

1700041

Hydraulic Troubleshooting

COURSE INFORMATION

Credits:na

PREREQUISITES AND/OR COREQUISITES

A minimum grade of C- in 7700003 Fluid Power II or equivalent

COURSE DESCRIPTION

This course is an in-depth study in the applications of hydraulic components and the various methods of troubleshooting fluid power components and systems in typical industrial applications.

COURSE GOALS

- I. Learn safety procedures needed to work with industrial hydraulic systems
- II. Identify fluid power components and their functions.
- III. Explain how to diagnose and test components safely.
- IV. Demonstrate how to diagnose and evaluate hydraulic components through safe fluid power troubleshooting techniques.

STUDENT LEARNING OUTCOMES

- I. System startup procedures
 - A. Safety in working around hydraulic systems
 - B. Diagnostic Equipment applications
 - C. Starting a new hydraulic pump
 - D. Troubleshooting using root cause method
- II. Hydraulic pumps
 - A. Diagnose and test internally drained pumps
 - B. Diagnose and test externally drained pumps
 - C. Diagnose and test case drain pressure
 - D. Diagnose and test for pump cavitation
 - E. Root cause analysis for cavitation
- III. Pressure control valves
 - A. Diagnose and test pilot operated relief valves
 - B. Diagnose and test direct operated relief valves
 - C. Performing series restriction pressure test
 - D. Diagnose and test operation of sequencing valves
 - E. Diagnose and test pressure reducing valves
- IV. Industrial Directional Control valves
 - A. Diagnose and test spool leakage
 - B. Diagnosing valve stacks

- C. Diagnose and test internal and external pilot pressure operated DCV
 - D. Diagnose and test internal and external back-press check valve on pilot operated DCV
 - E. Demonstrate how to convert pilot operated DCV from internally drained to external drained
- V. Mobile directional control valves
 - A. Diagnose and test spool leakage
 - B. Diagnose and test cylinder port relief valves
 - C. Diagnose and test anti-cavitation valves
 - D. Diagnose and test load check valves
- VI. Hydraulic cylinders
 - A. Diagnose and test cylinder seal/bore
 - B. Testing cylinder through stroke
 - C. Servicing cylinder rod end seal procedures
- VII. Hydraulic motors
 - A. Diagnose and test internally drained hydraulic motors
 - B. Diagnose and test externally drained hydraulic motors
 - C. Diagnose and test motor case pressure
 - D. Diagnose and test variable displacement hydraulic motors
 - E. Diagnose and test parallel hydraulic dual motor applications
- VIII. Cartridge and Flow control Valves
 - A. Diagnose and test cartridge valves
 - B. Diagnose and test Needle valve seat
 - C. Diagnose and test flow control valves with an without bypass checks
- IX. Check valves
 - A. Diagnose and test check valves
 - B. Diagnose and test pilot operated poppet check valves
 - C. Diagnose and test pilot operated piston check valves

INSTITUTIONAL OUTCOME(S)

- I. COMMUNICATION - Students will develop speaking, writing, reading, and listening skills.
- II. CRITICAL THINKING/PROBLEM SOLVING - Students will acquire, evaluate, and analyze information; develop sound reasoning skills; and apply the principles of the scientific method.
- III. QUANTITATIVE REASONING/INDUSTRY COMPETENCY - - Students will develop skills in problem-solving, logical thinking, and application of mathematical processes
 - Students operationalize skills, attitudes, and reasoning to consistently recognize problems and assertively and accurately address them.

COURSE MATERIALS

Troubleshooting Hydraulic Components, 6th edition, Fluid Power Training Institute # 0963961918;
 Troubleshooting hydraulic components simulator activities student workbook revision 9.0 by fluid Power Training Institute # HC-R004-102TSE-TA

GRADING CRITERIA

Students can expect to be graded on Written Assignments, Quizzes, Tests, Lab Activities, and Attendance. There is currently no scheduled time available to makeup classes or labs that are missed.

