

## FLORIDA STATE COLLEGE AT JACKSONVILLE

## COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: AER 2896

COURSE TITLE: Engine Performance I

PREREQUISITE(S): AER 1198 and AER 1694C

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 automotive engine performance and includes instruction in intake and exhaust systems, fuel delivery systems, fuel injection systems, and emission control systems. On Board Diagnostics Generation II will be covered. 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 2891)

COURSE TOPICS	CONTACT HOURS <u>PER TOPIC</u>
I. Introduction	3
A. Tools	
B. Safety	
II. Intake and Exhaust Systems	5
A. The Air Induction Systems	
B. Exhaust Systems Components	
C. Exhaust System Service	
D. Turbochargers and Superchargers	
III. Fuel Systems	6
A. Gasoline	
B. Fuel Performance	
C. Basic Fuels	
D. Gasoline Additives	
E. Diesel Fuel	
F. Alternative Fuels	
G. Fuel Delivery Systems	
H. Electronic Fuel System	
IV. Carburetors	6
A. Venturi	
B. Carburetion	
C. Basic Carburetor Circuits	
D. Additional Carburetor Control	
E. Types of Carburetors	
V. Emission Control Systems	6
A. Emission Testing	
B. Development of Emission Control Devices	
C. PCV Systems	
D. Exhaust Gas Recirculating (EGR) System	
E. Air Temperature Emission Control	
F. Spark Advance Systems	
G. Air Injection Systems	
H. Catalytic Converters	
I. Evaporative Emission Control System	
J. Emission Testing	

## COURSE TOPICS (CONTINUED)

CONTACT HOURS  
PER TOPIC

VI. On Board Diagnostics Generation II

24

VII. Fuel Injection Systems and Diagnosis

40

Total

90

PROGRAM TITLE: Automotive Service Management Technology

COURSE TITLE: Engine Performance I

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 mathematics.
- 01.07 Use and apply metric and English measurement skills.
- 01.11 Demonstrate use of technical manuals, specification handbooks and charts.
- 01.21 Demonstrate an understanding of basic ignition and fuel systems.
- 01.40 Demonstrate an understanding of electronic microprocessor concepts, functions and components.

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

- 02.19 Test and replace sending units. (ASE)

05.0 DEMONSTRATE PROFICIENCY IN SERVICING COOLING, AIR CONDITIONING AND HEATING SYSTEMS -- The student will be able to:

- 05.17 Service vacuum circuits.

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

- 06.04 Check the performance of engines equipped with on board computers.
- 06.15 Service air cleaners. (ASE)
- 06.16 Inspect, remove and replace fuel filters. (ASE)
- 06.17 Measure fuel flow and pressure.
- 06.18 Remove and replace fuel lines. (ASE)
- 06.19 Remove and replace fuel pumps. (ASE)
- 06.20 Adjust idle speed.

## LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S):	TITLES(S):
06.23	Remove and replace fuel injection system filters.
06.24	Set idle speed to specifications.
06.25	Remove and replace fuel injectors. (ASE)
06.26	Service throttle body fuel injection systems.
06.27	Service ported fuel injection systems.
06.28	Service positive crankcase ventilation (PCV) systems. (ASE)
06.29	Service evaporative control systems. (ASE)
06.30	Service thermostatic air cleaners. (ASE)
06.31	Service air-injection systems. (ASE)
06.32	Service exhaust gas recirculation (EGR) systems. (ASE)
06.33	Inspect, remove and replace catalytic converter. (ASE)
06.34	Diagnose mechanical, ignition and fuel emission problems.
06.35	Inspect, remove and replace exhaust system components. (ASE)
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.
06.41	Clean and overhaul electronically controlled carburetor systems. (ASE)
06.42	Remove and replace turbo chargers. (ASE)
06.43	Rebuild fuel injection pump. (ASE)
06.44	Check and adjust turbo charger waste gates. (ASE)
06.45	Test exhaust emissions using a four gas analyzer.
06.46	Service diesel injectors.
06.47	Remove and replace diesel engine fuel filters.
06.48	Check and adjust injection pump timing.
06.49	Remove and replace injection pumps.
06.50	Check and adjust idle and maximum speeds.
06.51	Test and service preheating systems.



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: <b><u>AER 2896</u></b>	SEMESTER CREDIT HOURS: <b><u>4.0</u></b>
COURSE TITLE: <b><u>Engine Performance I</u></b>	

*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 checked="" 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 checked="" type="checkbox"/> Working Collaboratively

<i>Section 5</i> <b>LEARNING OUTCOMES</b>	<b>METHOD OF ASSESSMENT</b>
• <u>DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE MECHANICS – see attached framework</u>	Written test, NATEF Authentic Task Observation (NATO)
• <u>DEMONSTRATE PROFICIENCY IN ENGINE PERFORMANCE SERVICE - see attached framework</u>	Written test, NATEF Authentic Task Observation (NATO)
• Test and replace sending units	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