Course Outline

2026-2027 Catalog

AET 43 - Hydraulic and Pneumatic Systems

Catalog Description

Transfer Status: CSU

Unit(s): 2.00

Lecture: 17.00 Contact hours/34.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Total: 68.00 Contact hours/34.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Course Description: 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.

Objectives

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

1. Explain the operating principles of hydraulic and pneumatic systems.
2. Evaluate component compatibility for hydraulic and pneumatic systems.
3. Explain nomenclature and symbols of hydraulic and pneumatic systems.
4. Solve problems involving pressure and flow.
5. Identify components used in hydraulic and pneumatic systems.
6. Properly adjust air brakes using the simulator axle.
7. Perform in-cab air brake tests.
8. Assemble a working dual air brake system using actual components.
9. Communicate and work cooperatively with others.

Course Content

Topic Titles / Suggested Time Topic

Lecture

Topics	Lec Hrs
Introduction to Hydraulics, Safety	1.00
Basic Circuits and Components	2.00
Pumps	1.00
Valves	1.00
Actuators	1.00
Accumulators, Reservoirs, Conditioners	1.00
Fluids, Seals, Lines, Connectors	1.00
Maintenance, Diagnostics, Testing	1.00
Symbols and Diagrams	1.00
Introduction to Pneumatics, Safety, Fundamentals	1.00
Single and Dual Circuit Systems	1.00
Foundation Brakes and Adjustment	1.00
Supply and Service BrakeSystem	1.00
Emergency, Park and Tractor/Trailer System	1.00
Anti-Lock Systems	1.00
Diagnostics and Testing, Commercial Driver's License (CDL)	1.00
Total Hours:	**17.00**

Lab

Topics	Lab Hrs
Introduction to Hydraulics, Safety	3.00
Basic Circuits and Components	3.00
Pumps	4.00
Valves	4.00
Actuators	3.00
Accumulators, Reservoirs, Conditioners	3.00

Topics	Lab Hrs
Fluids, Seals, Lines, Connectors	3.00
Maintenance, Diagnostics, Testing	3.00
Symbols and Diagrams	3.00
Introduction to Pneumatics, Safety, Fundamentals	3.00
Single and Dual Circuit Systems	3.00
Foundation Brakes and Adjustment	4.00
Supply and Service BrakeSystem	3.00
Emergency, Park and Tractor/Trailer System	3.00
Anti-Lock Systems	3.00
Diagnostics and Testing, CDL	3.00
Total Hours:	**51.00**

Methods of Instruction

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

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.

Examples of Assignments

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.

Writing Assignments

1. 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.
2. 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.

Out-of-Class Assignments

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

Recommended Materials of Instruction

Deere and Company. (2011). FOS Hydraulics. *Deere & Co, 8th.*

Other Learning Materials

Bendix Air Brake Handbook (online)

Minimum Qualifications

Agricultural Engineering

Created/Revised by: Enyeart, Bruce
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