08 Demonstrate an understanding of lubrication requirements.
- 01.10 Perform auto safety inspection.
- 01.11 Demonstrate use of technical manuals, specification handbooks and charts.
- 01.12 Demonstrate an understanding of steering geometry and suspension geometry such as caster, camber, toe-in, king pin inclination (steering axis) and toe-in and toe-out on turns.
- 01.13 Demonstrate an understanding of the function of steering and suspension system components such as coil springs, leaf springs, torsion bars, twin "I" beams, quadralink, rubber bushings, shock absorbers, tie rods, bail joints, shackles, idler arm, pitman arm and control arm.
- 01.14 Demonstrate an understanding of manual and power steering operation such as power steering pump, power steering control valve and power steering fluid leaks.
- 01.46 Install air shocks.

03.0 DEMONSTRATE PROFICIENCY IN SERVICING STEERING, SUSPENSION AND WHEEL SYSTEMS --

The student will be able to:

- 03.01 Diagnose suspension problems.
- 03.02 Diagnose wheel/tire vibrations, shimmy and tramp.
- 03.03 Diagnose steering problems.
- 03.04 Lubricate suspension, steering gear and linkage. (ASE)
- 03.05 Check manual steering gear fluid level. (ASE)
- 03.06 Inspect steering systems. (ASE)

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S):

TITLES(S):

- 03.07 Inspect suspension systems. (ASE)
- 03.08 Inspect and test shock absorbers.
- 03.09 Check power steering fluid level. (ASE)
- 03.10 Inspect, repair and replace tires and wheels.
- 03.11 Rotate wheels and tires. (ASE)
- 03.12 Balance wheels. (ASE)
- 03.13 Service wheel bearings and grease seals on non-drive axles/spindles. (ASE)
- 03.14 Remove and replace spindles and ball joints. (ASE)
- 03.15 Remove and replace shock absorbers and mountings. (ASE)
- 03.16 Measure and adjust torsion bar height. (ASE)
- 03.17 Remove and replace coil springs/torsion bars. (ASE)
- 03.18 Remove and replace control arms and bushings. (ASE)
- 03.19 Remove and replace steering linkage components.
- 03.20 Remove and replace steering dampers. (ASE)
- 03.21 Remove and replace rear suspension parts. (ASE)
- 03.22 Remove and replace manual/power steering gear assemblies.
- 03.23 Check two-wheel alignment.
- 03.24 Rebuild MacPherson type struts. (ASE)
- 03.25 Overhaul recirculating ball manual gears.
- 03.26 Rebuild rack-and-pinion manual gears. (ASE)
- 03.27 Remove and replace power steering pumps, (ASE)
- 03.28 Rebuild power steering pumps.
- 03.29 Overhaul integral steering gears.
- 03.30 Rebuild rack-and-pinion power steering assembly.(ASE)
- 03.31 Check four-wheel alignment.

08.0 DEMONSTRATE PROFICIENCY IN SERVICING MANUAL DRIVE TRAINS AND AXLES -- The student will be able to:

- 08.14 Remove and replace drive axle bearings and seals.
- 08.18 Inspect, remove, replace and lubricate front drive axle flexible joints and boots.
- 08.19 Inspect, remove and replace constant-velocity universal joints.



**Florida State College
At Jacksonville**

Course Learning Outcomes & Assessment

NOTE: Use either the Tab key or mouse click to move from field to field. The box will expand to accommodate your entry.

<i>Section 1</i> COURSE PREFIX AND NUMBER: <u>AER1450</u>	SEMESTER CREDIT HOURS: <u>90</u>
COURSE TITLE: <u>Steering and Suspension</u>	

Section 2
TYPE OF COURSE: (Click on the box to check all that apply)

<input type="checkbox"/> AA Elective	<input checked="" type="checkbox"/> AS Required Professional Course	<input type="checkbox"/> College Prep
<input type="checkbox"/> AS Professional Elective	<input checked="" type="checkbox"/> AAS Required Professional Course	<input type="checkbox"/> Technical Certificate
<input type="checkbox"/> Other _____	<input type="checkbox"/> PSAV	<input type="checkbox"/>
Apprenticeship		
<input type="checkbox"/> General Education: (For General Education courses, you must also complete Section 3 and Section 7)		

Section 3 (If applicable)
INDICATE BELOW THE DISCIPLINE AREA FOR GENERAL EDUCATION COURSES:

<input type="checkbox"/> Communications	<input type="checkbox"/> Social & Behavioral Sciences	<input type="checkbox"/> Mathematics
<input type="checkbox"/> Natural Sciences	<input type="checkbox"/> Humanities	

Section 4
INTELLECTUAL COMPETENCIES:

<input checked="" type="checkbox"/> Reading	<input type="checkbox"/> Speaking	<input checked="" type="checkbox"/> Critical Analysis	<input type="checkbox"/> Quantitative Skills	<input type="checkbox"/> Scientific Method of Inquiry
<input checked="" type="checkbox"/> Writing	<input checked="" type="checkbox"/> Listening	<input checked="" type="checkbox"/> Information Literacy	<input type="checkbox"/> Ethical Judgment	<input type="checkbox"/> Working Collaboratively

<i>Section 5</i> LEARNING OUTCOMES	METHOD OF ASSESSMENT
• <u>DEMONSTRATE KNOWLEDGE AND PROFICIENCY IN SERVICING STEERING SYSTEMS</u> see attached framework	Written test, NATEF Authentic Task Observation (NATO)
• <u>DEMONSTRATE KNOWLEDGE AND PROFICIENCY IN SERVICING SUSPENSION SYSTEMS</u>	Written test, NATEF Authentic Task Observation (NATO)
• <u>DEMONSTRATE KNOWLEDGE AND PROFICIENCY IN AUTOMOBILE ALIGNMENT</u>	Written test, NATEF Authentic Task Observation (NATO)
• <u>DEMONSTRATE KNOWLEDGE AND PROFICIENCY IN SERVICING WHEELS AND TIRES</u>	Written test, NATEF Authentic Task Observation (NATO)
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Section 6
Name of Person Completing This Form: Jacob Alliton Date: Nov 1 2007