AUTO 107 Course Outline as of Spring 2006

CATALOG INFORMATION

Dept and Nbr: AUTO 107 Title: ASE EQUIVALENCY
Full Title: ASE (Automotive Service Excellence) Equivalency Course
Last Reviewed: 3/13/2006

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	5.00	Lecture Scheduled	5.00	17.5	Lecture Scheduled	87.50
Minimum	5.00	Lab Scheduled	1.00	17.5	Lab Scheduled	17.50
		Contact DHR	0		Contact DHR	0
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 175.00 Total Student Learning Hours: 280.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade or P/NP
Repeatability:	27 - Exempt From Repeat Provisions
Also Listed As:	
Formerly:	

Catalog Description:
Bureau of Automotive Repair (BAR) approved course, which provides basic training in automotive electrical systems and electronics, engine performance, and solving driveability and emissions problems. Certification of completion of this course and the Clean Air Car Course fulfills the BAR education qualification to take the smog check licensing examination. BAR certification of completion requires 70% pass on all exams.

Prerequisites/Corequisites:

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:
Description: BAR approved course provides basic training in automotive electrical systems and electronics, engine performance, and solving driveability and emissions problems. Certification of completion of this course (requires 70% on all exams) and the Clean Air Car Course fulfills the BAR education qualification to take the smog check licensing examination. (Grade or P/NP)

Prerequisites/Corequisites:
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit:
Repeatability: Exempt From Repeat Provisions

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**	Effective:	Inactive:
CSU GE:	**Transfer Area**	Effective:	Inactive:
IGETC:	**Transfer Area**	Effective:	Inactive:

CSU Transfer:	Effective:	Inactive:
UC Transfer:	Effective:	Inactive:

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:
Upon successful completion of the course, students will be able to:
1. Apply basic electrical and electronic theory as it relates to automotive diagnostics and repair.
2. Use electrical equipment necessary to diagnose automotive electrical problems.
3. Test automotive electrical components and circuits.
4. Apply basic 4-cycle engine theory to the diagnosis and repair of auto engines.
5. Operate and test fuel and air induction systems.
6. Analyze, diagnose, and repair ignition related problems.
7. Diagnose emission failures and utilize appropriate repair techniques.
8. Apply procedures to update/reprogram on-board computers to repair driveability and emission failure problems.
9. Utilize a systematic approach to diagnosing driveability and emission failure problems using a loaded mode (dyno) inspection system.
10. Properly use advanced diagnostic equipment to repair driveability and emission failure problems.
11. Access and utilize materials in various formats, including the Internet, to obtain vehicle diagnostic and repair information.
12. Enroll in Clean Air Car Course and, upon successful completion, qualify to take the smog check licensing examination.

Topics and Scope:

I. Engine Electrical/Electronics
   A. Theory of electrical principles

1. Electron theory
2. Direct current (D/C)
3. Alternating current (A/C)
4. Conductors
5. Insulators
6. Magnetism
7. Induced electricity

B. Terms
1. Voltage
2. Amperage
3. Resistance

C. Electrical circuit configurations
1. Series
2. Parallel
3. Series/parallel

D. Ohm's Law and application to various electrical circuits

E. Understanding wire sizing and proper repair of component wires

F. Overview of safety procedures employed when working on automotive electrical circuitry
1. Shock
2. Fire
3. Burns
4. Explosions
5. Proper tools and procedures

G. Theory, operation, and testing of circuit protection devices
1. Fuses
2. Fusible links
3. Circuit breakers

H. Theory, operation, and testing of:
1. Switches
2. Relays
3. Solenoids
4. Diodes
5. Transistors

I. Theory, operation, and testing of components/systems
1. Battery
2. Starting
3. Charging
4. Lighting
5. Gauges
6. Instrumentation
7. Horn
8. Wiper/washer
9. Air bag
10. Accessories

J. Set up, scaling, and proper application of diagnostic test equipment
1. Volt/Ohm/Amp meter
2. DMM (digital multi meters)
3. Test light
4. Logic probe
5. Digital storage oscilloscope (DSO)

K. Proper use of wiring diagram and component locator manuals
L. Voltage drop testing

II. Engine Performance
A. Theory and operation of the four stroke spark ignition engine
1. Component parts
2. Pressure/vacuum theory
3. Volumetric efficiency
a. Turbo charging
b. Super charging
B. Analysis of engine mechanical problems using diagnostic equipment
1. Vacuum gauge
2. Compression tester
a. Cranking test
b. Running test
3. Cylinder leakage tester
C. Overview of engine oil lubricants
1. Grading
2. Proper application per manufacturer specifications
3. Harmful effects of misapplication on engine operation and catalytic converters
D. Overview of preventive vehicle maintenance and its role in maintaining low vehicle pollution levels
E. Theory, operation, and testing of induction systems
1. Carburetor
a. Component parts
b. Theory
c. Operation
2. Fuel injection
a. Component parts
b. Theory
c. Operation
3. Plastic manifolds
4. Fly-by-wire throttle
F. Theory, operation, and testing of electronic ignition systems
G. Analysis of ignition related problems using an oscilloscope/engine analyzer
H. Analysis of tailpipe exhaust gas emission failures
1. HC (hydrocarbon)
2. CO
3. CO2
4. O2
I. Low emission carburetor adjustments procedures
J. Basic theory, operation, and testing of on-board computer systems: sensor/actuators
K. Identification of fault codes
L. Proper use of diagnostic trouble trees
M. Related diagnostic materials in various formats
1. CD
2. DVD
3. Other

III. Advanced Engine Performance
A. Overview of OBD I (On-Board Diagnostic System) code setting

criteria
B. Overview of OBD II system
C. Utilization of manufacturer Internet sites to obtain vehicle diagnostic and repair information
D. Obtaining and filtering manufacturer Technical Service Bulletins (TSB) in solving driveability and emission failure problems
E. Overview of procedures to update/reprogram on-board computers to repair driveability/emission failure problems
F. Overview of a systematic approach to diagnosing driveability and emission failure problems using a loaded mode (dyno) system
G. Proper use of a scan tool and digital storage oscilloscope (DSO) to diagnose driveability and emission failure problems
H. Advanced diagnostic and testing procedures to identify failed computer controlled engine management systems and emission controlled components
1. O2 wave form analysis
2. NOx diagnostics
3. Catalytic converter testing
I. Overview of diagnostic and repair procedures for fuel evaporative systems

Assignment:

1. Reading, 15 - 20 pages per week.
2. Written answers to questions at end of each textbook chapter.
3. Lab exercises covering:
a. Electronic and electrical systems;
b. Engine performance, driveability, diagnosis, and repair;
c. Advanced diagnostic equipment;
d. Diagnosis and repair of on-board computer systems;
e. Diagnosis and repair of exhaust emission systems.
4. Lab reports on lab procedures and results.
5. Locate repair instructions, legal requirements, and diagnostic help on the Internet and complete worksheet.
6. Online quizzes (3-5).
7. Three exams.

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab reports, Textbook questions; Internet exercise; labs.	Problem solving 20 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None	Skill Demonstrations 0 - 0%

Exams: All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Matching items, Completion, Short answer. (Quizzes and exams.)	Exams 70 - 80%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Bureau of Automotive Repair textbooks, 2006 editions. Titles to be announced upon publication.