

PRECISION AGRICULTURE TECHNOLOGY AND MANAGEMENT
ASM 429: **Hydraulic Principals and Applications (14455)**

Class Information:

Credit – 3
Spring 2025
Class Room: South Engineering 314
Time: 11:00 – 11:50 am Mon. and Wed.
Labs is Tues. at 2:00-4:50 pm

Instructor:

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Ladd 104H
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Office Hours: By appointment or drop in. Usually available Tuesdays and Thursdays 8-5.

Course Description: Study of fluid power principles, components, schematics, and systems. Emphasis is on proper use, maintenance, and applications of hydraulic power equipment.

TEXT: "Hydraulics", Deere and Company, 8th edition 2015

COURSE OBJECTIVES:

1. To develop an introductory understanding of basic agricultural hydraulics.
2. To develop good problem solving skills and to learn to look for alternative solutions to problems in regards to use of hydraulics.
3. To solve basic, applied, and practical problems of hydraulics on tractors and farm equipment.
4. To develop higher level thinking and problem solving with hydraulics.

REQUIRED RESOURCES: Text book, non-spiral letter size paper for homework, pencil, eraser, basic calculator

BLACKBOARD: Blackboard will be used for announcements, class presentations, assignments, and temporary grades presentation

GRADING

<u>Items</u>		Total Points
Tests	(Four tests, 100 pts each)	400
Book Questions	(15 question sets, 10 pts each)	150
Lab points	(10 points per lab)	140
Quizzes	(2 quizzes, 10 pts. each)	20
		Total pts: 710

All the home works must be submitted on time. No late submissions are accepted for full credit.

(There may be extra credits for students in addition to the formal grading. So the total grade points can be more than 640).

The cut off for letter grades: 100-90.00% = A; 89.99-80.00% = B; 79.99-70.00% = C;
69.99-60.00% = D; 59.99% or lower = F

Exams and quizzes policies:

Students are expected to take the tests at the appointed time and date unless other arrangements are made with the instructor. The tests will be combinations of types of questions, which may include short answer, problems, multiple choice, and fill in the blank questions, depending on what works best for the material covered. Quizzes may be given throughout the semester and may be either announced or unannounced. There are no make-ups for quizzes or tests, except in medical, family emergencies, or interview cases. Missed tests, exams, and quizzes will receive zero points unless missed for an acceptable reason and with advance notification where possible. The final exam will be comprehensive. Marks will be deducted if steps are not shown in word problem(s) in the test(s).

Labs

Labs are held at the Machinery Learning Center shop and are “hands on”. You will be expected to work on various systems components to learn how they work and what they look like. You will be asked to analyze parts and determine function, if parts are good or bad, and how to re-assemble components. You will be graded on your analyses and the understanding you demonstrate through working on systems by answering questions verbally and in written form.

MISSING CLASSES or LABS

You are expected to attend all class and lab periods but there is no roll-call. If a class or lab is missed, contact the instructor or class mates for notes. The PowerPoint presentations will be posted in the blackboard. Labs will have to be made up as they are “hands on” you may make arrangements to visit another lab time or arrange a time with the instructor.

If you are unable to attend the class or lab, let the instructor know ahead of time by e-mail or other written formats.

IMPORTANT NOTIFICATION

Academic Honesty

The academic community is operated on the basis of honesty, integrity, and fair play. [NDSU Policy 335: Code of Academic Responsibility and Conduct](#) applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the [Office of Registration and Records](#). Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

Students with special requirements

Any students with disabilities who need accommodations in this course are invited to share these concerns or requests with the instructor and contact the [Center for Accessibility and Disability Resources](#) as soon as possible.

Veterans and military personnel

Veterans or military personnel with special circumstances or who are activated are encouraged to notify the instructor as early as possible and are encouraged to provide Activation Orders.

Family Educational Rights and Privacy Act (FERPA)

Your personally identifiable information and educational records as they relate to this course are subject to [FERPA](#).

Important Dates (Full NDSU dates/deadlines can be found [here](#))

Jan 1 Mon HOLIDAY — New Year's Day (offices closed)

Jan 8 Mon Classes begin at 4:00 p.m.

Jan 9 Tue First full day of classes

Jan 15 Mon HOLIDAY — Martin Luther King, Jr. Day (no classes, offices closed)

Jan 16 Tue Last day to be added to Campus Connection Wait Lists

Jan 18 Thu Last day to Add classes via Campus Connection* Permit needed after this date.

