SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	Hydraulic Brake Systems		
CODE NO. :	MPT202	**Semester**	THREE
PROGRAM:	Motive Power Technician – Advanced Repair		
AUTHOR:	George Parsons		
DATE:	September 2016	**PREVIOUS OUTLINE DATED:**	May 2016
APPROVED:	*"Corey Meunier"* **CHAIR**		May 2016
TOTAL CREDITS: 3	THREE		
PREREQUISITE(S):	MPF103 & MPF122		
HOURS/WEEK:	SIX		

For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610

I. COURSE DESCRIPTION:

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.

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.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain the construction and operation of brake lines, cylinders, shoes, pads, drums, discs, combination valve, power brake boosters and cables.

Potential Elements of the Performance:

- Compare and contrast materials used to make brake pads and shoes.
- Analyze master cylinders, wheel cylinders and calipers to determine operation.
- Test combination valve with pressure gauges to check operation
- Inspect brake lines and flex hoses.
- Analyze parking brake mechanisms to verify operation.
- Describe power brake booster operation, Vacuum and Hydraulic.

2. Diagnose and repair hydraulic brake system faults following manufacturer procedures.

Potential Elements of the Performance:

- Evaluate brake noises.
- Solve brake drag and lock up problems.
- Measure brake drums and rotors to determine sources of vibration.
- Identify corrective actions as required.
- Verify proper power brake booster operation.

- Repair and replace brake components as required
- Machine brake disc's and drums
- Service calipers and drum brake assemblies and verify proper operation.
- Perform automated bleed procedure

3. Describe the purpose and fundamentals of hydraulic traction control and anti-lock brake systems.

Potential Elements of the Performance:

- Explain velocity and acceleration.
- Compare and contrast wheel skid to wheel lock.
- Outline tire coefficient of friction pertaining to stopping and acceleration.
- Describe predetermined deceleration and accelerations rates.

4. Describe the construction and operation of hydraulic traction control and anti-lock brake systems.

Potential Elements of the Performance:

- Explain accumulator and pump operation.
- Describe wheel speed sensor location and operation.
- Compare and contrast one, two, three and four channel systems.
- Outline the differences between integrated and non-integrated systems.
- Explain hydraulic modulation.
- Outline the effects of using different sized tires.

5. Perform inspection and diagnostic procedures on hydraulic traction control and anti-lock brake systems following manufacturers' recommendations.

Potential Elements of the Performance:

- Perform a visual inspection.
- Scan system and extract data.
- Retrieve trouble codes.
- Explain hydraulic system pressure precautions.
- Test and verify wheel speed sensor operation.
- Perform automated bleed procedure

6. Perform inspection, testing, and diagnostic procedures following manufacturers' recommendations and safe work practices on Heavy Duty Hydraulic brake systems.

Potential Elements of the Performance:

Interpret test results and performance problems

- noises
- drag or lockup
- vibrations
- imbalance
- check park brake operation
- Disassemble and measure multi disc brake components
- Pressure test brake applied pressure

7. Recommend reconditioning or repairs following manufacturers' recommendations for Heavy Duty Hydraulic brake systems.

Potential Elements of the Performance.

- identify corrective repair actions according to manufacturers' recommended procedures

III. TOPICS:

1. Brake lines, cylinders, shoes, pads, drums, discs, combination valve, power brake boosters and cables.
2. Diagnose brake system faults following manufacturer procedures
3. Fundamentals of anti-lock brake systems.
4. Construction and operation of anti-lock and traction control systems.
5. Inspection and diagnostic procedures on traction control and anti-lock brake systems
6. Heavy Duty Hydraulic brake systems.
7. Recommend reconditioning or repairs for Heavy Duty Hydraulic brake systems.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Title: Heavy Duty Truck Systems
Edition: 6th ed.,
Author: Bennett
Publisher: Thomson Nelson Learning Canada

Title: Automotive Technology: A Systems Approach
Edition: 2nd Canadian Ed.
Author: Erjavec
Publisher: Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory in the Shop:

- CSA approved steel toe boots (high top)
- CSA approved safety glasses
- Approved coveralls

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.

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

VI. SPECIAL NOTES:

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

A Department Attendance Policy will be discussed.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

Cell phones are not allowed
in the classrooms or shop areas during class time.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.

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COURSE OUTLINE ADDENDUM

1. Course Outline Amendments:
   The faculty member reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

2. Retention of Course Outlines:
   It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

3. Prior Learning Assessment**:**
Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Key Dates Calendar for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio. Student Services can provide information regarding the Prior Learning Assessment and Recognition policy or it can be viewed on the student portal.

Substitute course information is available in the Registrar's office.

4. Student Portal:
The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. In addition announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more is available. Go to https://my.saultcollege.ca.

5. Communication:
The College considers ***Desire2Learn (D2L)*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of this Learning Management System (LMS) communication tool.

6. Accessibility Services:
If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with the Accessibility Services office. Call Ext. 2703 or email studentsupport@saultcollege.ca so that support services can be arranged for you.

7. Audio and Video Recording Devices in the Classroom:
Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. Students with disabilities who require audio or visual recording devices in the classroom as an accommodation will receive approval from their counsellor once the Audio and Video Recording Devices in the Classroom Policy has been reviewed by the student. Recorded classroom instruction will be used only for individual academic use and will not be used for any other purpose. Recordings may only be used for individual study of materials presented during class and may not be published or distributed. Intentional misuse of audio and video recordings or intentional misrepresentation when requesting the use of a device for recording shall constitute a violation of this policy and laws protecting intellectual property.

8. Academic Dishonesty:
Students should refer to the definition of "academic dishonesty" in the *Student Code of Conduct*. Students who engage in academic dishonesty will be issued a sanction under the Student Code of Conduct which could lead to and include expulsion from the course/program. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, students must use a documentation format for referencing source material.

9. Tuition Default:
Students who have defaulted on the payment of tuition) as of the first week of November (fall semester courses), first week of March (winter semester courses) or first week of June (summer semester courses) will be removed from placement and clinical activities due to liability issues. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.