Faculty is required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT. FLPW COURSE NUMBER: 1110

NUMBER OF CREDITS: 2 credits (2 lect., 0 lab)

COURSE TITLE: Fluid Power Hydraulic Calculations

CATALOG DESCRIPTION: Application of math concepts are used to calculate basic system parameters such as lifting force, pressures, horsepower, time, velocities, tubing sizes, unloading systems, and various parameters for hydraulic pumps and motors such as: efficiencies, flow, pressure, horsepower, speed, torque and displacement.

AUDIENCE: Mechatronic students.

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)

Area: by meeting the following competencies:
Area: by meeting the following competencies:
Area: by meeting the following competencies:

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE: MATH0098 and STSK0095 or equivalent test scores

LENGTH OF COURSE: semester

THIS COURSE IS USUALLY OFFERED:
Every other year ☐ fall ☑ spring ☐ summer ☐ undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The academic objectives of this course are:
   a. Demonstrate ability to calculate hydraulic system parameters.

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:
   a. Performing tests with an examination (or discussion) of the rationale for each test.
3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
   a. Participating in class discussions and reports
   b. Participating in assignments, worksheets, and reports

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Participating in classroom discussions
   b. Working with other students on research activities
   c. Working with students from other cultures

TOPICS TO BE COVERED:
1. Cylinders/rod area/diameters
2. Force/pressure/area
3. Cylinder extend/retract time
4. Cylinder extend/retract flow/adjusted GPM
5. Hydraulic HP/watts
6. Cylinder extend/retract speed (velocity)
7. Fluid conductor sizes
8. 2-pump system HP
9. Selecting standardized components
10. Pump displacement
11. Pump volume efficiency, mechanical efficiency, & overall efficiency
12. Actual motor torque/rpm/hp
13. Circuit Input hp
14. Hydraulic motor displacement
15. Hydraulic motor flow/PSI
16. Hydraulic motor efficiency

COURSE LEARNING OUTCOMES (GENERAL):
1. Apply math concepts to calculate basic hydraulic system parameters.
2. Apply math concepts to calculate parameters for hydraulic pumps and motors.

STUDENT LEARNING OUTCOMES (SPECIFIC):
1. Calculate cylinders/rod area/diameters
2. Calculate force/pressure/area
3. Calculate cylinder extend/retract time
4. Calculate extend/retract flow/adjusted GPM
5. Calculate HP/watts from circuits
6. Calculate cylinder extend/retract speed (velocity)
7. Calculate fluid conductor sizes from circuits
8. Calculate 2-pump system HP
9. Select standardized components
10. Calculate pump displacement
11. Calculate pump volume efficiency, mechanical efficiency, & overall efficiency
12. Calculate actual motor torque/rpm/hp from circuits
13. Calculate input hp from circuits
14. Calculate motor displacement
15. Calculate motor flow/PSI
16. Calculate motor efficiency

LEARNING/TEACHING TECHNIQUES used in the course are:
- Collaborative Learning
- Problem Solving
- Student Presentations
- Interactive Lectures
- Creative Projects
- Individual Coaching
- Lecture
- Films/Videos/Slides
- Demonstrations
- Other (describe below)
- Lab

ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:
- Reading
- Tests
- Problem Solving
- Individual Projects
- Oral Presentations
- Worksheets
- Interactive Lectures
- Collaborative Projects
- Textbook Problems
- Papers
- Creative Projects
- Group Problems
- Term Paper
- Lecture
- Demonstrations
- Other (describe below)

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

The information in this course outline is subject to revision

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or via your preferred Telecommunications Relay Service.

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Revised 10/1/16