

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER:	AER 2941C
MODULE TITLE:	Automotive MLR Internship I
PREREQUISITE (S):	None
COREQUISITE (S):	None
CREDIT HOURS:	2
CONTACT HOURS/WEEK:	20
CONTACT HOUR BREAKDOWN:	
Lecture/Discussion:	
Laboratory:	
Other <u>internship</u> :	20
FACULTY WORKLOAD POINTS:	Calculated on the # of students in the internship
STANDARDIZED CLASS SIZE ALLOCATION:	OPEN
COURSE DESCRIPTION:	
<p>In order to meet the State of Florida Department of Education (DOE) and National Automotive Technician Education Foundation (NATEF) standards, interns must complete a minimum of hours on-the-job learning experience addressing the standards designated in each course of instruction. While working under the mentorship of an experienced technician, students must document the required hours referenced to the standards in each module.</p>	
SUGGESTED TEXT(S):	NATEF Standards
IMPLEMENTATION DATE:	Fall Term, 2002 (20031)
REVIEW OR MODIFICATION DATE:	Fall Term 2005 (20061) Fall Term 2008 (20091)

MODULE OUTLINE

FIRST YEAR AUTOMOTIVE INTERNSHIP

Internship Based Objectives:

Student will complete the internship evaluation NATEF Task list associated with each module completed during the first year of this program of study.

Program Title: Automotive Service Management Technology
 Module Title: First Year Internship
 CIP Number: 1615080300/0615080300

LIST PERFORMANCE STANDARD ADDRESSED:

NUMBER(S): TITLES(S):

The student will be evaluated on the following practical skills standards:

INTRODUCTION TO AUTOMOTIVE TECHNOLOGY

- 04.09 Identify or demonstrate appropriate responses to criticism from employer, supervisor or other employees.
- 01.01 Apply shop safety rules, EPA and OSHA standards.
- 01.02 Identify and use appropriate emergency first aid procedures.
- 01.03 Identify, use and maintain hand and power tools properly.
- 01.04 Identify and practice using appropriate precision measuring tools and torque methods.
- 01.05 Identify and use metric and English measurement skills.
- 01.13 Utilize flat rate manuals, service manuals, service bulletins, parts manuals and electronic service information
- 01.06 Use computer and operate keyboard.
- 08.02 Perform oil and filter change.
- 08.08 Lubricate suspension and steering systems.
- 12.34 Lubricate suspension and steering systems. P-2
- 08.03 Service transmission; perform visual inspection; replace fluids and filters.
- 08.04 Inspect engine assembly for fuel, oil, coolant, and other leaks.
- 08.06 Check rear axle drive assembly seals and vents; check lube level.
- 12.55 Inspect tires; check and adjust air pressure. P-1
- 12.57 Rotate tires according to manufacturer's recommendations. P-1
- 12.60 Reinstall wheel; torque lug nuts. P-1
- 08.13 Balance wheel and tire assembly (static and dynamic).
- 08.14 Dismount, inspect, repair, and remount tire on wheel.
- 12.61 Dismount, inspect, repair, and remount tire on wheel. P-2
- 08.20 Inspect, clean, fill, and replace battery.
- 08.22 Start a vehicle using jumper cables using a battery auxiliary power supply.
- 08.23 Perform slow/fast battery charge.
- 08.52 Replace fuel filters.
- 14.01 Use wiring diagrams during diagnosis of electrical circuit problems. P-1
- 14.02 Check electrical circuits with a test light; determine needed repairs. P-2
- 14.03 Check voltage and voltage drop in electrical/electronic circuits using a digital multimeter (DMM); determine needed repairs. P-1

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S): TITLES(S):

ELECTRICAL / ELECTRONICS

- 14.04 Check current flow in electrical/electronic circuits and components using an ammeter; determine needed repairs. P-1
- 14.05 Check electrical circuits using jumper wires; determine needed repairs. P-2
- 14.06 Find shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine needed repairs. P-1
- 14.07 Measure and diagnose the cause(s) of abnormal key-off battery drain; determine needed repairs. P-1
- 14.08 Inspect and test fusible links, circuit breakers, and fuses; replace as needed. P-1
- 14.09 Inspect and test switches, connectors, relays, and wires of electrical/electronic circuits; repair or replace as needed. P-1
- 08.51 Obtain and interpret digital multimeter (DMM) readings
- 14.10 Perform battery state-of-charge test; determine needed service. P-1
- 14.11 Perform battery capacity (load, high-rate discharge) test; determine needed service. P-1
- 14.12 Maintain or restore electronic memory functions. P-2
- 14.13 Inspect, clean, fill, and replace battery. P-2
- 14.14 Perform slow/fast battery charge. P-2
- 14.15 Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed. P-1
- 14.16 Start a vehicle using jumper cables and a battery or auxiliary power supply. P-1
- 14.17 Perform starter current draw and circuit voltage drop test; determine needed repairs P-1
- 14.18 Inspect and test starter relays and solenoids; replace as needed. P-2
- 14.19 Remove and replace/reinstall starter. P-2
- 14.20 Perform starter bench tests; determine needed repairs. P-2
- 14.21 Inspect, test, and repair or replace switches, connectors, and wires of starter control circuits. P-2
- 14.22 Diagnose charging system problems that cause an undercharge, a no-charge or an overcharge condition. P-1
- 14.23 Inspect and adjust alternator drive belts; replace as needed. P-1
- 14.24 Remove, inspect, and replace/reinstall alternator. P-2
- 14.25 Perform charging circuit voltages drop tests; determine needed repairs. P-2
- 08.57 Return cores for rebuilt and exchange items.

HEATING AND AIR-CONDITIONING

- 15.02 Conduct a performance test of the A/C system; determine needed repairs. P-2
- 15.03 Leak test A/C system; determine needed repairs. P-2
- 15.05 Select oil type; measure and add oil to the A/C system as needed. P-2
- 15.25 Inspect and test heater control valve(s); replace as needed. P-2
- 15.35 Verify correct operation and maintenance of refrigerant handling equipment. P-1
- 15.36 Identify and recover A/C system refrigerant. P-1
- 15.37 Recycle refrigerant. P-1
- 15.39 Test recycled refrigerant for non-condensable gases. P-1
- 15.40 Evaluate and charge A/C system. P-1

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S):	TITLES(S):
15.07	Inspect A/C compressor drive belts; replace and adjust as needed. P-2
15.08	Inspect, test, and replace A/C compressor clutch components or assembly. P-2
15.09	Remove and replace A/C compressor and mountings. P-2
15.10	Inspect and replace A/C compressor shaft seal assembly(ies). P-2
15.12	Install A/C system filter. P-3
15.13	Remove and inspect A/C system mufflers, hoses, lines, fittings, o-rings, seals, and service valves; replace as needed. P-2
15.15	Inspect receiver/drier or accumulator/drier; replace as needed. P-2
15.16	Inspect and test expansion valve or orifice (expansion) tube; replace as needed. P-2
15.26	Diagnose failures in the electrical controls of the heating and A/C systems; determine needed repairs. P-2
15.27	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; repair as needed. P-2
15.28	Test A/C compressor load cut-off systems; determine needed repairs. P-3
15.30	Inspect and test A/C-heater control panel assembly; replace as needed. P-3
15.31	Inspect and test A/C-heater control cables and linkages; adjust or replace as needed. P-3
15.32	Inspect and test A/C-heater vacuum control switches, hoses, diaphragms (motor), vacuum reservoir, check valve, and restrictors; replace as needed. P-3
15.33	Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed. P-3
15.34	Check operation of automatic and semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine needed repairs. P-3
15.26	Diagnose failures in the electrical controls of the heating and A/C systems; determine needed repairs. P-2
5.27	Inspect and test A/C-heater blower, motors, resistors, switches, relays, wiring, and protection devices; repair as needed. P-2
15.31	Inspect and test A/C-heater control cables and linkages; adjust or replace as needed. P-3
15.32	Inspect and test A/C-heater vacuum control switches, hoses, diaphragms (motor), vacuum reservoir, check valve, and restrictors; replace as needed. P-3
15.34	Inspect and test A/C-heater ducts, doors, hoses, and outlets; replace as needed. P-3
15.29	Test A/C compressor load cut-off systems; determine needed repairs. P-3
15.30	Inspect and test A/C-heater control panel assembly; replace as needed. P-3
15.34	Check operation of automatic and semi-automatic heating, ventilation, and air-conditioning (HVAC) control systems; determine needed repairs. P-3

