

EL CAMINO COLLEGE
COURSE OUTLINE OF RECORD

I. Course Information

Course Acronym:*

ATEC

Course Number:* 21

Descriptive Title:* Introduction to Engine Performance

Division: Industry and Technology

Department:*

Automotive Technology

Course Disciplines: Automotive Technology

Catalog Description:*

This course covers the study, theory and application of computer-controlled engine management systems, minor engine performance, electrical and fuel systems. Laboratory activities stress the proper use of test equipment utilized in the automotive field.

Conditions of Enrollment:

Prerequisite:

Co-requisite:

Recommended Preparation: Automotive Technology 1 or equivalent

**Enrollment
Limitation:**

Hours Lecture (per week): 2

Hours Laboratory (per week): 2

Outside Study Hours:* 4

Total Course Hours:* 72

Course Units:* 2.5

Grading Method: Letter Grade only

Credit Status: Credit, degree applicable

Transfer CSU: Yes

Effective Date: Prior to July 1992

Transfer UC: No

Effective Date:

General Education:
ECC

Term:

Other:

CSU GE:

Term:

Other:

IGETC:

Term:

Other:

II. Outcomes and Objectives

A. Student Learning Outcomes (SLOs) (The course student learning outcomes are listed below.)
SLO revisions are completed via the SLO Change Form available on the College Curriculum Committee website.

Student Learning Outcomes:

SLO #1 Safety Exam

Given an in class exam, based on readings, classroom discussions and demonstrations, the student will be able to work in the Automotive Shop safely and pass the Automotive Safety Exam with 100% accuracy.

SLO #2 Engine Analysis

The student will perform and analysis of an engine using the Automotive Compression/ Cylinder Leakage Test /Vacuum Testing lab worksheet to manufacturer specifications.

SLO #3 Battery System Test

The student will be able to test the performance of the automotive battery charging and starting systems using the Automotive Battery/ Charging/Starting Systems Testing lab worksheet and manufacturer specifications.

B. Course Objectives (The major learning objective for in this course are listed below.)

Course Objectives:

1. Complete a safety test with 100% accuracy.
2. Distinguish engine components.
3. Perform an analysis of an engine condition by conducting compression, cylinder leakage, and vacuum tests.
4. Evaluate, test, and service a cooling system.
5. Evaluate, test, and service a lead-acid battery.
6. Evaluate, test, and service starting systems.
7. Evaluate, test, and service charging systems.
8. Distinguish ignition components.
9. Evaluate, test, and service an ignition system.
10. Evaluate, test, and service fuel systems.
11. Evaluate, test, and service emission control systems.

III. Outline of Subject Matter

(Topics should be detailed enough to enable an instructor to determine the major areas that should be covered to ensure consistency from instructor to instructor and semester to semester.)

Example:

- I. Main Topic (3 hours, lecture)
 - A. Sub topics
 - B. Sub topics
 1. Super sub topic
 2. Super sub topic

Major Topics:

I. OVERVIEW OF ENGINE PERFORMANCE AND SAFETY (8 hours, lecture)

1. Course requirements
2. Safety information and test
3. Engine construction and design
4. Four stroke cycle
5. Vacuum testing
6. Compression/cylinder leakage

II. OVERVIEW OF ENGINE PERFORMANCE AND SAFETY (8 hours, lab)

1. Course requirements
2. Safety information and test
3. Engine construction and design
4. Four stroke cycle
5. Vacuum testing
6. Compression/cylinder leakage (lab sheet)

III. COOLING/LUBRICATION SYSTEMS (2 hours, lecture)

1. Components and operation
2. Inspection and service
3. Pressure/block leakage test
4. Cooling system

IV. COOLING/LUBRICATION SYSTEMS (2 hours, lab)

1. Components and operation
2. Inspection and service
3. Pressure/block leakage test
4. Cooling system (lab sheet)

V. BASIC ELECTRICITY (4 hours, lecture)

1. Volt/ohm/amperage testing
2. Electrical worksheet

VI. BASIC ELECTRICITY (4 hours, lab)

1. Volt/ohm/amperage testing
2. Electrical worksheet

VII. BATTERY, STARTING, AND CHARGING SYSTEMS (6 hours, lecture)

1. Battery service and testing
2. Starting system testing
3. Charging system testing
4. Automotive Voltage Regulator (AVR) test

VIII. BATTERY, STARTING, AND CHARGING SYSTEMS (6 hours, lab)

1. Battery service and testing
2. Starting system testing
3. Charging system testing
4. AVR test (lab sheet)

IX. IGNITION SYSTEM (6 hours, lecture)

1. Components and operation
2. Inspection and service
3. Differing ignition setups and systems

X. IGNITION SYSTEM (6 hours, lab)

1. Components and operation
2. Inspection and service
3. Ignition operational monitoring and analysis (Lab sheet)

XI. FUEL SYSTEM (Introduction) (6 hours, lecture)

1. Components and operation
2. Inspection and service
3. Exhaust gas testing

XII. FUEL SYSTEM (6 hours, lab)

1. Components and operation
2. Inspection and service
3. Exhaust gas testing

XIII. EMISSION CONTROLS (4 hours, lecture)

1. Components and operation
2. Inspection and service
3. Emission control testing

XIV. EMISSION CONTROLS (4 hours, lab)

1. Components and operation
2. Inspection and service
3. Emission control testing

Total Lecture Hours: 36

Total Laboratory Hours: 36

Total Hours: 72

IV. Primary Method of Evaluation and Sample Assignments

A. Primary Method of Evaluation (choose one):

- 1) Substantial writing assignments
- 2) Problem solving demonstrations (computational or non-computational)
- 3) Skills demonstrations

Primary Method of Evaluation: 3) Skills demonstration

B. Typical Assignment Using Primary Method of Evaluation

Typical Assignment Using Primary Method of Evaluation: Perform a compression test on an engine and record data on a compression test lab sheet. Analyze data using manufacturer's specifications to determine recommended service and/or repairs and parts required. Submit lab sheet to the instructor.

