COURSE OUTLINE: MPF125 - FLUID POWER SYSTEMS

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Course Code: Title	MPF125: FLUID POWER SYSTEMS
Program Number: Name	4044: MOT POWER ADV REPAIR 5085: HEAVY EQUIP/REPAIR
Department:	MOTIVE POWER
Academic Year:	2024-2025
Course Description:	Upon successful completion of this course, Fundamentals of Fluid Power Systems, you 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 also be able to describe the inspection and testing procedures for hydraulic conductors and fittings and describe a regular scheduled maintenance service following manufacturers recommendations. The student will also be able to 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.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4044 - MOT POWER ADV REPAIR** VLO 1 Analyse, diagnose, and solve various motive power system problems by using problem-solving and critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships. VLO 7 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. VLO 8 Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems. VLO 9 Apply knowledge of hydraulics and pneumatics to the testing and analysis of motive power systems and subsystems. VLO 10 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards. VLO 11 Use information technology and computer skills to support work in a motive power environment.

	VLO 16 Complete all assigned work in compliance with occupational, health, safety, and environmental law; established policies and procedures; codes and regulations; and in accordance with ethical principles. **5085 - HEAVY EQUIP/REPAIR** VLO 1 Identify basic motive power system problems by using critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships. VLO 6 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. VLO 7 Use a variety of test equipment to assess basic electronic circuits, vehicle systems, and subsystems. VLO 8 Apply basic knowledge of hydraulics and pneumatics to the testing and inspection of basic motive power systems and subsystems. VLO 9 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards. VLO 10 Use information technology and computer skills to access data concerning repair procedures and manufacturers' updates.
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. 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

Simulator Activities Practical Hydraulics Student Workbook by Fluid Power Training Institute
Edition: Revision 8.2
Printed in house and supplied from the Colleges Book Store

Course Outcomes and Learning Objectives:

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 practical	45%
Theory Assignments	10%
Theory Tests	35%

Date: November 12, 2024

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.