# BUTTE COLLEGE
## COURSE OUTLINE

I. **CATALOG DESCRIPTION**

**AUT 30 - Engine Performance and Emission Controls Lecture** **5 Unit(s)**

**Prerequisite(s):** AUT 41 (or concurrent enrollment)
**Co-requisite(s):** AUT 31
**Recommended Prep:** AUT 1
**Transfer Status:** CSU
85 hours Lecture

This course introduces the theory, operation, and repair of the ignition, fuel, engine management, and emission control systems. This course is designed to help prepare the student to take the California State Smog Check Inspector and Repair Technician Licensing exams.

II. **OBJECTIVES**

Upon successful completion of this course, the student will be able to:

A. Describe the theory and operation of various types of automotive ignition systems.
B. Describe the theory and operation of various types of automotive fuel systems.
C. Describe the theory and operation of the computer-controlled engine management system.
D. Describe the theory and operation of various engine emission control systems.
E. Describe the California Bureau of Automotive Repair (BAR) requirements for performing smog inspections and repairs.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

| Topics | Hours |
|---|---|
| 1. Ignition system theory, design, and operation. | 15.00 |
| 2. Fuel system theory, design, and operation. | 15.00 |
| 3. Theory, design, and operation of computer-controlled engine management systems. | 15.00 |
| 4. Theory, design, and operation of emission control systems. | 15.00 |
| 5. California BAR procedures for performing emissions inspection (Smog Check) and repair of inspection failures. | 25.00 |
| Total Hours | 85.00 |

IV. **METHODS OF INSTRUCTION**

A. Lecture
B. Instructor Demonstrations
C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
D. Discussion
E. Multimedia Presentations

V. **METHODS OF EVALUATION**

A. Exams/Tests
B. Quizzes
C. Homework

D. Class participation
E. Final Examination

## VI. EXAMPLES OF ASSIGNMENTS

A. Reading Assignments
1. After reading the BAR Smog Check Inspection Manual, be prepared to verbally describe how to perform a Smog Check Inspection.
2. After reading the chapter on "Electronic Fuel Injection" in the Engine Performance Classroom Manual, be prepared to verbally discuss how the fuel injector pulse width is affected by changes in engine load and RPM.

B. Writing Assignments
1. In the AUT 30 Homework Book, write a 100 word response explaining the relationship of the three exhaust gases (CO, HC, NOx), and explain how a catalytic converter can minimize these gases.
2. In the AUT 30 Homework Book, write short answers of at least 30 words, for each of the ten questions at the end of Chapter 8 "Electronic Fuel Injection," in the Engine Performance Classroom Manual.

C. Out-of-Class Assignments
1. Post a blog of at least 200 words, discussing new or emerging technology in the area of "Engine Performance." Some examples would be Direct Fuel Injection or HCCI Engines.
2. Post substantive comments of at least 50 words, on each of your classmates' blog discussions of new or emerging technology in the area of "Engine Performance."

## VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. Pickerill, Ken. Today's Technician Automotive Engine Performance Classroom & Shop Manuals . 6th Edition. Delmar Cengage Learning, 2014.

Materials Other Than Textbooks:

A. Safety Glasses

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