BRAKES

13.04	Diagnose poor stopping, pulling or dragging caused by problems in the hydraulic system; determine needed action. P-1
13.05	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action. P-2
13.06	Fabricate and install brake lines (double flare and ISO types); replace hoses, fittings, and supports as needed. P-2
13.07	Select, handle, store, and install brake fluids to proper level. P-1
13.10	Inspect, test, and replace components of brake warning light system. P-3
13.11	Bleed (manual, pressure, vacuum or surge) brake system. P-1
13.12	Flush hydraulic system. P-3

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S):	TITLES(S):
13.35	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action. P-1
13.36	Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust wheel bearings. P-1
13.37	Check parking brake cables and components for wear, rusting, binding, and corrosion; clean, lubricate, and replace as needed. P-2
13.38	Check parking brake operation; adjust as needed. P-1
13.39	Check operation of parking brake indicator light system. P-2
13.40	Check operation of brake stop light system; adjust and service as needed. P-1
13.41	Replace wheel bearing and race. P-1
13.01	Measure and adjust pedal height. P-2
13.02	Check master cylinder for internal and external leaks and proper operation; determine necessary action. P-2
13.03	Remove, bench bleed, and reinstall master cylinder. P-1
13.08	Inspect, test, and replace metering (hold-off), proportioning (balance), pressure differential, and combination valves. P-3
13.09	Inspect, test, replace, and adjust height (load) sensing proportioning valve. P-3
13.11	Bleed (manual, pressure, vacuum or surge) brake system. P-1
13.12	Flush hydraulic system. P-3
13.31	Test pedal free travel with and without engine running; check power assist operation. P-2
13.32	Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. P-2
13.33	Inspect the vacuum-type power booster unit for vacuum leaks; inspect the check valve for proper operation; determine necessary action. P-3
13.34	Inspect and test hydro-boost system and accumulator for leaks and proper operation; necessary action.
13.14	Remove, clean (using proper safety procedures), inspect, and measure brake drums; service or replace as needed. P-1
13.15	Mount brake drum on lathe machine braking surface. P-2
13.16	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. P-2
13.17	Remove and reinstall wheel cylinders. P-2
13.18	Pre-adjust brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings. P-2
13.19	Reinstall wheel, torque lug nuts, and make final checks and adjustments. P-1
13.21	Remove caliper assembly from mountings; clean and inspect for leaks and damage to caliper housing. P-2
13.22	Clean and inspect caliper mounting and slides for wear and damage. P-2
13.23	Remove, clean, and inspect pads and retaining hardware; determine needed service. P-2
13.24	Disassemble and clean caliper assembly; inspect parts for wear, rust scoring, and damage; replace seal, boot, and damaged or worn parts. P-2
13.25	Reassemble, lubricate, and reinstall caliper, pads, and related hardware. P-2
13.26	Clean, inspect, and measure rotor with a dial indicator and a micrometer; follow manufacturer's recommendations in determining need to machine or replace. P-1
13.27	Refinish rotor according to manufacturer's recommendations. P-2
13.29	Fill master cylinder with recommended fluid and seat pads; inspect caliper for leaks. P-1
13.30	Reinstall wheel, torque lug nuts, and make final checks and adjustments. P-1

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S):	TITLES(S):
13.31	Remove and replace rotor. P-2
13.42	Inspect, and test anti-lock brake system (ABS) components; determine necessary action. P-2
13.43	Diagnose poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise concerns caused by the anti-lock brake system (ABS); determine necessary action. P-2
13.44	Diagnose anti-lock brake system (ABS) electronic control(s) and components using self-diagnosis and/or recommended test equipment; determine necessary action. P-1
13.45	Depressurize high pressure components of the anti-lock brake system (ABS) following manufacturer's recommended safety procedures. P-2
13.46	Bleed the anti-lock brake system's (ABS) front and rear hydraulic circuits following manufacturer's procedures. P-2
13.47	Remove and install anti-lock brake system (ABS) electrical/electronic/hydraulic components following manufacturer's procedures and specifications. P-3
13.48	Service, test, and adjust anti-lock brake system (ABS) speed sensors following manufacturer's recommended procedures. P-2
13.49	Diagnose anti-lock brake system (ABS) braking concerns caused by vehicle modifications (tire size, curb height, final drive ratio, etc. P-3

