FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER:	AER 2899
COURSE TITLE:	Engine Performance II
PREREQUISITE(S):	AER 2896
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 job entry skills in the diagnosis and repair of drivability problems. Topics covered include engine performance, electronic ignition systems (EI), and computer system operations. Emphasis is placed on manufacturer's diagnostic charts and diagnostic equipment. Use of scan tools on fuel injected vehicles will be addressed. Students enrolled in Dealer Specific programs (GM ASEP) will work with manufacturer supplied curriculum and vehicles. Both classroom and laboratory will be provided.

SUGGESTED TEXT(S):	Automotive Technology, 2nd e., Halderman
IMPLEMENTATION DATE:	Fall Term, 1991 (921)
REVIEW OR MODIFICATION DATE:	Fall Term, 1993 (941) Fall Term, 1998 Spring Term, 1999 Fall Term, 2002 (20031) Fall Term, 2005 (20061) Fall Term, 2008 (20091) Fall Term, 2009 (20101) (was AER 2892)

CONTACT HOURS	COURSE TOPICS PER TOPIC
I. Introduction	3
A. Tools B. Safety	
II. Electronic Ignition Systems	28
III. Fuel Injection System Diagnosis	13
A. Gasoline Fuel Injection B. System Sensors C. Electronic Control Computer D. Fuel Injectors E. Continuous Injection System F. Servicing Fuel Injection Systems	
IV. Computerized Engine Controls	30
A. System Functions B. System Components C. Primary Sensors D. Computer Outputs and Actuators E. System Operation F. Logical Troubleshooting G. Isolating Computerized Engine Control Problems	
V. Engine Performance Testing and OBD II	16

PROGRAM TITLE: Automotive Technology

COURSE TITLE: Engine Performance II

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.
- 01.11 Demonstrate use of technical manuals, specification handbooks and charts.
- 01.18 Demonstrate an understanding of basic heating and cooling systems.
- 01.20 Demonstrate knowledge of engine components.
- 01.21 Demonstrate an understanding of basic ignition and fuel systems.
- 01.30 Describe electrical terms, magnetism, electrical current flow and Ohms' law.
- 01.31 Demonstrate an understanding of series circuits.
- 01.32 Demonstrate an understanding of parallel circuits.
- 01.33 Demonstrate an understanding of series-parallel circuits.
- 01.35 Demonstrate an understanding of advanced electronics concepts.
- 01.36 Demonstrate an understanding of electronic schematic diagrams and diagnostic techniques.
- 01.37 Demonstrate an understanding of electrical/electronic wire repair procedures.
- 01.38 Demonstrate an understanding of electronic semiconductor concepts and components.
- 01.39 Demonstrate an understanding of electronic transistor concepts and components.
- 01.40 Demonstrate an understanding of electronic microprocessor concepts, functions and components.
- 01.51 Inspect and replace passenger restraints.

02.0 APPLY ELECTRICAL AND ELECTRONIC SKILLS IN DIAGNOSING/TROUBLESHOOTING MALFUNCTIONS OF ELECTRICAL/ELECTRONIC COMPONENTS -- The student will be able to:

- 02.01 Use and apply basic electrical and electronic test equipment and meters.
- 02.04 Measure voltage drop, current flow and resistance in a circuit or component with a multimeter. (ASE)
- 02.05 Locate an open circuit and a short circuit.
- 02.10 Test, remove and replace fuses and circuit breakers. (ASE)
- 02.13 Test, remove and replace regulators. (ASE)
- 02.16 Test and replace electrical system switches. (ASE)
- 02.19 Test and replace sending units. (ASE)

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S): TITLES(S):

02.20 Diagnose engine malfunctions.
02.26 Test and replace instrument panel units. (ASE)
02.27 Diagnose and service cruise control systems. (ASE)
02.29 Test and repair automotive alarm system components. (ASE)

06.0 DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE -- The student will be able to:

06.01 Analyze engine performance.
06.02 Perform running cylinder balance tests.
06.03 Perform cylinder compression tests.
06.04 Check the performance of engines equipped with on-board computers.
06.06 Remove and replace distributor. (ASE)
06.07 Check the distributor advance in a vehicle.
06.08 Remove distributor; inspect, test and service.
06.09 Inspect and test primary circuits.
06.12 Inspect, remove and replace ignition wires, caps and rotors.
06.13 Remove, gap and replace spark plugs. (ASE)
06.14 Service electronic ignition systems.
06.17 Measure fuel flow and pressure.
06.20 Adjust idle speed.
06.21 Clean and adjust chokes. (ASE)
06.22 Inspect, remove and replace manifold control valves.
06.23 Remove and replace fuel injection system filters.
06.24 Set idle speed to specifications.
06.26 Service throttle body fuel injection systems.
06.27 Service ported fuel injection systems.
06.34 Diagnose mechanical, ignition and fuel emission problems.
06.37 Perform cylinder leakage tests.
06.38 Diagnose and correct malfunctions in computer control systems.
06.39 Diagnose, test and replace on-board computer controls.
06.40 Diagnose, service and replace computerized sensors.
06.45 Test exhaust emissions using a four gas analyzer.

09.0 DEMONSTRATE PROFICIENCY IN ENGINE REPAIR SERVICE -- The student will be able to:

09.05 Perform cylinder balance tests.
09.06 Perform cylinder compression tests.
09.07 Perform cylinder leakage tests. (ASE)
09.30 Adjust valve lifters. (ASE)

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.

Section 1	
COURSE PREFIX AND NUMBER: **AER 2899**	SEMESTER CREDIT HOURS: **4.0**
COURSE TITLE: **Engine performance II**	

Section 2

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

- ☐ **AA Elective**
- ☒ **AS Required Professional Course**
- ☐ **College Prep**
- ☐ **AS Professional Elective**
- ☒ **AAS Required Professional Course**
- ☐ **Technical Certificate**
- ☐ **Other ____**
- ☐ **PSAV**
- ☐ **Apprenticeship**
- ☐ **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:

- ☐ **Communications**
- ☐ **Social & Behavioral Sciences**
- ☐ **Mathematics**
- ☐ **Natural Sciences**
- ☐ **Humanities**

Section 4

INTELLECTUAL COMPETENCIES:

- ☒ **Reading**
- ☒ **Speaking**
- ☒ **Critical Analysis**
- ☐ **Quantitative Skills**
- ☐ **Scientific Method of Inquiry**
- ☒ **Writing**
- ☒ **Listening**
- ☒ **Information Literacy**
- ☐ **Ethical Judgment**
- ☒ **Working Collaboratively**

Section 5 **LEARNING OUTCOMES**		**METHOD OF ASSESSMENT**
•	DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE MECHANICS – see attached framework	Written test, NATEF Authentic Task Observation (NATO)
•	APPLY ELECTRICAL AND ELECTRONIC SKILLS IN DIAGNOSING/TROUBLESHOOTING MALFUNCTIONS OF ELECTRICAL/ELECTRONIC COMPONENTS - see attached framework	Written test, NATEF Authentic Task Observation (NATO)
•	DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE	Written test, NATEF Authentic Task Observation (NATO)
•	DEMONSTRATE PROFICIENCY IN ENGINE REPAIR SERVICE	Written test, NATEF Authentic Task Observation (NATO)
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Section 6

Name of Person Completing This Form: Paul Soar Date: 11/10/2007