

DE ANZA COLLEGE
APPLIED TECHNOLOGIES DIVISION
Automotive Technology
ENGINE PERFORMANCE PROGRAM

Course Information Sheet

AT 99B Automotive Charging, Ignition, and Accessory Systems

I. General Information:

Instructor: Pete Vernazza
Classroom Number: EI2F
Office: (408) 864-8216
Tool Room: (408) 864-8768
Email: vernazzapete@fhda.edu
Dates: 11-3-14 through 12-12-14
Days: Monday through Friday
Hours: 7:30 AM to 12:10 PM
Final Examination Date: 12-12-14

One hundred fifty hours lecture-laboratory per quarter

The fundamentals of automotive electronic devices as they apply to the automotive charging and ignition systems. Emphasis on diagnosis of these systems using test instruments including the oscilloscope. Introduction to automotive accessory systems including wiring and repair techniques. Skill development in the understanding of the electrical wiring diagram networks as provided by manufacturers.

Student Learning Outcome - The student will demonstrate the ability to repair a copper strand wire, perform a parasitic draw test, and measure the resistance of various components.

II. Course Objectives

The student will:

- A. Test discrete electronic components
- B. Repair wiring harnesses and connections
- C. Demonstrate electrical wiring installation skills
- D. Identify individual electrical circuits from within a comprehensive electrical wiring diagram
- E. Explain the operation of a basic automotive body electrical systems by using only a wiring diagram
- F. Service and rebuild an alternator
- G. Bench-test an electronic voltage regulator
- H. Repair and adjust automotive ignition systems

- I. Test, service, adjust, and install a breaker-point distributor
- J. Test, service, adjust, and install a pulse-generator and a hall-effect switch distributor
- K. Use electronic diagnostic equipment including the oscilloscope to analyze automotive ignition system performance

III. Essential Student Materials

- A. Texts as listed
- B. Basic tool set and tune-up tool set
- C. Approved shop clothing, safety shoes, and safety glasses
- D. Scientific calculator (T.I. 30 or better)

IV. Essential College Facilities

Classroom and automotive technology laboratory

V. Expanded Description: Content and Form

- A. Fundamentals of semiconductors
 - 1. Diodes — as check valves and rectifiers
 - 2. Transistors — as switches
 - 3. SCR's — as controls
 - 4. Testing and servicing techniques
- B. Wiring and soldering procedures
 - 1. Soldering irons, rosin-core solder
 - 2. Crimping and insulating procedures
 - 3. Testing and servicing techniques
- C. Fundamentals of electrical circuits
 - 1. Electrical wiring diagrams
 - 2. Common circuit symbols
 - 3. Component identification, location, and operation
- D. Accessory circuits
 - 1. Lamp circuits
 - a. Park and headlamps
 - b. Brake lamps
 - c. Directional and hazard
 - 2. Steering column switches
 - a. Turn signal
 - b. Cruise control
 - c. Lamp circuits
 - 3. Troubleshooting system malfunctions
- E. Circuit testing and troubleshooting procedures
 - 1. Meter and test-light usage techniques
 - 2. Wiring diagrams and schematic interpretation

- F. The automotive charging circuit
 - 1. Component identification
 - 2. Component operation, test procedures, and specifications
 - 3. Disassembly procedures
 - 4. Cleaning and inspection procedures
 - 5. Repair equipment operating procedures
 - 6. Assembly procedures
 - 7. Bench testing and installation procedures

- G. Breaker-point ignition systems principles of operation
 - 1. Schematic interpretation and circuit development
 - 2. Component identification

- H. Oscilloscope theory and operation
 - 1. Procedures and precautions
 - 2. Pattern interpretation

- I. Testing and repair procedures, breaker-point ignition systems
 - 1. Distributors, ignition cables, and spark plugs
 - 2. Meter testing and synchrograph service
 - 3. Manufacturers specifications

- J. Electronic ignition systems principles of operation
 - 1. Schematic interpretation and circuit development
 - 2. Component identification
 - 3. Manufacturers specifications

