# Washtenaw Community College Comprehensive Report

# FLP 110 Fluid Power Fundamentals - II
# Effective Term: Spring/Summer 2020

## Course Cover

**Division:** Advanced Technologies and Public Service Careers
**Department:** Advanced Manufacturing
**Discipline:** Fluid Power
**Course Number:** 110
**Org Number:** 14410
**Full Course Title:** Fluid Power Fundamentals - II
**Transcript Title:** Fluid Power Fundamentals - II
**Is Consultation with other department(s) required:** No
**Publish in the Following:** College Catalog , Time Schedule , Web Page
**Reason for Submission:** Three Year Review / Assessment Report
**Change Information:**
**Consultation with all departments affected by this course is required.**
**Rationale:** Three-year update is due.
**Proposed Start Semester:** Fall 2019
**Course Description:** In this course, students will expand on the foundation developed in FLP 101 with coverage of variable displacement pumps, proper system contamination control and filtration, hydraulic fluid requirements and compatibility, solenoid valves, load control valves, speed controls, fluid power motors and pressure intensifiers. Students will develop skills in a hands-on lab environment with tasks such as building fluid power circuits and the disassembly and inspection of hydraulic components. FLP 110 is generally offered in the second 7 1/2 week session.

## Course Credit Hours

**Variable hours:** No
**Credits:** 2
**Lecture Hours: Instructor:** 30 **Student:** 30
**Lab: Instructor:** 15 **Student:** 15
**Clinical: Instructor:** 0 **Student:** 0

**Total Contact Hours: Instructor:** 45 **Student:** 45
**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

## Requisites

**Prerequisite**
FLP 101 minimum grade "C"
may enroll concurrently

## General Education

## Request Course Transfer

**Proposed For:**

## Student Learning Outcomes

1. Identify complex fluid power symbols.
   **Assessment 1**
   Assessment Tool: Departmental exam
   Assessment Date: Fall 2022
   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 exam will be scored using the answer key.
   Standard of success to be used for this assessment: 70% of students will score 70% or higher on the outcome-related questions.
   Who will score and analyze the data: Departmental faculty will analyze the data.

2. Indicate operation and purpose of intermediate level components in fluid power circuits.
   **Assessment 1**
   Assessment Tool: Departmental exam
   Assessment Date: Fall 2022
   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 exam will be scored using the answer key.
   Standard of success to be used for this assessment: 70% of students will score 70% or higher on the outcome-related questions.
   Who will score and analyze the data: Departmental faculty will analyze the data.

## Course Objectives

1. Identify the International Standards Organization (ISO) and American National Standards Institute (ANSI) schematic symbols of less commonly-used fluid power components.
2. Identify proper application of contamination control devices.
3. Describe principle of operation of meter-in, meter-out and bleed-off flow control valves.
4. Use basic fluid power formulae to calculate actuator force, velocity, area, flow, pressure and prime mover horsepower (HP).
5. Describe the principle of the operation of pressure control valves.
6. Identify commonly used components in fluid power circuits such as reservoirs; filters; meter-in; meter-out and bleed-off control valves; pressure reducing, sequence, unloading, counterbalance valves; intensifiers and accumulators.

## New Resources for Course

## Course Textbooks/Resources

Textbooks

Eaton Hydraulics. *Industrial Hydraulics Manual*, 5th ed. Eaton Hydraulics, 2001, ISBN: 9780978802202.

IFPS. *Lightning Reference Manual*, 5th ed. International Fluid Power Society, 2001, ISBN: 9789970008001.

Manuals

Periodicals

Software

## Equipment/Facilities

Level III classroom
Other: Document camera

| Reviewer | Action | Date |
|---|---|---|
| **Faculty Preparer:** | | |
| *Jim Popovich* | *Faculty Preparer* | *Aug 12, 2019* |
| **Department Chair/Area Director:** | | |
| *Thomas Penird* | *Recommend Approval* | *Aug 14, 2019* |
| **Dean:** | | |
| *Brandon Tucker* | *Recommend Approval* | *Aug 22, 2019* |
| **Curriculum Committee Chair:** | | |
| *Lisa Veasey* | *Recommend Approval* | *Sep 19, 2019* |
| **Assessment Committee Chair:** | | |
| *Shawn Deron* | *Recommend Approval* | *Oct 10, 2019* |
| **Vice President for Instruction:** | | |
| *Kimberly Hurns* | *Approve* | *Oct 14, 2019* |

MASTER SYLLABUS

WASHTENAW COMMUNITY COLLEGE

Course Discipline Code & No: FLP 110 Title: Fluid Power Fundamentals - II Effective Term WI 2010

Division Code: HAT Department Code: INTD Org #:

Don't publish: ☐ College Catalog ☐ Time Schedule ☐ Web Page

**Reason for Submission.** Check all that apply.

- ☒ New course approval
- ☐ Three-year syllabus review/Assessment report
- ☐ Course change
- ☐ Reactivation of inactive course
- ☐ Inactivation (Submit this page only.)

