

Washtenaw Community College Comprehensive Report

MEC 105 Pneumatics and Hydraulics in Fluid Power Effective Term: Fall 2022

Course Cover

College: Advanced Technologies and Public Service Careers

Division: Advanced Technologies and Public Service Careers

Department: Advanced Manufacturing

Discipline: Mechatronics

Course Number: 105

Org Number: 14400

Full Course Title: Pneumatics and Hydraulics in Fluid Power

Transcript Title: Pneumatics & Hydraulics

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: New Course

Change Information:

Rationale: VPI and Dean mandate to eliminate the Fluid Power specialty in the Mechatronics degree. Five Fluid Power courses are being reduced to 1.

Proposed Start Semester: Fall 2022

Course Description: In this course, students are introduced to the fundamental principles of fluid power used in both pneumatics and hydraulics. By applying Pascal's Law, students will understand prime mover requirements, the principles and operation of fluid power fixed displacement pumps and compressors, pressure and flow control valves and actuators. Failure modes and troubleshooting concepts are also covered.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

Level 3

Requisites

General Education

Request Course Transfer

Proposed For:

Eastern Michigan University
Ferris State University
Grand Valley State University
Wayne State University

Student Learning Outcomes

1. Identify basic American National Standards Institute (ANSI) and International Organization for Standardization (ISO) component symbols.

Assessment 1

Assessment Tool: Outcome-related questions on the Department final exam
Assessment Date: Winter 2025
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: All students
How the assessment will be scored: Answer key
Standard of success to be used for this assessment: 70% of students will score 70% or higher.
Who will score and analyze the data: Department faculty

2. Perform calculations for fluid power circuits such as torque, velocity, force and pressure ratio.

Assessment 1

Assessment Tool: Outcome-related questions on the Department final exam
Assessment Date: Winter 2025
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: All students
How the assessment will be scored: Answer key
Standard of success to be used for this assessment: 70% of students will score 70% or higher.
Who will score and analyze the data: Department faculty

3. Calculate force, pressure and area in pneumatic and hydraulic circuits using Pascal's law.

Assessment 1

Assessment Tool: Outcome-related questions on the Department final exam
Assessment Date: Winter 2025
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: All students
How the assessment will be scored: Answer key
Standard of success to be used for this assessment: 70% of students will score 70% or higher.
Who will score and analyze the data: Department faculty

4. Identify the operation and purpose of novice level components in pneumatic and hydraulic circuits.

Assessment 1

Assessment Tool: Outcome-related questions on the Department final exam
Assessment Date: Winter 2025
Assessment Cycle: Every Three Years
Course section(s)/other population: All sections
Number students to be assessed: All students
How the assessment will be scored: Answer key
Standard of success to be used for this assessment: 70% of students will score 70% or higher.
Who will score and analyze the data: Department faculty

5. Build a circuit from a schematic.

Assessment 1

Assessment Tool: Lab exercise

Assessment Date: Winter 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students will score a 7 of 10 (70%) or higher.

Who will score and analyze the data: Department faculty

Course Objectives

1. Identify components commonly found in pneumatic and hydraulic circuits and describe their function and purpose in those systems.
2. Distinguish between hydraulic and pneumatic compressors and pumps.
3. Describe the purpose of pressure control valves.
4. Identify the purpose of flow control valves in circuits using linear actuators.
5. Describe the purpose of directional control valves in fluid power circuits.
6. Identify the purpose of linear and rotary actuators.
7. Describe the proper care and maintenance of fluid conditioning systems.
8. Identify pneumatic air quality standards.
9. Describe ISO fluid contamination measurements and standards.
10. Identify the proper placement of fluid conditioners.
11. Describe the proper placement of a Filter Regulator Lubricator (FRL) unit.
12. Identify the data needed to perform calculations using Pascal's Law and basic gas laws.
13. Perform calculations using Pascal's Law and basic gas laws.

New Resources for Course**Course Textbooks/Resources**

Textbooks

Daines, James R, Daines, Martha J. *Fluid Power Hydraulics and Pneumatics*, Third ed. Tinley Park: Goodheart-Wilcox, 2020, ISBN: 9781649258465.

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Other: Pneumatic and Hydraulic Trainers

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Jim Popovich</i>	<i>Faculty Preparer</i>	<i>Feb 03, 2022</i>
Department Chair/Area Director: <i>Allan Coleman</i>	<i>Recommend Approval</i>	<i>Feb 03, 2022</i>
Dean: <i>Jimmie Baber</i>	<i>Recommend Approval</i>	<i>Feb 03, 2022</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Feb 22, 2022</i>
Assessment Committee Chair:		

Shawn Deron

Recommend Approval

Feb 23, 2022

Vice President for Instruction:

Kimberly Hurns

Approve

Feb 23, 2022