Basic Hydraulics (DEMR 1316)

Credit: 3 semester credit hours (3 hours lecture)

Prerequisite/Co-requisite: None

Course Description
Fundamentals of hydraulics including components and related systems.

Required Textbook and Materials
1. **Hydraulics** Fundamentals of Service
   Author: Deere and Company
   ISBN # 0-86691-265-7
2. **Hydraulic System Diagnostics** Fundamentals of Service
   Author: Deere and Company
   ISBN # 0-86691-249-5
3. Notebook and 8.5" x 11" notebook paper
4. Blue and Black ink pens

Course Objectives
Upon completion of this course, the student will be able to:
1. Describe fundamentals of hydraulics. SCANS: F1.4, F2.4, F3.3, F4.1, F6.2, F10.3, F11.3, C1.2, C15.4
2. Test hydraulic circuits. SCANS: F1.4, F2.4, F3.3, F4.1, F6.2, F10.3, F11.3, C1.2,C9.2, C15.4
3. Use a systematic approach to troubleshooting. SCANS: F1.4, F2.4, F3.3, F4.1, F6.2, F10.3, F11.3, C1.2, C15.4
4. Repair hydraulic systems. SCANS: F1.4, F2.4, F3.3, F4.1, F6.2, F10.3, F11.3, C1.2, C15.4
5. Identify hydraulic circuits, diagrams, and symbols. SCANS: F1.4, F2.4, F3.3, F4.1, F6.2, F10.3, F11.3, C1.2,C9.2, C15.4

SCANS Skills and Competencies
Beginning in the late 1980's, the U.S. Department of Labor **S**ecretary's **C**ommission on **A**chieving **N**ecessary **S**kills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools.* In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

Course Outline

I.) Hydraulics – How it works
- A. Basic Principles of Hydraulics
- B. How a Hydraulic System Works
- C. Use of Hydraulics

II.) Safety Rules for Hydraulics
- A. Specific Hydraulic Hazard Information
- B. General Safety Information
- C. Recognizing Safety Information

III.) Symbols in Diagrams
- A. Reading Hydraulic Symbol Drawings
- B. Characteristics of Symbols

IV.) Hydraulic Pumps
- A. Displacement of Pumps
- B. Types of Pumps

V.) Hydraulic Valves
- A. Types of Valves
- B. Valve Servicing and Care

VI.) Hydraulic Cylinders
- A. Piston Cylinders
- B. Vane Cylinders
- C. Seals

VII.) Hydraulic Motors
- A. Introduction
- B. Motor Application and Efficiency

VIII.) Hydraulic Accumulators
- A. Uses of Accumulators
- B. Pneumatic Accumulators

IX.) Hydraulic Fluids
- A. Properties of Fluids
- B. Maintenance of Fluids

X.) General Maintenance
- A. Safety Rules
- B. Cleanliness

XI.) Diagnosis and Testing of Hydraulic Systems
- A. Introduction
- B. Troubleshooting Safely

Grade Scale

90 – 100	=	A
80 – 89.9	=	B
70 – 79.9	=	C
60 – 69.9	=	D
0 – 59.9	=	F

Course Evaluation

Final grades will be calculated according to the following criteria:

Daily work, quizzes, and homework assignment.	**40%**
Test over Lecture and Chapters	**30%**
Outside assignment or class presentation.	**10%**
Final Exam	**20%**

Course Requirements

1. Complete specific reading assignments in a timely manner specified by the instructor.
2. Seek out available material on the subject being taught, utilizing the library, periodicals and / or the Internet.
3. Wear sleeved shirts, full length jeans or work pants and preferably leather shoes to class and on campus. No shorts or tank tops are allowed.
4. Participate in project interview when offered.
5. Complete all work book and class assignments.
6. Be present at class sessions and examinations as scheduled.
7. Basic skill in math.

Attendance Policy

1. Missing more than 20% of classes will result in an automatic "F" for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

If you wish to drop, you are responsible for the drop process. I will not initiate the drop, no matter how many absences or zeroes you have; that is, if you stop coming to class and do not drop, you will earn an F in the course.
Students are allowed only 6 drops, from any public Institute of higher education, in their lifetime.

Course Policies

1. **No Cell Phone** or **Electronic Devices** allowed in class, except in special circumstances and it is approved by the instructor.
   All cell phones must be turned off and put away. Text messaging during class time will not be tolerated. Text messaging during an exam will be considered academic dishonesty. The exam will be considered over and the student will receive a zero for the exam.
2. **No** smoking or use of any **tobacco** products allowed
3. Do not bring any **food** or **drinks** in class
4. No visitor allowed in class including children
5. Do not disturb lecture for any reason. If you must leave class or come in late, do so without disturbing class.
6. **DRESS CODE: Proper work attire only, NO *Open shoes, Short pants, low riding, or sleeveless shirts*, will be allowed in any program classrooms.**
7. **No** grades will be **dropped**, No homework or assignments can be made up or accepted after instructor has taken up for grading.
8. **Homework** must be done **in proper outline form, neat and legible**, prepared on **loose leaf (8.5" X 11") note book paper**, written only on **one** side.

9. Assignment must be turn in at the beginning of class
10. Any student caught cheating will be dropped from class and given an F for the semester grade.

NOTE:

Students who violate any of these policies will be asked to leave class and given an absent for the class period. Students who are continuing disturbing classes will be suspended from class for the remainder of the semester and given an grade of F.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Course Schedule

Week	Topic	Reference
1	Course introduction and policies • Lecture	Handouts
2/3	Safety Rules For Hydraulics • Lecture, Chapter Exercises Symbols Used In Fluid Power Diagrams • Lecture, Chapter Exercises • Test chapter 2,3	Chapter 2 Chapter 3
4/5/6	How a Hydraulic System Works • Lecture, Chapter Exercises • Test chapter 1	Chapter 1
7/8/9	Hydraulic Pumps • Lecture, Chapter Exercises Hydraulic Valves • Lecture, Chapter Exercises	Chapter 4 Chapter 5
10	Hydraulic Cylinders • Lecture • Chapter Exercises • Test chapter 4,5,6	Chapter 6

11/12/13	Hydraulic Motors • Lecture: Chapter Exercises Hydraulic Accumulators • Lecture: Chapter Exercises • Test chapter 7,8	Chapter 7 Chapter 8
14/15	General Maintenance • Lecture: Chapter Exercises Diagnosis and Testing of Hydraulic Systems • Lecture: Chapter Exercises • Test chapter 14,15	Chapter 14 Chapter 15
16	Review and final exam • Final to be announced • End of semester	Review

The course schedule is a proposed schedule. Changes in the schedule may be made based upon the instructor's professional judgment. If you are absent on a day in which changes to the schedule have been announced, it is your responsibility to find out those changes.

Contact Information:

Instructor: Mr. Jerry Campbell

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800 950 6989 ext 8601 Office

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Office Hours: Office hours will be posted on office door 117 – TA 1, at the beginning of the second week of classes. Your instructor will be available during those hours posted. It is strongly advised that you make an appointment when you have a matter to discuss with an instructor. The instructor may be away from the office due to other school business or with other students.