

Las Positas College  
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## Course Outline for AUTO 69

### AUTO TESTING AND DIAGNOSIS

Effective: Fall 2008

#### I. CATALOG DESCRIPTION:

AUTO 69 — AUTO TESTING AND DIAGNOSIS — 4.00 units

Inspection, diagnosis and repair of connected and related components, and malfunctioning parts; replacing and adjusting components for maximum efficiency and emission standards. Students are strongly recommended to enroll in Automotive Lab concurrently. Prerequisites: Automotive 60B and 61B (both completed with a grade of "C" or higher)t.

3.00 Units Lecture 1.00 Units Lab

#### Prerequisite

AUTO 60B - Auto Electrics/Electronics II  
with a minimum grade of C  
and

AUTO 61B - AUTO FUEL EMISSIONS II  
with a minimum grade of C

#### Strongly Recommended

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#### Grading Methods:

Letter or P/NP

#### Discipline:

|                       | <b>MIN</b> |
|-----------------------|------------|
| <b>Lecture Hours:</b> | 54.00      |
| <b>Lab Hours:</b>     | 54.00      |
| <b>Total Hours:</b>   | 108.00     |

#### II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 4

#### III. PREREQUISITE AND/OR ADVISORY SKILLS:

**Before entering the course a student should be able to:**

##### A. AUTO60B

1. Diagnose and repair basic automotive electrical systems;
2. Use basic electrical testing equipment in correctly diagnosing electrical problems on today's automobiles
3. Use problem solving skills to break down automotive circuits and troubleshoot them
4. Demonstrate the use of digital meters on electronic components and communication systems;
5. Identify fundamentals of electronic theories, Ohms Law;
6. Describe theory and practical application of multiplex communication systems;
7. Categorize safety, security systems diagnosis and repair
8. Outline body controller systems
9. List Ignition, emission and power train system
10. Research wiring System 1. Schematic reading and deciphering;J. Research wiring System
11. Review hazardous material handling;
12. Distinguish safe shop environment from unsafe environment.

##### B. AUTO61B

1. Obtain and interpret scan tool data, retrieve and record stored On Board Diagnostics (OBD) diagnostic trouble codes;
2. Diagnose the causes of emissions or drivability concerns resulting from malfunctions in the computerized engine control system with or without diagnostic trouble codes;
3. 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;
4. Access and use service information to perform step-by-step diagnosis;
5. Check and adjust ignition system timing and timing advance/retard (where applicable);
6. 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;

7. . Perform exhaust system back-pressure test, and determine necessary action;
8. Diagnose malfunctions of emission control systems causing vehicle performance problems, and determine necessary action;
9. Adjust valves on engines with mechanical or hydraulic lifters;
10. Operate vehicle dynamometer to perform emission testing, and engine performance/drivability issues;
11. Outline hazardous waste handling;
12. Distinguish safe shop environment from an unsafe environment.

#### IV. MEASURABLE OBJECTIVES:

**Upon completion of this course, the student should be able to:**

- A. Research Rules and Regulations for Smog Check Stations, and Technicians
- B. Emission control Theory and Operation
- C. Test Analyzer System (TAS) operation
- D. Computer System Theory
- E. Diagnosis and repair of computerized Vehicles
- F. Outline hazardous waste handling
- G. Maintain a clean professional environment.

#### V. CONTENT:

- A. Rules and Regulations
  1. Research Rules and Regulations
    - a. Smog Check Stations
    - b. Smog Check Technicians
- B. Emission Control Theory and Operation
  1. Discuss impact of automotive emissions on the environment
  2. Evaluate exhaust gas emission smog test results
  3. Test Analyzer System (TAS) operation
    - a. TAS calibration
      1. Perform three day calibration
    - a. TAS Maintenance
      1. Service filters
      2. Lock out procedures
- C. Computer System Theory
  1. Closed and Open Loop operation
    - a. Closed Loop operation
      1. Components and function
    2. Open Loop operation
      - a. Components and function
- D. Diagnosis and repair of computerized Vehicles
  1. Analyze Emission system function and failures
    - a. Proper closed loop operation
    - b. System malfunction inspection and repair
- E. Handling of hazardous waste materials
  1. Storage and handling of gasoline
  2. Storage and handling of diesel fuel
- F. 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

#### VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. Student Hands-on labor
- C. **Audio-visual Activity** - 1. PowerPoint presentations 2. 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. Quizzes
  2. Class Participation
  3. Home Work
  4. 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: