



## COURSE OUTLINE: MCH258 - PNEUMATICS/HYDRAULIC

Prepared: Cam Pucci

Approved: David Oraziotti, Dean, Environment, Technology, and Business

<b>Course Code: Title</b>	MCH258: PNEUMATICS AND HYDRAULICS
<b>Program Number: Name</b>	4039: MECH. ENG. TN-MANUFA
<b>Department:</b>	MECHANICAL TECHNIQUES PS
<b>Academic Year:</b>	2022-2023
<b>Course Description:</b>	This course will cover hydraulics and pneumatics. On completion of the course, the student will understand basic hydraulic/pneumatic theory. Discussion will include advantages, design, safety, servicing, replacing parts, conducting lines, proper installation, functions of fluids, and troubleshooting. Reservoirs, filters, pumps, valves, motors, actuators, accumulators and other various equipment will be discussed. The student will be able to design, draw and assemble schematic circuits using Vickers' trainers and the Lab-Volt computerized simulators. Modern testing equipment will be used to test circuits and valves.
<b>Total Credits:</b>	4
<b>Hours/Week:</b>	4
<b>Total Hours:</b>	56
<b>Prerequisites:</b>	There are no pre-requisites for this course.
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>This course is a pre-requisite for:</b>	MCH125
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4039 - MECH. ENG. TN-MANUFA</b>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	VLO 1 Complete all work in compliance with current legislation, standards, regulations and guidelines.
	VLO 3 Comply with current health and safety legislation, as well as organizational practices and procedures.
	VLO 5 Use current and emerging technologies to support the implementation of mechanical engineering projects.
	VLO 6 Analyze and solve mechanical problems by applying mathematics and fundamentals of mechanical engineering.
	VLO 7 Interpret, prepare and modify mechanical engineering drawings and other related technical documents.
	VLO 8 Contribute to the design and the analysis of mechanical components, processes and systems applying fundamentals of mechanical engineering.
	VLO 9 Manufacture, assemble, maintain and repair mechanical components according to required specifications.
	VLO 10 Verify the specifications of materials, processes and operations to support the design and production of mechanical components.



<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects.				
<b>Course Evaluation:</b>	Passing Grade: 50%, D  A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.				
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	Grade Definition Grade Point Equivalent A+ 90 - 100% 4.00 A 80 - 89% B 70 - 79% 3.00 C 60 - 69% 2.00 D 50 - 59% 1.00 F (Fail) 49% and below 0.00  CR (Credit) Credit for diploma requirements has been awarded. S Satisfactory achievement in field /clinical placement or non-graded subject area. U Unsatisfactory achievement in field/clinical placement or non-graded subject area. X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. NR Grade not reported to Registrar's office. W Student has withdrawn from the course without academic penalty.				
<b>Books and Required Resources:</b>	Industrial Hydraulic Manual by Eaton Vickers Publisher: Eaton Corporation Industrial Section - Hydraulics Group Edition: 5th ISBN: 9780978802202 2nd print				
<b>Course Outcomes and Learning Objectives:</b>	<table border="1"> <thead> <tr> <th data-bbox="508 1185 800 1220">Course Outcome 1</th> <th data-bbox="808 1185 1427 1220">Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td data-bbox="508 1229 800 1446"> 1. Discuss the physical laws and concepts dealing with hydraulics and pneumatics. </td> <td data-bbox="808 1229 1427 1446"> 1.1 Pascal's Law - force / area / pressure  1.2 Conservation of Energy Law  1.3 Boyle's Law  1.4 Bernoulli's Law  1.5 Bramah's design  1.6 Laminar / turbulent flows  1.7 Gauge / atmospheric pressures  1.8 Basic design calculations  1.9 Velocity characteristics </td> </tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	1. Discuss the physical laws and concepts dealing with hydraulics and pneumatics.	1.1 Pascal's Law - force / area / pressure 1.2 Conservation of Energy Law 1.3 Boyle's Law 1.4 Bernoulli's Law 1.5 Bramah's design 1.6 Laminar / turbulent flows 1.7 Gauge / atmospheric pressures 1.8 Basic design calculations 1.9 Velocity characteristics
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	1.10 Discuss aeration, cavitation, pump flow
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
2. Compare hydraulics to other sources. Understand why hydraulics is used today.	2.1 List proper safety measures to be used when servicing hydraulics/pneumatics systems 2.2 Understand how to adjust valves using safe practices 2.3 Be able to safely replace components on a any system using safe work practices 2.4 Understand safe lock out practices for systems 2.5 Understand the dangers involved in various types of high pressure hydraulics
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Types of hydraulic and pneumatic conductors used today	3.1 Discuss various types of steel piping and fittings used in hydraulics 3.2 Discuss various types of tubing and fittings used today 3.3 Discuss hydraulic hoses used 3.4 Discuss sizing, grade, strength, and safety rating of each type of conductor 3.5 Discuss proper installation techniques for each type of conductor
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
4. Hydraulic Fluids	4.1 Understand the functions of fluids in hydraulic systems 4.2 Be knowledgeable of the various types of hydraulic fluids used and why 4.3 Understand basic fluid conditioning monitoring needed 4.4 Discuss proper filtering methods and ratings used today 4.5 Discuss proper testing methods available today
<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
5. Hydraulic and Pneumatic Components / Accessories	5.1 Reservoirs 5.2 Pumps/Compressors 5.3 Filters 5.4 Directional valves 5.5 Relief valves 5.6 Pressure valves 5.7 Actuators 5.8 Accumulators and other system accessories
<b>Course Outcome 6</b>	<b>Learning Objectives for Course Outcome 6</b>
6. Systems	6.1 Be able to draw, and hook up various circuits on the Vickers' s trainers in the Lab as assigned. 6.2 Simulate circuits using Lab-Volt computerized programs 6.3 Perform basic troubleshooting on the Trainers as assigned 6.4 Be able to perform basic preventative maintenance measures

**Evaluation Process and Grading System:**

Evaluation Type	Evaluation Weight
Final Exam	5%
Student Performance	15%



	Term Assignments	40%
	Term Tests	40%

**Date:** August 15, 2022

**Addendum:** Please refer to the course outline addendum on the Learning Management System for further information.