COURSE OUTLINE: MPF0125 - FLUID POWER SYSTEMS

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Course Code: Title	MPF0125: FLUID POWER SYSTEMS FOR CICE
Program Number: Name	1120: COMMUNITY INTEGRATN
Department:	C.I.C.E.
Semesters/Terms:	21W
Course Description:	Upon successful completion of this course, students in the CICE Program, with the assistance of a Learning Specialist, will be able to perform basic calculations of pressure, force and area using Imperial and System International (S.I.) measurement, be able to interpret basic hydraulic systems schematics and symbols, explain the operation of hydraulic components and be able to describe the different types of hydraulic fluids and their applications. The student will describe the inspection and testing procedures for hydraulic conductors and fittings and describe a regular scheduled maintenance service following manufacturers recommendations. The student will locate and identify the major components of a hydraulic system and perform leak and pressure tests. Students will be required to follow proper safety procedures when performing the above tasks according to both Sault College Motive Power Department Standards and Vehicle Manufacturers safety regulations and specifications.
Total Credits:	1
Hours/Week:	4
Total Hours:	32
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. 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 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. 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.

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	EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	V. EVALUATION PROCESS/GRADING SYSTEM: The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated: Classroom 35% of the final grade is comprised of term tests Assignments 10% of the final grade is comprised of a number of technical reports Shop 45% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude Employability Skills 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player. (Student will be given notice of test and assignment dates in advance) NOTE: All assignments will be in typed format. NO hand written assignments will be accepted. The following semester grades will be assigned to students: 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.
Books and Required Resources:	Heavy Duty Truck Systems by Bennett Publisher: Cengage Learning Edition: 7th
Course Outcomes and	Upon successful completion of this course, the CICE student, with the assistance of a Learning

Learning Objectives:

Specialist will acquire varying levels of skill development relevant to the following learning outcomes:

Course Outcome 1	Learning Objectives for Course Outcome 1
Explain the fundamentals of hydraulic systems.	• Pascal`s Law • Boyle`s Law • Charles`s Law • Gay-Lussac`s Law • Bernoulli`s Principle Describe hydraulic terms and applications. • Hydrostatics • Hydrodynamics • Positive and negative pressures • Fluid power leverage Perform calculations for pressure, force and area using the following systems: • Imperial • system international unites (s.i.)
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Identify the components and graphic symbols.	• reservoir (filters and lines) • pumps and compressors • valves (pressure, volume and directional control) • actuators (rotary and linear) Describe the features, composition, types, and application of schematics for hydraulic systems. • explain and interpret manufacturer`s schematic legends Perform basic circuit drawings using graphic symbols.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
Explain the fundamentals of hydraulic components.	Pumps • gear • vane • piston • pressure relief valves • directional control valves • volume control valves • linear actuators • rotary actuators • vented and pressurized reservoirs Identify the construction features, types, and styles of hydraulic components. • gear pumps • vane pumps • piston pumps • pressure relief valve • directional control valve • volume control valve • linear actuators

	• vented and pressurized reservoirs Describe the principles of operation of hydraulic components. • gear pumps • vane pumps • piston pumps • pressure relief valve • directional control valve • volume control valve • linear actuators • vented and pressurized reservoirs Identify and locate hydraulic components on basic systems using schematics, physically on a piece of equipment.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
Explain the purpose and fundamentals of hydraulic fluids pertaining to:	• power transfer medium • lubrication • cooling Identify the composition and properties of hydraulic fluids pertaining to: • viscosity • fire supporting (volatility and flammability) • fire retarding Describe the function and construction features of hydraulic fluid filters. • surface types • depth types
Course Outcome 5	**Learning Objectives for Course Outcome 5**
Explain the purpose of hydraulic conductors and connectors including lines, pipes, fittings and pipes and tubing.	Identify the construction features, types, and application of conductors and connectors. • Standard, British and Metric fitting Demonstrate the fabrication, inspection, and testing procedures following manufacturers` recommendations for hydraulic conductors and connectors. • identify the risks of fluid injection into the skin
Course Outcome 6	**Learning Objectives for Course Outcome 6**
Explain the fundamentals of regular hydraulic system maintenance service.	Demonstrate maintenance procedures following manufacturers` recommendations for hydraulic systems.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Employability Skills	10%
Shop	45%
Theory Assignments	10%

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Theory Tests	35%

CICE Modifications:

Preparation and Participation

1. A Learning Specialist will attend class with the student(s) to assist with inclusion in the class and to take notes.
2. Students will receive support in and outside of the classroom (i.e. tutoring, assistance with homework and assignments, preparation for exams, tests and quizzes.)
3. Study notes will be geared to test content and style which will match with modified learning outcomes.
4. Although the Learning Specialist may not attend all classes with the student(s), support will always be available. When the Learning Specialist does attend classes he/she will remain as inconspicuous as possible.

A. Further modifications may be required as needed as the semester progresses based on individual student(s) abilities and must be discussed with and agreed upon by the instructor.

B. Tests may be modified in the following ways:

1. Tests, which require essay answers, may be modified to short answers.
2. Short answer questions may be changed to multiple choice or the question may be simplified so the answer will reflect a basic understanding.
3. Tests, which use fill in the blank format, may be modified to include a few choices for each question, or a list of choices for all questions. This will allow the student to match or use visual clues.
4. Tests in the T/F or multiple choice format may be modified by rewording or clarifying statements into layman's or simplified terms. Multiple choice questions may have a reduced number of choices.

C. Tests will be written in CICE office with assistance from a Learning Specialist.

The Learning Specialist may:

1. Read the test question to the student.
2. Paraphrase the test question without revealing any key words or definitions.
3. Transcribe the student's verbal answer.
4. Test length may be reduced and time allowed to complete test may be increased.

D. Assignments may be modified in the following ways:

1. Assignments may be modified by reducing the amount of information required while maintaining general concepts.
2. Some assignments may be eliminated depending on the number of assignments required in the particular course.

The Learning Specialist may:

1. Use a question/answer format instead of essay/research format
2. Propose a reduction in the number of references required for an assignment
3. Assist with groups to ensure that student comprehends his/her role within the group
4. Require an extension on due dates due to the fact that some students may require additional time to process information

	5. Formally summarize articles and assigned readings to isolate main points for the student 6. Use questioning techniques and paraphrasing to assist in student comprehension of an assignment **E. Evaluation:** Is reflective of modified learning outcomes. **NOTE:** Due to the possibility of documented medical issues, CICE students may require alternate methods of evaluation to be able to acquire and demonstrate the modified learning outcomes
Date:	December 18, 2020
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.