STEERING & SUSPENSION

12.05	Inspect and replace steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel. P-2
12.07	Remove and replace manual or power rack and pinion steering gear; inspect mounting bushings and brackets. P-2
12.08	Disassemble, inspect, repair, and reassemble rack and pinion steering gear. P-3
12.10	Inspect and replace manual or power rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. P-2
12.15	Remove, inspect, and replace power steering pump, pump mounts, pump seals, and gaskets. P-3
12.16	Remove, inspect, and replace power steering pump pulley; check alignment. P-3
12.17	Perform power steering system pressure test; determine needed repairs. P-2
12.19	Inspect and replace pitman arm, relay (center link/intermediate) rod, idler arm and mountings, and steering linkage damper. P-3
12.20	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps. P-2
12.25	Remove, inspect, and replace upper and lower control arms, bushings, shafts, and rebound bumpers. P-2
12.26	Remove, inspect, replace, and adjust strut (compression/tension) rods and bushings. P-2
12.27	Remove, inspect, and replace upper and lower ball joints on short and long arm suspension systems. P-2
12.28	Remove, inspect, and replace steering knuckle assemblies. P-2
12.29	Remove, inspect, and replace short and long arm suspension system coil springs and spring insulators. P-2
12.33	Remove, inspect, and replace MacPherson strut cartridge or assembly, strut coil spring, insulators, and upper strut bearing mount. P-1
12.35	Remove, inspect, and replace coil springs and spring insulators. P-2
12.36	Remove, inspect, and replace transverse links, control arms, bushings, and mounts. P-2

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S): TITLES(S):

- 12.43 Measure vehicle riding height; determine needed repairs. P-2
- 12.44 Check and adjust front and rear wheel camber; determine needed repairs. P-2
- 12.45 Check and adjust caster; determine needed repairs. P-2
- 12.46 Check and adjust front wheel toe; adjust as needed. P-2
- 12.47 Center steering wheel. P-2
- 12.48 Check toe-out-on-turns (turning radius); determine needed repairs. P-2
- 12.49 Check SAI (steering axis inclination) and included angle; determine needed repairs. P-2
- 12.50 Check and adjust rear wheel toe. P-2
- 12.51 Check rear wheel thrust angle; determine needed repairs. P-2
- 12.52 Check for front wheel setback; determine needed repairs. P-2
- 12.53 Check front cradle (subframe) alignment; determine needed repairs. P-3
- 12.58 Measure wheel, tire, axle, and hub runout; determine needed repairs. P-2
Balance wheel and tire assembly (static and dynamic). P-1
- 12.04 Diagnose power rack and pinion steering gear vibration, looseness, and hard steering problems; determine needed repairs. P-2
- 12.21 Diagnose, inspect, adjust, repair or replace components of electronically controlled steering systems. P-3
- 12.22 Diagnose, inspect, repair or replace components of variable-assist steering systems. P-3



**Florida State College
At Jacksonville**

**Course Learning Outcomes & Assessment
For All College Credit Courses**

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

Section 1 COURSE PREFIX AND NUMBER: <u>AER 2941C</u>	SEMESTER CREDIT HOURS: <u>1.0</u>
COURSE TITLE: <u>Automotive Internship</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"/> 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 checked="" type="checkbox"/> Speaking	<input checked="" type="checkbox"/> Critical Analysis	<input checked="" 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 checked="" type="checkbox"/> Working Collaboratively

	LEARNING OUTCOMES	METHOD OF ASSESSMENT
•	01.0 DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE MECHANICS. see attached framework	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations
•	02.0 APPLY ELECTRICAL AND ELECTRONIC SKILLS IN DIAGNOSING\ TROUBLESHOOTING MALFUNCTIONS OF ELECTRICAL/ELECTRONIC COMPONENTS see attached framework	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations
•	03.0 Demonstrate proficiency in servicing steering, suspension and wheel systems.	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations
•	04.0 Demonstrate proficiency in servicing automotive brake systems.	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations
•	05.0 Demonstrate proficiency in servicing cooling, air conditioning and heating services.	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations
•	08.0 Demonstrate proficiency in servicing manual drive trains and axles.	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations
•	09.0 Demonstrate proficiency in engine repair service.	Student assembled portfolio of work orders, Employer evaluations, Co-op OJT observations

Section 6
Name of Person Completing This Form: Jeffrey Rehkopf Date: Oct 28, 2007