Jan 18 Thu Last day for no-record Drop of classes @ 100% refund*(full semester classes only)

Jan 18 Thu Last day to Withdraw to Zero Credits @ 100% refund*(full semester classes only)

Jan 24 Wed Payments due for NDSU account balances

Jan 29 Mon Last day to submit requests to Audit, Pass/Fail

Feb 19 Mon HOLIDAY — Presidents' Day (no classes, offices closed)

Feb 19 Mon Last day to Withdraw to Zero Credits @ 75% refund*full semester classes only)

Mar 4-8 Mon-Fri Spring Break Week (no classes, offices open)

Mar 15 Fri Late fee applied to unpaid account balances (11:59 p.m.)

Mar 21 Thu Last day to Withdraw to Zero Credits @ 50% refund*(full semester classes only)

No refunds issued for withdraw to zero credits after this date.

Mar 29-Apr 1 Fri-Mon HOLIDAY -- Spring Recess (no classes, offices closed Friday, offices open Monday)

Apr 5 Fri Last day to Drop classes with 'W' record*

Apr 5 Fri Last day to Withdraw to Zero Credits for Spring

Apr 15 Mon Late fees applied to unpaid account balances (11:59 p.m.)

Apr 29-May 3 Mon-Fri Dead Week

May 6-10 Mon-Fri Final Examinations

May 11 Sat Commencement ceremony

Field Trips

Field trips may be required for this course or its lab. You will need to be prepared to leave campus and meet at a location or meet for transport to a location. Field trips will be scheduled during regular class hours, however, sometimes they last longer.

Period	Date	Topic	Unit
1	Jan. 15	Chapter 1 Hydraulics-How it Works	1
2	20	Chapter 1 (<i>chap 1 questions due</i>)	1
	Lab week 1	How hydraulics work. Analyze bottle jacks	
3	22	Chapter 2 Safety Rules for Hydraulics	2
4	27	Chapter 2 (<i>chap 2 questions due</i>)	2
	Lab week 2	Hydraulic safety. Learning safety signs	
5	29	Chapter 3 Hydraulic Symbols	3
6	Feb. 03	Chapter 3 (<i>chap. 3 problems due</i>)	3
	Lab week 3	Hydraulic symbols. Learning symbol meanings	
7	05	Chapter 4 Hydraulic Pumps	4
8	10	Test on chapters 1-4 (<i>chap. 4 problems due</i>)	
	Lab week 4	Hydraulic pumps. Analyze pumps	
9	12	Chapter 5 Hydraulic Valves	5
10	17	Chapter 5 (<i>chap. 5 problems due</i>)	5
	Lab week 5	Hydraulic valves. Analyze hydraulic valves	
12	19	Chapter 6 Hydraulic Cylinders	6
13	24	Chapter 6 (<i>chap. 6 problems due</i>)	6
	Lab week 6	Hydraulic cylinders. Analyze hydraulic cylinders	
14	26	Chapter 7 Hydraulic Motors	7
15	Mar. 03	Chapter 7 (<i>chap. 7 problems due</i>)	7
	Lab week 7	Hydraulic motors. Analyze hydraulic motors	
16	05	Chapter 8 Hydraulic Accumulators	8
17	17	Chapter 8 (<i>chap. 8 problems due</i>)	8

	Lab week 8	Hydraulic accumulators. Analyze accumulators	
18	19	Test on chapters 5-8	
19	24	Chapter 9 Hydraulic Filters	9
	Lab week 9	Hydraulic filters. Analyze various filters and types	
21	26	Chapter 9 (<i>chap. 9 problems due</i>)	9
22	31	Chapter 10 Reservoirs and Oil Coolers	10
	Lab week10	Reservoirs and coolers. Analyze systems functions	
23	Apr. 02	Chapter 10 (<i>chap. 10 problems due</i>)	10
24	07	Chapter 11 Lines and Couplers	11
	Lab week11	Lines and couplers. Identify various types	
25	09	Chapter 11 (<i>chap. 11 problems due</i>)	12
26	14	Chapter 12 Hydraulic Seals	12
	Lab week12	Hydraulic seals. Identify and replace seals	
27	16	Chapter 12 (<i>chap. 12 problems due</i>)	12
28	21	Test on chapters 9-12	
	Lab week 13	Hydraulic fluids. Use and identify fluid types	
29	23	Chapter 13 Hydraulic Fluids	13
30	28	Chapter 13 (<i>chap. 13 problems due</i>)	13
	Lab week 14	Hydraulic maintenance. Practical solutions and I.D.	
31	30	Chapter 14 General Maintenance	14
32	May 05	Chapter 14 (<i>chap. 14 problems due</i>)	14
33	07	Chapter 15 Diagnosis and Testing	15
34		Chapter 15 (<i>chap. 15 problems due</i>)	15
35		Review	

These are tentative dates for tests and material covered, the actual dates and material may vary. **That is why attendance is important.** Any change in schedule will be notified ahead of time as much as possible.

THE DATE FOR FINAL EXAM IS THURSDAY, May 12 2025; 1:00 pm.