

BUTTE COLLEGE

COURSE OUTLINE

I. CATALOG DESCRIPTION

AUT 41 - Specialized Automotive Electronics and Microcomputers

5.5 Unit(s)

Prerequisite(s): NONE

Recommended Prep: AUT 1

Transfer Status: CSU

68 hours Lecture

76.5 hours Lab

This course teaches students the fundamentals of electricity and electronics, including semi-conductors and microcomputers, as they are used in the automotive industry. Electrical measuring devices, wire repair, circuits, schematics and practical diagnostic procedures are emphasized. Microcomputer inputs, processing, outputs, testing, and operation will be explained. Students will acquire the fundamental knowledge and skills to diagnose and service modern automotive electrical and electronic systems.

II. OBJECTIVES

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

- A. Identify and describe the fundamental principles and components of electrical and electronic circuits
- B. Analyze and measure series and parallel circuits
- C. Read, interpret, and illustrate electrical schematics
- D. Identify, explain, and test semi-conductors in electrical circuits
- E. Test automotive microcomputer systems
- F. Analyze and measure input, processing, and output of microcomputer systems
- G. Identify types of input/output signals
- H. Properly use tools and equipment for testing
- I. Identify and explain the use of multiplexed computer systems

III. COURSE CONTENT

A. Unit Titles/Suggested Time Schedule

Lecture	
<u>Topics</u>	<u>Hours</u>
1. Fundamentals of Electronics	6.00
2. Meters and Test Equipment	3.00
3. Series Circuits	3.00
4. Parallel Circuits	3.00
5. Schematics and Diagnosis	7.00
6. Wire Repair	2.00
7. Semiconductors	4.00
8. Transistors and Electronics	6.00
9. Microprocessor Fundamentals Overview	3.00
10. Input	3.00
11. Processing	3.00
12. Output	3.00

13. Microcomputer Controlled Systems	5.00
14. Tools and Equipment for Testing	2.00
15. Handling and Processors	3.00
16. On-car Diagnosis	2.00
17. Multiplexing	6.00
18. Diagnostic Multimeter (DMM) Skills Practice	4.00
Total Hours	68.00

Lab

<u>Topics</u>	<u>Hours</u>
1. Voltage, Resistance and Current	9.00
2. Meters and Test Equipment	9.00
3. Series Circuits	9.00
4. Parallel Circuits	9.00
5. Relay Diagnosis	9.00
6. Wire Repair	7.00
7. On and Off-car DMM Skills Practice	14.50
8. On-car Diagnosis	10.00
Total Hours	76.50

IV. **METHODS OF INSTRUCTION**

- A. Lecture
- B. Instructor Demonstrations
- C. Group Discussions
- D. Collaborative Group Work
- E. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- F. Reading Assignments
- G. Multimedia Presentations
- H. Laboratory Experiments

V. **METHODS OF EVALUATION**

- A. Exams/Tests
- B. Group Participation
- C. Class participation
- D. Final Examination
- E. Written or Oral Examinations
- F. Practical Evaluations
- G. One hands-on individual lab final

VI. **EXAMPLES OF ASSIGNMENTS**

- A. Reading Assignments
 - 1. Read the chapter on “Electrical Fundamentals” in your textbook. Answer the review questions and be prepared to take the chapter quiz.
 - 2. Read the Chapter on “Electrical Circuits and Ohm’s Law” in your textbook. Be prepared to discuss in class.
- B. Writing Assignments

1. Write a minimum 100 word journal entry on the knowledge that you gained reading “Electrical Circuits and Ohm’s Law.”
2. Write a half page summary on the knowledge that you gained reading “Electrical Fundamentals.”

C. Out-of-Class Assignments

1. Contribute to the online discussion forum on electrical fundamentals.
2. Describe the relationship between volts, ohms, and amps on a discussion board.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

- A. CDX Automotive. CDX Light Vehicle. 2nd Edition. Jones & Bartlett, 2013.
- B. Medina-Dressen. Specialized Automotive Electronics. Butte College, 2012.

Materials Other Than Textbooks:

- A. Electrical test boards, parts and accessories and complete systems or units of the automobile are used at the appropriate time to convey related information, shop work study and reference.
- B. Visual presentations pertinent to the subject matter will be used to present subjects.
- C. Safety Glasses

Created/Revised by: Bradley Dressen

Date: 11/02/2015