C. College-level Critical Thinking Assignments

Critical Thinking Assignment 1: Perform a battery load test with appropriate equipment and record data on a battery performance lab sheet. Analyze data using industry standards to determine the serviceability of the battery. Submit lab sheet to the instructor.

Critical Thinking Assignment 2: Draw a block diagram of a contemporary automotive ignition system. Submit diagram to the instructor.

D. Other Typical Assessment and Evaluation Methods

Examples: Class Performance, Objective Exam, Clinical Evaluation, Oral Exams, Completion, Other Exams, Embedded Questions, Performance Exams, Essay Exams, Presentation, Fieldwork, Quizzes, Homework Problems, Reading Reports, Journal kept throughout course, Term or Other Papers, Laboratory Reports, True/False, Matching Items, Written Homework, Multiple Choice, Other (specify)

Other Evaluation Methods: Performance Exams
 Other Exams
 Quizzes
 Written Homework
 Laboratory Reports
 Class Performance
 Multiple Choice
 Completion
 Matching Items
 True/False
 Other (specify): Compliance with manufacturer's service procedures

V. Instructional Methods

Examples: Lecture, Group Activities, Lab, Role play/simulation, Discussion, Guest Speakers, Multimedia presentations, Field trips, Demonstration, Other (specify)

Instructional Methods: Demonstration
 Laboratory
 Lecture
 Multimedia Presentations
 Internet Presentation/Resources

If other: Collaborative learning

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. Work Outside of Class

Work Outside of Class:* Study
 Required reading
 Problem solving activities
 Written work

If Other:

VII. Texts and Materials

A. Up-to-date Representative Textbooks: Please use the following format(s):

Printed Text - Author, Title, Edition, Publisher, Year.

Digital Text (OER Text) - Author (last name first). Title. Edition or Version (if beyond 1st). Publisher, Publication year or Revision date. URL. License.

Sample: Dillon, Dave. *Blueprint for Success in College and Career. Version 1.3. Rebus Community, 2018. press.rebus.community/blueprint2/. Licensed under CC BY 4.0.*

If you wish to list a text that is more than 5 years old, please annotate it as a “discipline standard”.

***Multiple textbooks may be listed.**

Up-To-Date Representative Textbooks: James D. Halderman, *Automotive Engine Performance*, 5th Edition, Pearson Education Inc. 2017 (Discipline Standard)

B. Alternative Textbooks: Please use the following format(s): if applicable

Printed Text - Author, Title, Edition, Publisher, Year.

Digital Text (OER Text) - Author (last name first). Title. Edition or Version (if beyond 1st). Publisher, Publication year or Revision date. URL. License.

Sample: Dillon, Dave. Blueprint for Success in College and Career. Version 1.3. Rebus Community, 2018. press.rebus.community/blueprint2/. Licensed under CC BY 4.0.

If you wish to list a text that is more than 5 years old, please annotate it as a “discipline standard”.

**Multiple textbooks may be listed.*

Alternative
Textbooks:

C. Required Supplementary Readings

Required
Supplementary
Readings:

D. Other Required Materials

Other Required Materials: Three ring binder notebook and paper
 Pen and pencil
 Safety glasses
 Shop safe clothing
 Tools (optional)
 Recording device (optional)
 Lab sheets
 Shop manuals
 Procedure sheets

VIII. Conditions of Enrollment

A. Requisites (Course Prerequisites and Corequisites) Skills needed without which a student would be highly unlikely to succeed.

Requisite:

Category:

Requisite course(s):
 List both
 prerequisites and
 corequisites in this
 box.

Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).

B. Requisite Skills: (Non-Course Prerequisite and Corequisites) Skills needed without which a student would be highly unlikely to succeed.

Requisite Skill:

Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable

C. Recommended Preparations (Course) (Skills with which a student's ability to succeed will be strongly enhanced.)

Requisite course: Automotive Technology-1

Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).

Work safely in the automotive shop.

ATEC 1 - Complete a safety test with 100% accuracy.

Safe use of hand tools.

ATEC 1 - Select and use the proper tools.

D. Recommended Preparation (Non-Course) (Skills with which a student's ability to succeed will be strongly enhanced.)

Requisite Skill: or equivalent

Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable

If students have not taken Automotive Technology 1 but have taken a similar course at another college or have basic automotive work experience, students will have the skills needed to take this course. It is highly recommended that students have basic automotive skills to enhance their success in this course.

E. Enrollment Limitations

Enrollment Limitations and Category:

Enrollment Limitations Impact:

Course Created by: Robert E. Beaudoin

Date: 10/25/1985

**Original Board
Approval Date:**

**Last Reviewed and/or
Revised by:** Michael Anderson

Date: 04/06/2023

**Last Board Approval
Date:** 07/17/2023 effective FALL 2024