



## COURSE OUTLINE: MPT202 - HYDRAULIC BRAKE SYST

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Approved: Corey Meunier, Chair, Technology and Skilled Trades

<b>Course Code: Title</b>	MPT202: HYDRAULIC BRAKE SYSTEMS
<b>Program Number: Name</b>	4044: MOT POWER ADV REPAIR
<b>Department:</b>	MOTIVE POWER
<b>Academic Year:</b>	2023-2024
<b>Course Description:</b>	<p>In this course, you will focus on the construction, repair and diagnosis of modern Automotive, Heavy Equipment and Truck hydraulic brake systems. Common sources of vehicle brake problems will be outlined at this time. The student will perform system pressure tests to verify proper operation of master cylinders, power brake boosters and brake pressure control valves. The student will also learn the construction and operation of modern anti lock brake systems and verify components using scan tools a digital multi meters.</p> <p>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.</p>
<b>Total Credits:</b>	3
<b>Hours/Week:</b>	6
<b>Total Hours:</b>	45
<b>Prerequisites:</b>	MPF103, MPF122
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4044 - MOT POWER ADV REPAIR</b>
<b>Please refer to program web page for a complete listing of program outcomes where applicable.</b>	<p>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.</p> <p>VLO 6 Diagnose and repair suspension, steering, and brake components and systems in compliance with manufacturer's recommendations.</p> <p>VLO 7 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices.</p> <p>VLO 8 Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems.</p> <p>VLO 9 Apply knowledge of hydraulics and pneumatics to the testing and analysis of motive power systems and subsystems.</p> <p>VLO 10 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.</p> <p>VLO 11 Use information technology and computer skills to support work in a motive power environment.</p> <p>VLO 15 Develop and use personal and professional strategies and plans to improve</p>



	<p>professional growth, job performance, and work relationships.</p> <p>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.</p>
<b>Essential Employability Skills (EES) addressed in this course:</b>	<p>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.</p> <p>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>EES 3 Execute mathematical operations accurately.</p> <p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p>
<b>Course Evaluation:</b>	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>The following semester grades will be assigned to students:</p> <p>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</p> <p>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.</p>
<b>Books and Required Resources:</b>	<p>Automotive Technology: A Systems Approach by Erjavec Publisher: Thomson Nelson Learning Canada Edition: 4th Canadian Edition</p>



Heavy Duty Truck Systems by Bennett  
 Publisher: Cengage Learning Edition: 7th

Modern Diesel Technology: Heavy Equipment Systems by Huzij/Spino/Bennett  
 Publisher: Cengage Learning Edition: 3rd

**Course Outcomes and Learning Objectives:**

<b>Course Outcome 1</b>	<b>Learning Objectives for Course Outcome 1</b>
1. Explain the construction and operation of brake lines, cylinders, shoes, pads, drums, discs, combination valve, power brake boosters and cables.	1.1 Compare and contrast materials used to make brake pads and shoes. 1.2 Analyze master cylinders, wheel cylinders and calipers to determine operation. 1.3 Test combination valve with pressure gauges to check operation 1.4 Inspect brake lines and flex hoses. 1.5 Analyze parking brake mechanisms to verify operation. 1.6 Describe power brake booster operation, Vacuum and Hydraulic.
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
2. Diagnose and repair hydraulic brake system faults following manufacturer procedures.	2.1 Evaluate brake noises 2.2 Solve brake drag and lock up problems 2.3 Measure brake drums and rotors to determine sources of vibration 2.4 Identify corrective actions as required 2.5 Verify proper power brake booster operation 2.6 Repair and replace brake components as required 2.7 Machine brake discs and drums 2.8 Service calipers and drum brake assemblies and verify proper operation 2.9 Perform automated bleed procedure
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Describe the purpose and fundamentals of hydraulic traction control and anti-lock brake systems.	3.1 Explain velocity and acceleration 3.2 Compare and contrast wheel skid to wheel lock 3.3 Outline tire coefficient of friction pertaining to stopping and acceleration 3.4 Describe predetermined deceleration and accelerations rates
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
4. Describe the construction and operation of hydraulic traction control and anti-lock brake systems.	4.1 Explain accumulator and pump operation 4.2 Describe wheel speed sensor location and operation 4.3 Compare and contrast one, two, three and four channel systems 4.4 Outline the differences between integrated and non-integrated systems 4.5 Explain hydraulic modulation 4.6 Outline the effects of using different sized tires



	<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
	5. Perform inspection and diagnostic procedures on hydraulic traction control and anti-lock brake systems following manufacturer's recommendations.	5.1 Perform a visual inspection 5.2 Scan system and extract data 5.3 Retrieve trouble codes 5.4 Explain hydraulic system pressure precautions 5.5 Test and verify wheel speed sensor operation 5.6 Perform automated bleed procedure
	<b>Course Outcome 6</b>	<b>Learning Objectives for Course Outcome 6</b>
6. Perform inspection, testing, and diagnostic procedures following manufacturer's recommendations and safe work practices on Heavy Duty Hydraulic brake systems.	6.1 Interpret test results and performance problems 6.2 noises 6.3 drag or lockup 6.4 vibrations 6.5 imbalance 6.6 Check park brake operation 6.7 Disassemble and measure multi disc brake components 6.8 Pressure test brake applied pressure	
	<b>Course Outcome 7</b>	<b>Learning Objectives for Course Outcome 7</b>
	7. Recommend reconditioning or repairs following manufacturer's recommendations for Heavy Duty Hydraulic brake systems.	7.1 Identify corrective repair actions according to manufacturer's recommended procedures

**Evaluation Process and Grading System:**

<b>Evaluation Type</b>	<b>Evaluation Weight</b>
Assignments	10%
Employability Skills	10%
Shop	45%
Theory Tests	35%

**Date:**

August 21, 2023

**Addendum:**

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

