BUTTE COLLEGE
COURSE OUTLINE

I. **CATALOG DESCRIPTION**

AET 43 - Hydraulic and Pneumatic Systems **2 Unit(s)**

Prerequisite(s): NONE
Recommended Prep: Reading Level IV; English Level III; Math Level II
Transfer Status: CSU
17 hours Lecture
51 hours Lab

This course is an introduction to the theory, operating principles, application, graphical symbols, component parts, systems, maintenance, adjustment, and repair of hydraulic and pneumatic systems used on modern trucks and heavy equipment used in the construction and agricultural industries.

II. **OBJECTIVES**

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

A. Explain the operating principles of hydraulic and pneumatic systems.
B. Evaluate component compatibility for hydraulic and pneumatic systems.
C. Explain nomenclature and symbols of hydraulic and pneumatic systems.
D. Solve problems involving pressure and flow.
E. Identify components used in hydraulic and pneumatic systems.
F. Properly adjust air brakes using the simulator axle.
G. Perform in-cab air brake tests.
H. Assemble a working dual air brake system using actual components.
I. Communicate and work cooperatively with others.

III. **COURSE CONTENT**

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

Lecture

Topics	Hours
1. Introduction to Hydraulics, Safety	1.00
2. Basic Circuits and Components	2.00
3. Pumps	1.00
4. Valves	1.00
5. Actuators	1.00
6. Accumulators, Reservoirs, Conditioners	1.00
7. Fluids, Seals, Lines, Connectors	1.00
8. Maintenance, Diagnostics, Testing	1.00
9. Symbols and Diagrams	1.00
10. Introduction to Pneumatics, Safety, Fundamentals	1.00
11. Single and Dual Circuit Systems	1.00
12. Foundation Brakes and Adjustment	1.00
13. Supply and Service BrakeSystem	1.00
14. Emergency, Park and Tractor/Trailer System	1.00
15. Anti-Lock Systems	1.00

16. Diagnostics and Testing, Commercial Driver's License (CDL)	1.00
Total Hours	17.00

Lab

Topics	Hours
1. Introduction to Hydraulics, Safety	3.00
2. Basic Circuits and Components	3.00
3. Pumps	4.00
4. Valves	4.00
5. Actuators	3.00
6. Accumulators, Reservoirs, Conditioners	3.00
7. Fluids, Seals, Lines, Connectors	3.00
8. Maintenance, Diagnostics, Testing	3.00
9. Symbols and Diagrams	3.00
10. Introduction to Pneumatics, Safety, Fundamentals	3.00
11. Single and Dual Circuit Systems	3.00
12. Foundation Brakes and Adjustment	4.00
13. Supply and Service BrakeSystem	3.00
14. Emergency, Park and Tractor/Trailer System	3.00
15. Anti-Lock Systems	3.00
16. Diagnostics and Testing, CDL	3.00
Total Hours	51.00

IV. **METHODS OF INSTRUCTION**

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

V. **METHODS OF EVALUATION**

A. Quizzes
B. Demonstration
C. Homework
D. Class participation
E. Lab Projects
F. Performance Examinations
G. Practical Evaluations
H. Mid-term and final examinations
I. Essays and research papers
J. Laboratory evaluation will include problem solving exercises or skill demonstrations.

VI. **EXAMPLES OF ASSIGNMENTS**

A. Reading Assignments
1. Read the chapter on pumps in FOS Hydraulics before class meets. Complete study questions at end of the chapter and be prepared to discuss them in class.
2. Read the sections on air brake fundamentals of the Bendix Air Brake Handbook before class meets. Be prepared to discuss these concepts in class.

B. Writing Assignments
1. At the end of class complete the daily Lab Report form to review the topic presented and answer the 3 questions evaluating your understanding of it briefly but fully. Return the white copy to the instructor- keep the pink copy for your reference.
2. List the steps for the in-cab air brake test in correct sequence. Be prepared in class to be able to relate them accurately in the correct order. You will also be required to perform this test in the truck from memory.

C. Out-of-Class Assignments
1. Locate and identify 5 hydraulic components on the John Deere 7405 tractor. Be prepared in class to do this from memory.
2. Complete the Dual Circuit air brake diagram by properly connecting all components. Be prepared in class to do this from memory.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

A. Deere and Company. FOS Hydraulics. 8th Edition. Deere & Co, 2011.

Materials Other Than Textbooks:

A. Bendix Air Brake Handbook (online)

Created/Revised by: Bruce Enyeart
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