# Washtenaw Community College Comprehensive Report

## FLP 226 Pneumatics
## Effective Term: Fall 2022

### Course Cover

**College:** Advanced Technologies and Public Service Careers
**Division:** Advanced Technologies and Public Service Careers
**Department:** Advanced Manufacturing
**Discipline:** Fluid Power
**Course Number:** 226
**Org Number:** 14410
**Full Course Title:** Pneumatics
**Transcript Title:** Pneumatics
**Is Consultation with other department(s) required:** No
**Publish in the Following:** College Catalog , Time Schedule , Web Page
**Reason for Submission:** Inactivation
**Change Information:**
**Other:**
**Rationale:** FLP 101 / 110 / 226 are being combined into one MEC 105 course.
**Proposed Start Semester:** Fall 2022
**Course Description:** In this course, students will be introduced to the operation and practical use of compressors, air distribution systems, actuators, directional valves and other controls used in automation. In addition, students will focus on the design of pneumatic control and power circuits using ANSI and ISO symbols and the moving part logic technique (pneumatic ladder logic). Students with other technical experience may request an override from the instructor.

### Course Credit Hours

**Variable hours:** No
**Credits:** 3
**Lecture Hours: Instructor:** 30 **Student:** 30
**Lab: Instructor:** 30 **Student:** 30
**Clinical: Instructor:** 0 **Student:** 0

**Total Contact Hours: Instructor:** 60 **Student:** 60
**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

**Prerequisite**
FLP 101 minimum grade "C"
and

**Prerequisite**
FLP 110 minimum grade "C"

## General Education

## Request Course Transfer

**Proposed For:**

## Student Learning Outcomes

1. Perform calculations using basic Gas Laws.
   **Assessment 1**
   Assessment Tool: Final exam
   Assessment Date: Fall 2019
   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: 80% of students will score 80% or higher
   Who will score and analyze the data: Departmental faculty

2. Build functioning intermediate level circuits using schematic diagrams and department equipment.
   **Assessment 1**
   Assessment Tool: Practical exam
   Assessment Date: Fall 2019
   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: Departmental rubric
   Standard of success to be used for this assessment: 80% of the students will score 80% or higher
   Who will score and analyze the data: Departmental faculty

3. Interpret component and circuit level actions and functions.
   **Assessment 1**
   Assessment Tool: Final exam
   Assessment Date: Fall 2019
   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: 80% of the students will score 80% or higher
   Who will score and analyze the data: Departmental faculty

4. Recognize and describe the relationships between force, pressure, area, volume, compression, humidity, and temperature.
   **Assessment 1**
   Assessment Tool: Final exam
   Assessment Date: Fall 2019
   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: 80% of students will score 80% or better
Who will score and analyze the data: Departmental faculty

## Course Objectives

1. Recognize basic ANSI and ISO schematic component symbols.
2. Perform a simple circuit design using the ANSI and ISO symbol sets.
3. Perform basic force, pressure and area calculations.
4. Describe how dew point and relative humidity relate to pneumatic systems.
5. Calculate the CFM needed to extend a cylinder within a certain time.
6. Describe the three major differences between the power circuit and control (pilot) circuit.
7. List three ways to design sequencing circuits.
8. Recognize and follow the operational sequence of a circuit designed with moving part logic symbols, such as Numatrol.
9. Design basic sequencing circuits using ANSI, ISO and Numatrol schematic symbols.
10. Describe basic Gas Laws and use them in calculations.
11. Read and interpret industrial pneumatic circuit diagrams.
12. Interpret a circuit diagram and build the pneumatic circuit.
13. Troubleshoot circuit failures and identify possible causes.
14. Recognize the relationships between force, pressure, area, volume, compression, humidity and temperature and how they affect pneumatic circuits.

## New Resources for Course

## Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

## Equipment/Facilities

Level III classroom
Other: Dept. owned pneumatic trainers.

| Reviewer | Action | Date |
|---|---|---|
| **Faculty Preparer:** | | |
| *Allan Coleman* | *Faculty Preparer* | *Jan 20, 2022* |
| **Department Chair/Area Director:** | | |
| *Allan Coleman* | *Recommend Approval* | *Jan 20, 2022* |
| **Dean:** | | |
| *Jimmie Baber* | *Recommend Approval* | *Jan 21, 2022* |
| **Curriculum Committee Chair:** | | |
| *Randy Van Wagnen* | *Reviewed* | *Feb 15, 2022* |
| **Assessment Committee Chair:** | | |
| **Vice President for Instruction:** | | |
| *Kimberly Hurns* | *Approve* | *Feb 18, 2022* |

# Washtenaw Community College Comprehensive Report

## FLP 226 Pneumatics
## Effective Term: Fall 2011

### Course Cover

**Division:** Vocational Technologies
**Department:** Industrial Technology
**Discipline:** Fluid Power
**Course Number:** 226
**Org Number:** 14410
**Full Course Title:** Pneumatics
**Transcript Title:** Pneumatics
**Is Consultation with other department(s) required:** No
**Publish in the Following:** College Catalog , Time Schedule , Web Page
**Reason for Submission:** Course Change
**Change Information:**
Course description
Pre-requisite, co-requisite, or enrollment restrictions
Outcomes/Assessment
Objectives/Evaluation
**Rationale:** Update syllabus
**Proposed Start Semester:** Fall 2011
**Course Description:**

This course covers operation and practical use of compressors, air distribution systems, actuators, directional valves and other controls used in automation. The second half of the course concentrates on the design of pneumatic control and power circuits using ANSI and ISO symbols and also the Moving Part Logic technique (pneumatic ladder logic).