- K. Pulse-generator and hall-effect distributor principles of operation
 - 1. Diagnosis
 - 2. Service and repair techniques
 - 3. Manufacturers specifications

- L. Testing and repair procedures, electronic ignition systems
 - 1. Modules, coils, and wiring
 - 2. Meter testing and synchrograph service
 - 3. Manufacturers specifications

VI. Assignments

- A. Reading from texts and handouts
- B. Lab assignments per expanded National Automotive Technology Education Foundation (NATEF) task list

VII. Methods of Evaluating Objectives

- A. Problem-solving quizzes covering major lecture topics
- B. Multiple choice final examination, including performance final examination
- C. Lab assignments per NATEF task list

D. Attendance per department policy

VIII. Texts and Supporting References

1. See my faculty website for ISBN's.

IV. Miscellaneous

1. **Choose lab partners carefully.**

2. You will make your own jumpers and test leads for probing connectors. I will supply everything. Once you make them, do NOT ask me for a jumper wire.

Do NOT ever probe a connector **terminal with a test lead or test light!*

**Do NOT ever pierce a wire with a test lead or test light probe!*

3. Who uses email every day? It would be wise to check email every day.

4. Read, read and read. Reading the assigned materials will greatly help your success in this class. If I give you a reading assignment, read it.

We will do a lot of "in-class" reading out-loud. If you do not feel comfortable reading out loud, please see me.

5. If you are going to be a "7:30 to noon student", you are going to have a long year. What does this mean?

Classroom and Lab Conduct

- A. Students will be dismissed from class for disruptive behavior per college policy
- B. Students *will wear safety glasses*, coveralls, and work shoes for the duration of labs. Wear coveralls properly – no "half mass"
- C. All required tools must remain available for lab activities. Basic hand tools cannot be checked from the tool room after the first six weeks. Spot checks of tools will be made at random. Students without the required tools will be disqualified from the automotive laboratory.
- D. Students are to remain in assigned areas through clean up.
- E. There is one official 20-minute break between lecture and lab. Additional breaks are at the discretion of the instructor.
- F. It is expected that work will be completed with pride and craftsmanship.
- G. Sunglasses are NOT permitted in the classroom during lecture or in the lab.
- H. Do NOT play the vehicle radio at any time during lab assignments
- I. Do NOT move vehicle seats to a reclined position at any time during lab.
- J. Do NOT leave bottles, cans, wrappers etc. in De Anza vehicles.
- K. If a De Anza vehicle has a dead battery, connect low amp charger to the battery at the end of class and leave overnight.

L. Turn Cell Phones off at all times in class.

M. Each day at the end of class, neatly tuck in your chairs

Grading System

90% and higher = A

80% to 89% = B

70% to 79% = C

60% to 69% = D

59% or lower = F

Grading System: Quizzes, comprehensive final, and lab performance final. All tests are open book/notes unless otherwise stated.

Per department policy, a minimum grade of "C" is required. Grades less than "C" in two courses are cause for dismissal from the program.

Attendance Policy

Just as on the job, regular, punctual attendance is required. Always call or email if you are going to be late or absent. The following limits and conditions apply per department policy:

- a. Students must record attendance on a time card. Punch in prior to 7:30 AM (start of class) and out at 12:10 PM (or at end of class). Punch in neatly and orderly.
- b. For each tardy, there is a 1-hour penalty. 7:30AM is tardy.
- c. Forgetting to punch in or out will constitute a 1-hour penalty.
- d. Up to 5 hours (each 6 weeks) can be made up providing the student calls in. Missed time cannot be made up if the student does not call or email prior to class.
- e. Make-up hours must be made-up prior to the day of the final exam.
- f. **Do NOT ever punch in or out for another student. If I find out that you do, you will have the next day off (5 HRS lost without make-up time). Period.**

Hours not made up will be deducted from total class percentage at the rate of 1% per hour. The instructor will specify terms and conditions for make-up.

I understand the classroom conduct, grading and attendance policy and tool requirements per De Anza College Automotive Technology guidelines

Name _____

Signature _____

Date _____

Tear out this sheet and return it to the Instructor