

FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER: AER 1694C

COURSE TITLE: Electrical Systems I

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 automotive electricity and electronics technology. Topics include the basics of electrical and electronics systems, battery and service, charging systems and lighting systems. Students enrolled in Dealer Specific programs (GM ASEP and Ford MLR) will work with manufacturer supplied curriculum and vehicles. Both classroom lecture and laboratory will be provided.

SUGGESTED TEXT(S): Automotive electricity and Electronics, 3rd ed 2004, Delmar

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 2007 (20081)
	Fall Term, 2008 (20091)	

COURSE TOPICS	CONTACT HOURS <u>PER TOPIC</u>
I. Introduction	3
A. Tools	
B. Safety	
II. Basics of Electrical Systems	29
A. Basics of Electricity	
B. Electrical Terms	
C. Conductors & Insulators	
D. Electrical Test Meters	
E. Electromagnetism Basics	
III. Basics of Electronics	21
A. Semiconductors	
B. Diodes and Transistors	
C. Semiconductors Circuits	
D. Protecting Electronic System	
E. Testing Electronic Circuits & Systems	
IV. Batteries Theory and Service	16
A. Conventional Design Battery	
B. Battery Cables	
C. Battery Hold-Down	
D. Heat Shields	
E. Low-Maintenance and Maintenance-Free Batteries	
V. Starting Systems	8
A. Starting Systems-Design and Components	
B. Starter Motors	
C. Drive Mechanisms	
D. Starter Drives	
E. Control Circuits	
F. Starting System Testing	

COURSE TOPICS (CONTINUED)

CONTACT HOURS
PER TOPIC

VI. Charging Systems

7

- A. Induced Voltage
- B. Alternating Current Charging Systems
- C. Indicators
- D. Preliminary Checks
- E. General Test Procedures
- F. Alternator Service

VII. Lighting Systems

6

- A. Lamps
- B. Headlamps
- C. Interior Light Assemblies
- D. Rear Interior Light Assemblies
- E. Light Bulbs
- F. Lighting Maintenance

PROGRAM TITLE: Automotive Service Management Technology

COURSE TITLE: Electrical Systems 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 & 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.
- 01.06 Apply basic math skills.
- 01.07 Use and apply metric and English measurements skills.
- 01.11 Demonstrate use of technical manuals, specification handbooks and charts.
- 01.30 Describe electrical terms, magnetism, electrical current flow and Ohm's 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.
- 01.50 Adjust headlights ASE
- 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.
- 02.02 Perform power checks with test lights.
- 02.03 Perform continuity tests.
- 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.
- 02.06 Analyze cranking system malfunctions.
- 02.07 Analyze charging system malfunctions. (ASE)
- 02.08 Service and test batteries
- 02.09 Remove and replace light bulbs. (ASE)
- 02.10 Test, remove and replace fuses and circuit breakers. (ASE)
- 02.11 Replace and test starters. (ASE)

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S):

TITLES(S):

- 02.12 Test and replace alternators.
- 02.14 Inspect and repair lighting systems. (ASE)
- 02.15 Diagnose, repair or replace turn signal and stoplight switches. (ASE)
- 02.16 Test and replace electrical system switches. (ASE)
- 02.17 Diagnose, repair or replace power window and power seat systems, including motors.
- 02.18 Diagnose and service windshield wiper/washer systems. (ASE)
- 02.19 Test and replace sending units. (ASE)
- 02.20 Diagnose engine malfunctions.
- 02.21 Inspect, remove and replace alternator belts.
- 02.23 Diagnose, repair or replace horn systems. (ASE)
- 02.24 Diagnose, repair or replace clock systems.
- 02.25 Diagnose, repair or replace warning buzzer.
- 02.26 Test and replace instrument panel units. (ASE)
- 02.27 Diagnose and service cruise control systems. (ASE)
- 02.28 Check, remove and replace radios. (ASE)
- 02.29 Test and repair automotive alarm system components. (ASE)



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>AER1694C</u>	SEMESTER CREDIT HOURS: <u>90</u>
COURSE TITLE: <u>Electrical Systems 1</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

	LEARNING OUTCOMES	METHOD OF ASSESSMENT
•	DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE MECHANIC ELECTRICAL SYSTEMS KNOWLEDGE see attached framework	Written test, NATEF Authentic Task Observation (NATO)
•	ELECTRICAL AND ELECTRONIC SKILLS DIAGNOSING/TROUBLESHOOTING MALFUNCTIONS OF ELECTRICAL/ELECTRONIC COMPONENTS	Written test, NATEF Authentic Task Observation (NATO)
•	DEMONSTRATE PROFICIENCY IN SERVICING AUTOMOTIVE ELECTRICAL ACCESSORIES	Written test, NATEF Authentic Task Observation (NATO)
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Section 6

Name of Person Completing This Form: Jacob Alliton Date: Oct 31 2007