### Course Credit Hours

**Variable hours:** No
**Credits:** 3
**Lecture Hours: Instructor:** 30 **Student:** 30
**Lab: Instructor:** 30 **Student:** 30
**Clinical: Instructor:** 0 **Student:** 0

**Total Contact Hours: Instructor:** 60 **Student:** 60
**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

**Prerequisite**
FLP 101 minimum grade "C"

and
**Prerequisite**
FLP 110 minimum grade "C"

## General Education

## Request Course Transfer

**Proposed For:**

## Student Learning Outcomes

1. Perform calculations using basic Gas Laws.
   **Assessment 1**
   **Assessment Tool:** Math section of final exam
   **Assessment Date:** Fall 2011
   **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:** 80% of students must score 80% or higher.
   **Who will score and analyze the data:** Full time faculty

2. Using schematic diagrams and department equipment, build functioning intermediate level circuits.
   **Assessment 1**
   **Assessment Tool:** Hands-on portion of final exam
   **Assessment Date:** Fall 2011
   **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:** Departmental rubric
   **Standard of success to be used for this assessment:** 80% of the students will score 80% or higher.
   **Who will score and analyze the data:** Department faculty

3. Design basic sequencing circuits using ANSI, ISO and Numatrol schematic symbols.
   **Assessment 1**
   **Assessment Tool:** Circuit design quiz
   **Assessment Date:** Fall 2011
   **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:** 80% of students will score 80% or better.
   **Who will score and analyze the data:** Department faculty

4. Interpret component and circuit level actions and functions.
   **Assessment 1**
   **Assessment Tool:** Final Exam
   **Assessment Date:** Fall 2011
   **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:** Department answer key
   **Standard of success to be used for this assessment:** 80% of the students will

score 80% or higher.
**Who will score and analyze the data:** Department faculty

5. Recall relationships between force, pressure, area, volume, compression, humidity, and temperature.
   **Assessment 1**
   **Assessment Tool:** Final Exam
   **Assessment Date:** Fall 2011
   **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:** Department answer key
   **Standard of success to be used for this assessment:** 80% of students will score 80% or better.
   **Who will score and analyze the data:** Department faculty

## Course Objectives

1. Recognize basic ANSI and ISO schematic component symbols.
   **Matched Outcomes**
   4. Interpret component and circuit level actions and functions.

2. Perform a simple circuit design using the ANSI and ISO symbol sets.
   **Matched Outcomes**
   3. Design basic sequencing circuits using ANSI, ISO and Numatrol schematic symbols.

3. Perform basic Force, Pressure, and Area calculations
   **Matched Outcomes**
   1. Perform calculations using basic Gas Laws.

4. Explain dew point and relative humidity and how they relate to aftercoolers.
   **Matched Outcomes**

5. Calculate the CFM needed to extend a cylinder within a certain time.
   **Matched Outcomes**
   1. Perform calculations using basic Gas Laws.

6. Describe the three major differences between the power circuit and control (pilot) circuit.

   **Matched Outcomes**
   4. Interpret component and circuit level actions and functions.

7. List three ways to design sequencing circuits.
   **Matched Outcomes**
   3. Design basic sequencing circuits using ANSI, ISO and Numatrol schematic symbols.

8. Recognize and follow the sequence of a circuit designed with Numatrol symbols.
   **Matched Outcomes**
   3. Design basic sequencing circuits using ANSI, ISO and Numatrol schematic symbols.

## New Resources for Course

## Course Textbooks/Resources

Textbooks

SMC. *Pneumatic Technology*, latest ed. SMC corp., 2010

Numatics corp.. *Practical Air Circuitry (PAC II)*, latest ed. Numatics corp., 1970

Manuals

Periodicals
Software

## Equipment/Facilities

Level III classroom
Other: Dept. owned pneumatic trainers.

| Reviewer | Action | Date |
|---|---|---|
| **Faculty Preparer:** | | |
| *Gary Schultz* | *Faculty Preparer* | *Jan 27, 2011* |
| **Department Chair/Area Director:** | | |
| *Gary Schultz* | *Recommend Approval* | *Mar 18, 2011* |
| **Dean:** | | |
| *Granville Lee* | *Recommend Approval* | *Mar 21, 2011* |
| **Vice President for Instruction:** | | |
| *Stuart Blacklaw* | *Approve* | *May 12, 2011* |