Las Positas College
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Course Outline for AUTO 61B

AUTO FUEL EMISSIONS II

Effective: Fall 2008

I. CATALOG DESCRIPTION:
AUTO 61B — AUTO FUEL EMISSIONS II — 4.00 units

Continuation of Automotive Technology 61A with emphasis on emission control, fuel injection and computer control systems. Includes software/hardware concepts and applications, sensors and control circuits, diagnosis and repair of systems and components. Strong 5 gas analysis will be studied. Students are strongly recommended to enroll in Automotive Lab concurrently. Prerequisite: Automotive Technology 61A (completed with a grade of "C" of higher).

2.00 Units Lecture 2.00 Units Lab

Prerequisite
AUTO 61A - Fuel Induction, Emission I
with a minimum grade of C

Strongly Recommended
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Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	36.00
Lab Hours:	108.00
Total Hours:	144.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:
Before entering the course a student should be able to:

A. AUTO61A

IV. MEASURABLE OBJECTIVES:
Upon completion of this course, the student should be able to:

A. Obtain and interpret scan tool data, retrieve and record stored On Board Diagnostics (OBD) diagnostic trouble codes;
B. Diagnose the causes of emissions or drivability concerns resulting from malfunctions in the computerized engine control system with or without diagnostic trouble codes;
C. Chart, inspect and test computerized engine control system sensors, Powertrain control module (PCM), actuators, and circuits using a graphing multi-meter (DMM)/digital storage oscilloscope (DSO), and perform necessary action;
D. Access and use service information to perform step-by-step diagnosis;
E. Check and adjust ignition system timing and timing advance/retard (where applicable);
F. Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems on vehicles with carburetor and fuel injection systems;
G. . Perform exhaust system back-pressure test, and determine necessary action;
H. Diagnose malfunctions of emission control systems causing vehicle performance problems, and determine necessary action;
I. Adjust valves on engines with mechanical or hydraulic lifters;
J. Operate vehicle dynamometer to perform emission testing, and engine performance/drivability issues;
K. Outline hazardous waste handling;
L. Distinguish safe shop environment from an unsafe environment.

V. CONTENT:
A. On Board Computer scan data
1. Retrieval of codes and data
a. Flash codes
b. Scanner codes
2. Interpretation of information

a. Factory set procedures
b. Develop own diagnostic procedures

B. Emission system diagnostics and testing
1. Perform flow chart testing, with codes, and without codes
2. Evaluate exhaust gas emission smog test results
3. Electronic pulse with modulation evaluation

C. Diagnostic patterns, and analyze scope readings
1. Digital storage oscilloscope usage
a. Scope connection
b. Pattern interpretation

D. Diagnostic service information
1. Access service information (electronic)
a. Application of information
2. Access service information (paper)
a. Application of information
3. Research labor time guides for work determined in diagnostics

E. Ignition timing
1. Inspection of adjustable systems
a. Proper operation of timing light
b. Follow factory procedures
c. Set timing to specifications

F. Explain theory and functionality of “OPEN/CLOSED loop systems
1. List theory of fuel flow delivery system in open loop status
a. Sensor contributions during start-up, warm-up
2. Describe operation of sensors during closed loop operation
a. Sensor contribution at operating temperatures

G. Exhaust system evaluation
1. Back pressure
a. Testing and diagnosis
2. Installation inspection

H. Emissions and performance
1. Explain impact of emissions system on vehicle performance
a. Diagnoses of power systems

I. Valve adjustments
1. Adjustment of hydraulic and solid lifters

J. Dynamometer
1. Set up and use of dynamometer
2. Safety procedures
3. List dynamic information obtained from testing (loaded mode)

K. Handling of hazardous waste materials
1. Storage and handling of gasoline
2. Storage and handling of diesel fuel

L. Professional environment
1. Safety glasses (clear lens) worn in all Laboratory areas
2. No loose clothing (coveralls strongly recommended)
3. Long Hair secured
4. No open toe shoes (safety shoes recommended)
5. Work areas maintained: clean free of debris and spills

VI. METHODS OF INSTRUCTION:
A. **Lecture** -
B. **Lab** - Student Hands-on laboratory activities and assignments
C. **Audio-visual Activity** - PowerPoint presentations, Mockup parts from automotive
D. **Discussion** - Group discussion

VII. TYPICAL ASSIGNMENTS:
A. Lecture based assignments 1. Text reading 2. Oral presentation 3. Class discussion 2. Lab based assignments 1. Completion of applied activities 2. Lab activity worksheet 3. Diagnosis and debugging 3. Student Lab work sheets with emphasis on hands-on applications 4. Review of Lab sheets in both Lab and class settings 5. Text reading assignments 6. Class discussions of reading assignments 7. Demonstrations pertaining to reading assignments

VIII. EVALUATION:
A. **Methods**

1. Exams/Tests
2. Quizzes
3. Class Participation
4. Home Work
5. Lab Activities

B. **Frequency**

IX. TYPICAL TEXTS:
1. Hollembeak, Barry, *Automotive Fuels & Emissions Classroom Manual,.*, Thomson Delmar Learning, 2005.
2. Hollembeak, Barry, *Automotive Fuels & Emissions Shop Manual.*, Thomson Delmar Learning, 2005.
3. Safety Glasses

X. OTHER MATERIALS REQUIRED OF STUDENTS: