



North Central State College

MASTER SYLLABUS

2025-2026

A. Academic Division: Engineering Technology, Business & Criminal Justice Division

B. Discipline: Mechanical Engineering Technology

C. Course Number and Title: MECT1750 Hydraulics and Pneumatics

D. Assistant Dean: Brooke Miller, M.B.A.

E. Credit Hours: 3

Lecture: 2 hours

Laboratory: 2 hours

F. Prerequisites: None

G. Syllabus Effective Date: Fall, 2025

H. Textbook(s) Title:

Fluid Power and Applications

- Author: Esposito
- Copyright Year: 2008
- Edition: Seventh
- ISBN #: 9780135136904

I. Workbook(s) and/or Lab Manual: None; Class Handouts will be distributed

J. Course Description: This course will be based on learning today's Fluid Control Concepts that are important in die construction in the manufacturing area. In addition to system design and layout, the student will gain experience through labs using construction and operating systems. (TAG # OET009)

K. College-Wide Learning Outcomes:

College-Wide Learning Outcome	Assessments -- How it is met & When it is met
Communication – Written	
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	
Information Literacy	
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Explain forces on plane and curved boundaries.*	This material is covered in the first 3 Chapters, utilizing math, physical properties, and applications of fluid power. Homework – First half of term Midterm Final
2. Define piping systems and the dynamics of pipe flow.*	This material is covered in Chapters 3 and 4, concentrating on energy and power in hydraulic systems and frictional losses in piping. It is also covered in multiple lab exercises using hydraulic trainers. Homework – First half of term Midterm Final
3. Design piping systems involving friction, systems with laminar and turbulent flow.*	Different flows are covered in Chapter 4, introducing Reynolds number plus losses in valves and fittings. Hydraulic circuits are analyzed both in the classroom and in the lab. Homework & Labs – Throughout the term Midterm Final.
4. Understand the difference between absolute and gage pressures.*	Pressures are covered in almost every chapter, from the basics in Chapter 2 (abs and gage) as well as in other chapters and lab exercises when analyzing hydraulic circuits. Homework – Throughout the term Midterm Final.
5. Understand the principles of hydraulic power transmission.*	Hydraulic power transmission is covered in Chapters 3 through 10 and during lab exercises using hydraulic trainers. Homework – First half of term Midterm Final.
6. Understand Pascal's Law.*	Material is covered in Chapter 3 and in lab exercises with hydraulic trainers. Homework – Throughout the term Midterm Final.
7. Understand Bernoulli's Equation.*	Material is covered in Chapter 3 specifically, and used in Chapter 4 while being exposed to frictional losses in hydraulic circuits. Homework – First half of term Midterm Final.
8. Understand the properties of fluids.*	Viscosity, density and bulk modulus are covered in Chapter 2 and during lab exercises comparing viscosities at various temperatures. Homework – Throughout the term Midterm Final.

M. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70–72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63–66	D	1.00	Below Average
60–62	D-	0.67	Poor
00–59	F	0.00	Failure

N. College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences.

Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

* *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at:

<https://ncestatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDF/14-081b.pdf>



North Central State College
SYLLABUS ADDENDUM

Academic Division:	Engineering Technology, Business and Criminal Justice Division	Discipline:	Mechanical Engineering Technology
Course Coordinator:			
Course Number:	MECT-1750-30	Course Title:	Hydraulics and Pneumatics
Semester / Session:	Spring 2026 / Full Semester	Start / End Date:	01/12/2026 – 05/08/2026

Instructor Information

Name:	Md Saiful Islam	Credentials:	Ph.D. in Geological Sciences, M.S. in Petroleum Engineering, and B.S. in Mechanical Engineering
Phone Number:	419-755-4717	E-Mail Address:	sislam@ncstatecollege.edu
Office Location:	Kehoe 234	Office Hours:	Tuesday & Thursday: 10:00 AM - 12:30 PM

I. Topical Timeline (Subject to Change):

Weeks	Topics	Assignment	Due Date
1	Introduction to Fluid Power		
2	Physical Properties of Fluid	Quiz-1 Lab-1	01/26/2026
3-4	Energy and Power in Hydraulic Systems	Quiz-2 Lab-2	02/09/2026
5-6	Frictional Losses in Hydraulic Pipelines	Quiz-3/Home Work Lab-3	02/23/2026
7	Hydraulic Pumps	Lab-4	
8	Contents covered in Weeks 1 to 7	Midterm Exam	03/02/2026
9	Spring Break - No Class		03/09/2026 – 03/13/2026
10-11	Hydraulic Pumps (Cont.), Hydraulic Cylinders, Hydraulic Motors	Quiz-4 Lab-5	03/30/2026
12	Hydraulic Valves	Quiz-5/Home Work Lab-6 Lab-7	04/20/2026
13-14	Pneumatics: Air Preparation and Components		
15	Pneumatics: Circuits and Applications		
16	Review		
17	Final Exam		05/04/2026

NOTE: This is a tentative schedule. Assignments and due dates may be changed at the discretion of the instructor.

II. Grading and Testing Guidelines:

- Final Grade Calculation:

Activity	Qty	Points	Percentage
Quizzes/Home Works	5	500	30
Mid Term Exam	1	100	25
Lab	8	800	20
Final Exam	1	100	25

- College Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70–72	C-	1.67	Below Average
67–69	D+	1.33	Below Average
63–66	D	1.00	Below Average
60–62	D-	0.67	Poor
00–59	F	0.00	Failure

III. Examination Policy:

1. The reasons for which a student will be excused from taking an examination:
 - a. Hospitalization (with documented verification)
 - b. Death in the immediate family (with documented verification)
 - c. Personal illness or illness in immediate family - (doctor's excuse required).
2. A student who misses an examination for any reason is responsible for:
 - a. Notifying the instructor before the day of the examination.
 - b. Set up a new date for the examination through email from instructor.
3. No makeup opportunity will be given for absences of quizzes.

IV. Class Attendance and Homework Make-Up Policy:

Attendance is required per NCSC policy. Class Absentees: No merit or demerit derived from attendance, unless it prevents you from taking a quiz or examination. Homework value will lose 10% per day late.

V. Classroom Expectations:

1. **Questions in class:** Any questions regarding the material are welcome during the class. If something is not clear to you, it probably is not clear to others. So, ask questions. Your question not only helps yourself, but it also helps others. If your question is too specific and its answer is too long, I may invite you to ask me later in my office.
2. **Office hours:** Take the full advantage of the office hours. Any questions regarding assignments, exam reviews, or general understanding of the material are welcome. If you cannot make the scheduled office hours, appointments can be made in class or by email.
3. **Diagrams:** The importance of diagrams in this course, and generally in Mechanical Engineering, cannot be possibly over-emphasized. Their benefit is two-fold; a) Diagrams help you imagine a problem's scenario, so you will not leave out any details and your solution will be accurate, b) Diagrams are a good tool to represent your solution more clearly to your audience (here, a grader for example, and later to your manager/colleagues). Both a) and b) will enhance your performance as a student and as a future engineer.
4. **Assignments:** Doing the assignments is extremely important. As you will see, the concepts of Hydraulics and Pneumatics are very simple. Applying them to different problems, however, is challenging at least. You can master the application techniques only by practicing. So, do not neglect the assignments. The assigned homework problems are the bare minimum number required for you to consider. You must solve as many extra problems on your own as possible for best results in this course.