BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

AUT 22 - Automotive Heating and Air Conditioning Lecture **2 Unit(s)**

Prerequisite(s): AUT 41 (or concurrent enrollment)
Co-requisite(s): AUT 23
Recommended Prep: AUT 1
Transfer Status: CSU
40 hours Lecture

In this course students study the theory and principles of operation of automotive Heating, Ventilation and Air Conditioning (HVAC) systems as well as engine cooling system operation and repair. Basic laws of heat transfer, refrigeration and compression/expansion of liquid/vapor are introduced.

II. **OBJECTIVES**

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

A. Describe HVAC system diagnosis and repair procedures.
B. Identify basic refrigeration system diagnosis and repair procedures and processes.
C. Identify basic applications of heating, ventilation, and engine cooling systems diagnosis and repair.
D. Compare HVAC operating systems and related controls, and identify appropriate diagnosis and repair protocols.
E. List and define refrigerant recovery, recycling, and handling and procedures.
F. Describe various applications of heating, ventilation, and engine cooling systems diagnosis and repair.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

Topics	Hours
1. Principles and theory of heating and air conditioning operation	9.00
2. The dynamics of refrigerant in an operating air conditioning system	8.00
3. The operating principles and all individual parts of HVAC systems	7.00
4. Diagnosis and repair of the automotive HVAC system including refrigeration, heating and ventilation components	16.00
Total Hours	40.00

IV. **METHODS OF INSTRUCTION**

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

V. **METHODS OF EVALUATION**

A. Exams/Tests
B. Homework
C. Class participation
D. Final Examination

VI. EXAMPLES OF ASSIGNMENTS

A. Reading Assignments
   1. Review your Procedure Reference and be prepared to discuss safety and hazmat handling in class.
   2. Read the outlined chapter on refrigeration principles and prepare for your first quiz.

B. Writing Assignments
   1. Complete the reading about refrigerant recovery, recycling, and handling procedures and fill in the identified sections in your "Things to Know" handout.
   2. Write a one-page summary of your collaborative ventilation electrical schematic and present it to the class.

C. Out-of-Class Assignments
   1. Perform the 9 self-study modules assigned by American Honda. Your instructor will confirm that you have completed the required modules.
   2. Complete the Mechanical Safety portion of the SP2 safety test with a score of 80% or better. Prior to working in the lab, you must complete the following areas: Introduction, Fires, Slips & Falls, Power Tools, Lifts, Operating Vehicles, Jump Starting, Chemicals & the MSDS.

VII. RECOMMENDED MATERIALS OF INSTRUCTION

Textbooks:

A. Halderman, J. Automotive Engines and Air Conditioning. Pearson, 2014.

Materials Other Than Textbooks:

A. Parts, accessories and complete systems or units of the automobile are used at the appropriate time to convey related information, shop work study and reference.

Created/Revised by: George Medina
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