FLORIDA STATE COLLEGE AT JACKSONVILLE

COLLEGE CREDIT COURSE OUTLINE

COURSE NUMBER:	AER 1798C
COURSE TITLE:	Air Conditioning and Heating
PREREQUISITE(S):	AER 1694C
COREQUISITE(S):	None
CREDIT HOURS:	4
CONTACT HOURS/WEEK:	6
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 theory, service and repair of automotive heating and air conditioning systems. 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 Heating and Air Conditioning, 3rd ed, Prentice Hall
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 PER TOPIC
I. Introduction	3
A. Tools B. Safety C. Special Tools and Equipment	
II. Engine Cooling Systems and Automotive Heaters	12
A. Cooling System Principles B. Liquid Cooling Systems C. Cooling System Diagnosis and Repair D. Heater Systems E. Heater Diagnosis and Repair	
III. Basic Refrigeration and AC Systems	12
A. Energy, Temperatures, Pressures, and Humidity B. Refrigerants, Vaporization and Condensation C. Refrigeration Cycles, Parts and Assemblies Operation D. Specialized Equipment E. Methods of Control and Regulation F. Safety and Health Factors Related to the Trade	
IV. Refrigeration Components	28
A. Compressor Types and Operation B. Compressor Repair and Testing C. Control Valve Types and Operation D. Electrical System Types and Operation E. Vacuum Systems Types and Operation F. Testing, Service, and Adjustments	
V. Air Conditioning/Heating Service and Repair	35
A. Evaporator Service/Repair B. Compressor Service/Repair C. Control Valve Service/Repair D. Heating/Defrosting Service/Repair E. Air Flow Service/Repair F. Electrical Systems Service/repair G. Vacuum Systems Service/Repair	

PROGRAM TITLE: Automotive Service Management Technology

COURSE TITLE: Air Conditioning and Heating

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 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 I 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, 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 hand books and charts.
- 01.18 Demonstrate an understanding of basic heating and cooling systems.
- 01.19 Demonstrate an understanding of basic air conditioning systems.
- 01.53 Check and adjust specified fluid levels.

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

- 05.01 Diagnose overheating problems.
- 05.02 Check radiator coolant level.
- 05.03 Test and add coolant. (ASE)
- 05.04 Pressure test cooling systems. (ASE)
- 05.05 Test radiator caps. (ASE)
- 05.06 Inspect, remove and replace radiator and heater hoses. (ASE)
- 05.07 Remove, test and replace thermostats. (ASE)
- 05.08 Flush cooling systems and replace coolant.
- 05.09 Remove and replace radiators. (ASE)
- 05.10 Remove and replace water pumps.
- 05.11 Diagnose basic air conditioning system problems.
- 05.12 Inspect and pressure test basic air conditioning systems.
- 05.13 Flush air conditioning systems.
- 05.14 Discharge, evacuate and charge basic air conditioning systems. (ASE)
- 05.15 Leak test basic air conditioning systems. (ASE)
- 05.16 Service air conditioning electrical circuits.
- 05.17 Service vacuum circuits.

LIST PERFORMANCE STANDARD ADDRESSED: (CONTINUED)

NUMBER(S): TITLES(S):

05.18 Remove and replace components in basic air conditioning system. (ASE)
05.19 Remove and replace engine fan clutches and electric cooling fan and controls.
05.20 Remove and replace blower motors.
05.21 Remove and replace heater core, control units and cables. (ASE)
05.22 Diagnose and repair electronic air conditioning controls.
05.23 Remove and replace air conditioning compressor shaft seals.

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: AER1610	SEMESTER CREDIT HOURS: 90
COURSE TITLE: Air Conditioning and Heating	

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 AIR CONDITIONING SYSTEMS see attached framework	Written test, NATEF Authentic Task Observation (NATO)
• DEMONSTRATE AN UNDERSTANDING OF AUTOMOTIVE HEATING SYSTEMS	Written test, NATEF Authentic Task Observation (NATO)
• DEMONSTRATE PROFICIENCY IN SERVICING AUTOMOTIVE AIR CONDITIONING SYSTEMS	Written test, NATEF Authentic Task Observation (NATO)
• DEMONSTRATE PROFICIENCY IN SERVICING AUTOMOTIVE HEATING SYSTEMS	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