PARTICIPATION/ATTENDANCE POLICY

Students can expect that attendance/participation will be a part of their final grade, and determined by the instructor at his/her discretion. Students are encouraged to attend every class as regular attendance as it contributes to successful course completion and will impact the final grade.

COURSE EXPECTATIONS

For successful completion of this course, students are expected to Read Course Material, Complete all Assignments, Take Notes, Study and Participate in classroom discussions.

ACADEMIC INTEGRITY AND CONDUCT POLICY

The integrity of a class and program rests on the principle that the grades awarded to students must reflect only their own individual efforts and achievement. Students are required to perform the work specified by the instructor and are responsible for the content of work submitted, such as papers, reports, examinations, and other work. Violations of academic integrity include various types of plagiarism and cheating.

Plagiarism

Plagiarism includes, but is not limited to:

- Using exact words from a source without appropriate crediting
- Cutting and pasting electronically from any source without appropriate crediting
- Using wording and/or sentence structure too close to the original in paraphrasing
- Using visual images in whole or in part created by someone else without appropriate crediting
- Buying a paper and presenting any part of it as your own
- Borrowing any part of a paper and presenting it as your own without appropriate crediting
- Falsifying or inventing any information or citation in an academic exercise

Cheating

Cheating includes, but is not limited to:

- Obtaining or giving assistance in any academic work such as on quizzes, tests, homework, etc., without instructor's consent
- Taking a test or course or turning in work for someone else
- Allowing someone to take a test or course or turn in work in your name
- Using crib notes or electronic devices to get unauthorized assistance on tests or other in-class work
- Using work from another class or previous semester without instructor consent

CLASS CANCELLATION POLICY

Class meetings can occasionally be called off due to bad weather, check the local news and radio for information or call 319-296-4444 for the current status of college closings, class cancelations, delay start, or early dismissal information.

STUDENTS' SPECIAL NEEDS STATEMENT

Hawkeye Community College (HCC) strives for student-centered, quality education with flexibility to allow for students' special needs. Students with physical, mental, or learning disabilities should contact the Special Needs Coordinator in Student Services at 319-296-4014 or specialneeds@hawkeyecollege.edu to learn how to apply for accommodations at HCC. Or, visit our website for more information and forms: <http://www.hawkeyecollege.edu/students/services/student-disability-services/default.aspx>

NONDISCRIMINATION STATEMENT

Hawkeye Community College does not discriminate on the basis of sex; race; age; color; creed; national origin; religion; disability; sexual orientation; gender identity; genetic information; political affiliation; or actual or potential parental, family, or marital status in its programs, activities, or employment practices as required by Iowa Code §§ 216.6 and 216.9, Titles VI and VII of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d and 2000e), the Equal Pay Act of 1973 (29 U.S.C. § 206, et seq.), Title IX (Educational Amendments, 20 U.S.C. §§ 1681-1688), Section 504 (Rehabilitation Act of 1973, 29 U.S.C. § 794), and Title II of the Americans with Disabilities Act (42 U.S.C. § 12101, et seq.). Veteran status is also included to the extent covered by law. Any person alleging a violation of equity regulations shall have the right to file a formal complaint. Inquiries concerning application of this statement should be addressed to: John Clopton (Equity Coordinator and Title IX Coordinator for Employees) or Nancy Henderson (Title IX Coordinator for Students), Hawkeye Community College, 1501 East Orange Road, P.O. Box 8015, Waterloo, Iowa 50704-8015, telephone 319-296-4405, email: equity-titleIX@hawkeyecollege.edu, or the Director of the Office for Civil Rights, U.S. Department of Education, Citigroup Center, 500 W. Madison, Suite 1475, Chicago, IL 60661, phone number 312/730-1560, fax 312/730-1576.

DISCLAIMER

This syllabus is believed to be accurate at the time it was written. However, the instructor reserves the right to make changes as deemed necessary, provided notification is given to the students.

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