**Change information: Note all changes that are being made. Form applies only to changes noted.**

- ☐ Consultation with all departments affected by this course is required.
- ☒ Course discipline code & number (was FLP 111)*
  *Must submit inactivation form for previous course.
- ☒ Course title (was Fluid Power Fundamentals)
- ☒ Course description
- ☐ Course objectives (minor changes)
- ☒ Credit hours (credits were: 4)
- ☒ Total Contact Hours (total contact hours were: 90)
- ☐ Distribution of contact hours (contact hours were: lecture: _____ lab _____ clinical _____ other _____)
- ☐ Pre-requisite, co-requisite, or enrollment restrictions
- ☐ Change in Grading Method
- ☒ Outcomes/Assessment
- ☒ Objectives/Evaluation
- ☐ Other _____

**Rationale for course or course change. Attach course assessment report for existing courses that are being changed.**
The content taught in FLP 111 has been split into two separate courses FLP 101 and FLP 110 to allow students to receive introductory (101) training to all areas (robotics, fluid power and numerical control) and then focus on their area of concentration.

**Approvals** Department and divisional signatures indicate that all departments affected by the course have been consulted.

**Department Review by Chairperson** ☐ New resources needed ☐ All relevant departments consulted

Print: Jim Popovich (Faculty/Preparer) Signature _____ Date: 12/1/09

Dept. Chair Recommendation ☑ Yes ☐ No

Print: Gary L. Schultz (Department Chair) Signature _____ Date: 12/1/09

**Division Review by Dean**

☐ Request for conditional approval

Recommendation ☒ Yes ☐ No _____ (Dean's/Administrator's Signature) Date 12/21/09

**Curriculum Committee Review**

Recommendation _____

☐ Tabled ☒ Yes ☐ No _____ (Curriculum Committee Chair's Signature) Date 3/11/10

**Vice President for Instruction Approval**

_____ (Vice President's Signature) Date 3-12-10

Approval ☒ Yes ☐ No ☐ Conditional

Do not write in shaded area.
Log File 12/21/09 Ecopy ☐ Banner _____ C&A Database _____ C&A Log File _____ Basic skills ☐ Contact fee ☐

Please return completed form to the Office of Curriculum & Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

*Complete ALL sections which apply to the course, even if changes are not being made.

| Course: | Course title: |
|---|---|
| FLP 110 | Fluid Power Fundamentals - II |

**Credit hours:** 2

If variable credit, give range:

_____ to _____ credits

**Contact hours per semester:**

| | Student | Instructor |
|---|---|---|
| Lecture: | 30 | 30 |
| Lab: | 15 | 15 |
| Clinical: | — | — |
| Practicum: | — | — |
| Other: | — | — |
| **Totals:** | 45 | 45 |

**Are lectures, labs, or clinicals offered as separate sections?**

☐ Yes - lectures, labs, or clinicals are offered in separate sections

☒ No - lectures, labs, or clinicals are offered in the same section

**Grading options:**

☐ P/NP (limited to clinical & practica)

☐ S/U (for courses numbered below 100)

☒ Letter grades

**Prerequisites.** Select one:

☒ College-level Reading & Writing

☐ Reduced Reading/Writing Scores (Add information at Level I prerequisite)

☐ No Basic Skills Prerequisite (College-level Reading and Writing is not required.)

**In addition to Basic Skills in Reading/Writing:**

Level I (enforced in Banner)

| | Course | Grade | Test | Min. Score | Concurrent Enrollment (Can be taken together) | Corequisites (Must be enrolled in this class also during the same semester) |
|---|---|---|---|---|---|---|
| | FLP 101 | C | | | ☒ | |
| ☐ and ☐ or | | | | | ☐ | |
| ☐ and ☐ or | | | | | ☐ | |
| ☐ and ☐ or | | | | | ☐ | |

Level II (enforced by instructor on first day of class)

| | Course | Grade | Test | Min. Score |
|---|---|---|---|---|
| | | | | |
| ☐ and ☐ or | | | | |
| ☐ and ☐ or | | | | |

**Enrollment restrictions** (In addition to prerequisites, if applicable.)

☐ and ☐ or Consent required

☐ and ☐ or Admission to program required

Program: _____

☐ and ☐ or Other (please specify):

_____

**Please send syllabus for transfer evaluation to:**

Conditionally approved courses are not sent for evaluation.

