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Course Outline for APAU 970
AUTO ELECTRICAL/ELECTRONIC SYS
Effective: Fall 2009

I. CATALOG DESCRIPTION:

APAU 970 — AUTO ELECTRICAL/ELECTRONIC SYS — 1.50 units

This is a Bureau of Automotive Repair approved alternative to the ASE A-6 certification required for obtaining and maintaining smog technician licenses. This course focuses on diagnosis and repair of automotive electrical and electronic systems. The course is designed to help the student understand how electricity works in today's modern automobile. Industry Advisory: Students entering the course are expected to have a firm background in automotive engine theory and operation. In order to be eligible to take the State Licensing Exam at completion of the course/program, they must also have one year trade experience in engine performance/emissions, or nine semester units (13 quarter units) in Automotive Technology, or 180 hours at an accredited automotive school. Only students who are part of the automotive apprenticeship may enroll in an APAU class. 1 hour lecture, 1.5 hours laboratory.

1.00 Units Lecture 0.50 Units Lab

Grading Methods:

Discipline:

	MIN
Lecture Hours:	18.00
Lab Hours:	27.00
Total Hours:	45.00

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

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

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

1. diagnose and repair automotive battery, starting, and charging systems using meters, test lights, and logic probes
2. diagnose open, short, and grounded circuits
3. diagnose intermittent electrical problems
4. explain Ohm's Law and apply in lab exercises
5. perform a voltage drop test
6. read and understand a wiring diagram including standard industry symbol identification
7. successfully apply diagnostic flow charts in order to achieve accurate diagnostic results of electronic components

V. CONTENT:

- A. Use of meters, test lights, and logic probes in diagnosing battery, starting, and charging systems
- B. Circuit Problems
 1. Opens, causes and corrections
 2. Shorts, causes and corrections
 3. Grounds, causes and corrections.
- C. Intermittent electrical problems
 1. Diagnostic Strategy
 2. Collection Information
 3. Attacking problem
- D. Ohm's Law and electrical theory
 1. Ohms Law
 2. Computing Ohms Law
 3. Using Ohms Law in stock vehicles
 4. Using Ohms Law with aftermarket accessories
- E. Voltage drops
 1. What do they mean?
 2. Better than Ohms?
- F. Wiring diagrams
 1. Schematic Icons
 2. Reading Charts
- G. Diagnostic Flow Charts

VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. **Lecture** -
- C. **Lab** - Hands-On lab Exercises
- D. **Audio-visual Activity** - Audio Visual presentations
- E. **Discussion** -

VII. TYPICAL ASSIGNMENTS:

A. Read each chapter in the text and be prepared to seek clarification and ask questions in class. B. Orally discuss the material covered in each chapter. C. Complete the review questions and related lab exercises for each chapter. 1. Explain how the computer is used to control the a alternator 2. Why do voltage regulators include temperature compensation D. Complete lab activity worksheets for diagnosis and debugging using electrical/electronic diagnostic equipment. 1. Charging voltage check 2. Lighting system troubleshooting

VIII. EVALUATION:

A. **Methods**

- 1. Exams/Tests
- 2. Class Participation
- 3. Lab Activities

B. **Frequency**

- 1. Weekly Quizzes
- 2. Weekly Lab Assignments
- 3. Midterm
- 4. Final

IX. TYPICAL TEXTS:

- 1. S. Myron Maurseth *Automotive Electrical and Electronic Systems.*, California Institute of Automotive Technology (CIAT), 2004.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Safety glasses – required
- B. Slip resistant, steel-toed boots – strongly recommended