BOWLING GREEN STATE UNIVERSITY

ENGT 2300/Fluid Power Transmission
Spring/2025
MW/9:30AM-11:20PM

Instructor: Md Mahmudur Rahman "Mahmud"
Office #: Technology 219
Office Telephone #: 419-372-6684
e-Mail: *mdmahmr@bgsu.edu*
Office Hours: (*2:00-3:00PM MW*)

Required Readings: *No Textbook is required. Lecture materials will be provided.*
Recommended Readings:

1. Fluid Power with Applications by ***Anthony Esposito*** ISBN-10**:** 0135136903, Publisher: Pearson, 7th edition (2008)

2. Introduction to Fluid Power by ***James L Johnson*** ISBN-10: 0766823652, Publisher: Cengage Learning, 2001

GENERAL COURSE DESCRIPTION

This course provides an in-depth exploration of hydraulic and pneumatic power systems, focusing on their design, operation, and maintenance. Topics include pumps, motors, valves, and circuits, with emphasis on real-world industrial applications. Students will gain practical experience through a combination of lectures and laboratory sessions, equipping them with the skills to analyze and maintain fluid power systems effectively.

Prerequisites: Math placement score of 41 or higher or a grade of C or better in MATH 1220, MATH 1260 or MATH 1280.

COURSE OBJECTIVE

1. To understand the fundamental theoretical concepts governing fluid power systems.
2. To gain a comprehensive understanding of the principles and components of hydraulic and pneumatic power circuits.
3. To explore common hydraulic and pneumatic components, including pumps, motors, valves, and actuators, along with their symbols and performance characteristics.
4. To develop the ability to design, analyze, and optimize fluid power systems for industrial applications using commercial components, including circuits for directional, speed, pressure, force, and flow control.
5. To acquire knowledge of the operation, troubleshooting, and maintenance of fluid power systems to ensure reliability and efficiency.
6. To become familiar with industry standards, safety protocols, and emerging trends in fluid

power technology.

7. To enhance problem-solving and teamwork skills through hands-on laboratory experiments and projects, enabling students to work with actual components and fluid power circuits used in common industrial applications.

INSTRUCTOR BIO:

Dr. Rahman holds a Ph.D. in Mechanical Engineering from the University of Louisville and has over 12 years of experience in academia and advanced research. He teaches courses in Thermodynamics, Fluid Mechanics, Heat Transfer, Materials Science, Advanced Engineering Mathematics, and Engineering Design. Dr Rahman developed a simulation technique to enhance understanding of colloidal suspensions and worked in interfacial coalescence. Dr. Rahman's research career includes notable postdoctoral appointments at Argonne National Laboratory, the University of Delaware, and Georgia Southern University. His work has been internationally recognized, earning nominations for awards such as Best Robotics Paper at MARSS 2022 and the ASGSR International Space Station Lab Best Poster Award in 2019. He has presented at numerous conferences and published in prestigious journals, including *Journal of Colloid and Interface Science* and *Physics of Fluids*. Dr. Rahman integrates hands-on learning into his teaching and is committed to advancing the understanding of complex engineering systems.

HOMEWORK AND QUIZ POLICIES:

There will be a total of 7 homework assignments in this course, and students are required to submit them by the specified deadlines. For each homework assignment, a few problems (typically 5) will be assigned. Out of these, 2 or 3 problems will be graded, and the graded problems will be announced in advance when the homework problems are assigned. Following each homework submission, a quiz will be conducted based on the homework content, and the quiz grade will account for 80% of the total (assignment+quiz) grade. Out of the 7 (HWs+Quizzes), the best 6 (HWs+Quizzes) grades will be considered in the final evaluation. Students are strongly encouraged to complete all homework thoroughly, as the quizzes will test their understanding of the material covered.

STUDENT EVALUATION

2 Tests	- 24%
Final (Comprehensive)	- 26%
HWs and Quizzes	- 20%
Labs	- 30%
Extra credit (lab)	- 5%

ATTENDANCE POLICY

Being late or absent during meetings of this course will adversely affect your grade. Attendance will be taken at every class meeting. University policy provides that the instructor has no obligation to give makeup exams or provide additional time to make up missed work resulting from absence from class. If you are absent and miss an important assignment, a makeup will be allowed only if you provide a written explanation from a doctor, employer, or other appropriate source.

If students are absent from class, even when it is due to a field trip or other University sponsored

event, it is entirely the student's responsibility to notify professor and determine if the work can be made up. Participation in a field trip or event does not mean that the student is "excused" from class until and unless the professors in the missed classes excuse them.

COURSE GRADE

90 or more	A
80-90.	B
70-80	C
60-70	D
60 and below	F

ACADEMIC HONESTY

If there is evidence of plagiarism on any assignment, the student will receive a zero for the assignment and a letter grade drop for the course. This penalty will also apply to the individual that provided the assignment. All the instances of academic dishonesty will be reported according to the University policy.

Complete BGSU Academic honesty policy can be found at
http://www.bgsu.edu/content/dam/BGSU/catalog/academic-honesty/official-policy.pdf

ACCESSIBILITY POLICIES

Please inform me and the appropriate individual at the BGSU Accessibility Services office of any disability that can affect your ability to perform well in this course. The AS office will provide equal access and reasonable accommodations to BGSU students with disabilities. The office is located at 38 College Park Office Building on Main Campus or Firelands Campus at 105 George Mylander Hall, phone 419-372-8495, e-mail access@bgsu.edu. The link to the disability service website is Student Accessibility Information.

DICLAIMER

- The instructor reserves the right to adjust the syllabus anytime during the semester.
- Checking phones, text, email, and general internet activity during lecture/class time is prohibited unless given permission by the instructor.
- There will be no make-up exams unless approved by the instructor in advance.

COURSE SCHEDULE (ENGT 2300)

Date	Topic	
01/13, 01/15 **Week 1**	Course syllabus, Introduction to fluid power Importance of Dimensions and Units	
01/22 **Week 2**		
01/27, 01/29 **Week 3**	Physical properties of hydraulic fluids	
02/03, 02/05 **Week 4**	Energy and power in hydraulic systems	Quiz 1
02/10, 02/12 **Week 5**	Frictional losses in hydraulic pipelines **Lab 1: Basic Principles of Hydraulics (02/12)**	Quiz 2
02/17, 02/19 **Week 6**	Directional control valves	Exam 1 (02/17)
02/24, 02/26 **Week 7**	Pressure control valves **Lab 2: Pressure Control Valves (02/26)**	
03/03, 03/05 **Week 8**	**Spring break (No classes)**	
03/10, 03/12 **Week 9**	Flow Control Valves **Lab 3: Flow and Directional Control Valves (03/12)**	Quiz 3
03/17, 03/19 **Week 10**	Hydraulic Cylinders, Motors, and Rotary Actuators	Quiz 4
03/24, 03/26 **Week 11**	Hydraulic pumps, theory, specification, performance **Lab 4: Basic Controls of Cylinders (03/26)**	Quiz 5
03/31, 04/02 **Week 12**	Pneumatic compressors, cylinders, motors,	Exam 2 (03/31)
04/07, 04/09 **Week 13**	Pneumatics: circuits and applications, design considerations Directional, force, and speed control of air cylinders. **Lab 5: Pneumatics (04/09)**	Quiz 6
04/14, 04/16 **Week 14**	Fluid Power in the Context of Control and Engineering Systems- some general discussion **Lab 6: Pneumatics (04/16)**	Quiz 7
04/21, 04/23 **Week 15**	Pneumatic Vacuum System, Cylinder speed Final Exam Review	Final