



COURSE SYLLABUS

1. **TITLE OF COURSE:** **AUTOMOTIVE BATTERY, STARTING, AND CHARGING SYSTEMS**

- PREFIX/NUMBER:** ASE 123 **CREDIT HOURS:** 2 CR. (1.5L/1.75 LBV)

2. **PREREQUISITE:** None

3. **RESOURCES NEEDED:**
 - TEXT:**
 - SUPPLIES:** Automotive DVOM and uniform shirts

4. **COURSE DESCRIPTION:** Covers the operation, testing, and servicing of automotive battery, starting, and charging systems. Includes voltage and amperage testing of starter and generator, load testing and maintenance of a battery, and starter and generator overhaul.

5. **COURSE GOAL:**

6. **COURSE OBJECTIVES:**

By the end of the course, students will:

 - I. Battery Diagnosis and Service
 - (A) Perform battery state-of-charge test; determine needed service.
 - (B) Perform battery capacity test; determine needed service.
 - (C) Maintain or restore electronic memory functions.
 - (D) Inspect, clean, fill, and replace battery.
 - (E) Inspect and replace slow/fast battery charge.
 - (F) Inspect and clean battery cables, connectors, clamps, and hold-downs; repair or replace as needed.
 - (G) Start a vehicle using jumper cables and a battery or auxiliary power supply according to manufacturers recommended specifications.

 - II. Starting System Diagnosis and Repair
 - (A) Perform starter current draw tests; determine necessary action. Perform starter circuit voltage drop tests; determine necessary action.
 - (B) Inspect and test starter relays and solenoids; replace as needed. Remove and install starter. Perform starter bench tests; determine necessary action.
 - (C) Inspect test switches, connectors, and wires of starter control circuits; perform necessary action.
 - (D) Disassemble, clean, inspect, and test starter components; replace as needed.

 - III. Charging System Diagnosis and Repair

- (A) Perform charging system output test; determine necessary action.
- (B) Diagnose charging system for the cause of undercharge, no-charge, and over-charge conditions.
- (C) Inspect and adjust generator (alternator) drive belts; replace as needed.
- (D) Inspect and test voltage regulator/regulating circuit; perform necessary action.
- (E) Remove, inspect, and install generator (alternator).
- (F) Disassemble generator (alternator), clean, inspect, and test components; determine necessary action. Perform charging circuit voltage drop tests; determine necessary action.

7. EVALUATION PROCEDURES:

- (A) There will be a written exam after each unit and a final, during the 7½ week term, during class time, and on announced dates. All will be weighted equally, except the final will count double.
- (B) There may be unannounced “pop” quizzes throughout the 7½ week term, which will also be weighted equally to other exams.
- (C) Routine evaluations will be made on an individual basis by the instructor during each lab session.
- (D) There will be a lab final (performance) exam. The score on this exam will be entered twice (doubled) when computing your final grade.
- (E) Grading will be weighted--30% of your grade for written assignments, 40% of your grade for lab assignments, 30% of your grade for tests. One grade point value will be deducted from total grade percentage for every hour absent.

Grading Scale	
Raw Score Range	Letter Grade
90 to 100	A
80 to 89	B
70 to 79	C
60 to 69	D
0 to 59	F

Written Assignments 30%	Lab Assignments 40%	Tests 30%	Attendance
50/50 50/38 50/50	50/38 50/50 50/38	100/90 100/70 100/90	One grade point value will be deducted from total grade value for every hour absent.
150/138	150/126	300/250	

Special Remarks:

1. All announced examinations will be made up of multiple choice, completion and short essay type questions and will be given during regular class periods. Make-up exams will only be given if prior arrangements have been made.

2. **Attendance:** College policy states that students may be dropped from enrollment when absent 20% of the scheduled class meetings. If enrolled from the beginning of the term, 15 hours will usually constitute 20% of a four-credit semester course which meets five hours per week. Reinstatement procedures are described in the PCC catalog.
3. **Tardy Policy:** A student who is late three times (enters classroom after the instructor has taken roll) will be charged with one full absence unless the student can provide valid reasons for one or more of these tardies.
4. **Assignments/Missed Exams:** It is the student's responsibility, whether present or absent, to obtain all material presented and to complete all course assignments. If prior arrangements are made or extenuating circumstances exist, makeup of tests may be allowed. Late homework papers will not be accepted unless those same extenuating circumstances exist. Makeup of quizzes is to be at the instructor's discretion.

8. COURSE OUTLINE:

I. Battery

- (A) Fundamentals of a Battery
- (B) Battery Construction
- (C) Types of Batteries
- (D) Jump Starting and Charging Procedures
- (E) Battery Testing and Servicing

II. Charging Systems

- (A) Review of Generating Principles
- (B) Alternator Operation and Construction
- (C) Diode Rectification
- (D) Three Phase Y and Delta Wired Stators
- (E) Regulation and Indicator Circuits
- (F) Field Circuit Types
- (G) Testing of Charging Systems
- (H) Alternator Bench Testing
- (I) Diode Testing

III. Starting Systems

- (A) Review of Electric Motor Operation
- (B) Starter Motor and Operation
- (C) Starter Electrical Circuits
- (D) Starter Control Circuits
- (E) Starter Draw Test
- (F) Starter Ground Circuit Testing

(G) Starter Insulated Circuit Testing

(H) Starter Removal and Installation

(I) Starter Drive

(J) Starter Bench Testing

9. METHODS OF INSTRUCTION:

To be successful in this course, students are expected to participate in discussions, readings, in-class writing, and peer review activities. The instructor may assign point values to such activities.

10. ACADEMIC INTEGRITY:

The very nature of higher education requires that students adhere to accepted standards of academic integrity. Therefore, Pueblo Community College has adopted a policy of academic conduct as described in the Student Handbook. Violation of academic integrity may be defined to include the following: cheating, plagiarism, falsification and fabrication, abuse of academic materials, complicity in academic dishonesty, and personal misrepresentation. It is the student's responsibility to be aware of the behaviors that constitute academic dishonesty. Sanctions for violating the standards of academic integrity may include warning, probation, suspension, and/or failure of the course or assignment at the discretion of the instructor.

11. ADA NOTICE:

Students who have a documented disability may be eligible to receive accommodations for this class. Please contact the Disability Resources Center at 549-3446 for further information.