Insert course number and title you wish the course to transfer as.

☐ E.M.U. as _____

☐ U of M as _____

☐ _____ as _____

☐ _____ as _____

☐ _____ as _____

☐ _____ as _____

| Course: | Course title: |
|---|---|
| FLP 110 | Fluid Power Fundamentals - II |

| | | |
|---|---|---|
| **Course description**<br>State the purpose and content of the course. Please limit to 500 characters. | This class builds on the foundation set in FLP 101 with coverage of variable displacement pumps, proper system contamination control and filtration, hydraulic fluid requirements and compatibility, solenoid valves, load control valves, speed controls, fluid power motors and pressure intensifiers. Hands-on exercises include building of fluid power circuits and disassembly/inspection of hydraulic components. This course contains material previously taught in FLP 111. FLP 110 is generally offered in the second 7½ week session. | |
| **Course outcomes**<br>List skills and knowledge students will have after taking the course.<br>**Assessment method**<br>Indicate how student achievement in each outcome will be assessed to determine student achievement for purposes of course improvement. | **Outcomes**<br>(applicable in all sections) | **Assessment**<br>Methods for determining course effectiveness |
| | Identify additional and more complex fluid power symbols. | Departmental exam |
| | Indicate operation and purpose of intermediate level components in fluid power circuits. | Departmental exam |
| **Course Objectives**<br>Indicate the objectives that support the course outcomes given above.<br><br>**Course Evaluations**<br>Indicate how instructors will determine the degree to which each objective is met for each student. | **Objectives**<br>(applicable in all sections) | **Evaluation**<br>Methods for determining level of student performance of objectives |
| | Identify the ISO or ANSI schematic symbols of less commonly-used fluid power components.<br>Identify proper application of contamination control devices.<br>Describe principle of operation of meter-in, meter-out and bleed-off flow control valves.<br>Use basic fluid power formulae to calculate actuator force, velocity, area, flow, pressure and prime mover H.P.<br>Describe the principle of the operation of pressure control valves.<br>Indentify commonly used components in fluid power circuits.<br>• Reservoirs<br>• Filters<br>• Meter-in, meter-out and bleed-off control valves<br>• Pressure reducing, sequence, unloading, counterbalance valves.<br>• Intensifiers and accumulators | Exams, quizzes and completion of lab exercises |

**List all new resources needed for course, including library materials.**

**Student Materials:**

| List examples of types | | Estimated costs |
|---|---|---|
| Texts<br>Supplemental reading<br>Supplies<br>Uniforms<br>Equipment<br>Tools<br>Software | Industrial Hydraulics Manual by Easton Hydraulics | |
| | Fluid Power Designers' Lighting Reference Manual – 8th + ed. | $ 90.00 |
| | 3-ring binder | $ 22.00 |
| | Calculator | $ 20.00 |
| | Safety Glasses | |

**Equipment/Facilities:** Check all that apply. (All classrooms have overhead projectors and permanent screens.)

Check level only if the specified equipment is needed for all sections of a course.

- ☐ Level I classroom
  Permanent screen & overhead projector
- ☐ Level II classroom
  Level I equipment plus TV/VCR
- ☒ Level III classroom
  Level II equipment plus data projector, computer, faculty workstation

- ☐ Off-Campus Sites
- ☐ Testing Center
- ☐ Computer workstations/lab
- ☐ ITV
- ☐ TV/VCR
- ☐ Data projector/computer
- ☐ Other _____

**Assessment plan:**

| Learning outcomes to be assessed (list from Page 3) | Assessment tool | When assessment will take place (semester & year) | Course section(s)/other population | Number students to be assessed |
|---|---|---|---|---|
| Identify additional and more complex fluid power symbols. | Departmental exam | Fall 2010 and every three years thereafter | All sections | All students |
| Indicate operation and purpose of intermediate level components in fluid power circuits. | Departmental exam | Fall 2010 and every three years thereafter | All sections | All students |

**Scoring and analysis of assessment:**

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally developed rubric, external evaluation, other). Attach the rubric/scoring guide.

   **Departmental exam will be scored using the answer key.**

2. Indicate the standard of success to be used for this assessment.

   **The overall class average on all questions identified for assessment will be 70% or higher.**

3. Indicate who will score and analyze the data (data must be blind-scored).

   **Departmental faculty will blind-score and analyze the data.**

4. Explain the process for using assessment data to improve the course.

   **Assessment results will be discussed by faculty teaching the class and presented at a department meeting. Areas of weakness and their solutions will be identified. Necessary course changes will be implemented.**