



**I. COURSE DESCRIPTION:**

This course deals with the study and interrelationship of essential basic fundamentals, composition, construction and operating principles of hydraulic and pneumatic brake systems. The student will also inspect and service hydraulic and pneumatic brake assemblies using manufacturer's maintenance procedures.

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. *Define the essential basic information and fundamentals of standard hydraulic and air brake systems.***Potential Elements of the Performance

- Pascal's Law, mechanical advantage
- Effect of heat co-efficient of friction
- Brake fluid composition
- Self –energization
- Weight transfer affecting brake designs for light and heavy-duty off road equipment brakes
- Laws of levers
- Pressure volume relationships
- Boyles and Charles law

**2. *Explain the basic function, composition and construction of drum and disc brake system assemblies as applied to hydraulic and air brakes.***Potential Elements of the Performance:

- Master cylinder, drum, shoes, wheel cylinders, discs, pads, calipers, lines and hoses
- Slack adjusters
- Air brake chambers
- Control valves
- Lines and hoses
- SAHR
- Multi disc wet brakes
- Driveline brakes
- Parking brakes

**3. Explain the basic principals of operation of drum and disc brake system assemblies as applied to hydraulic and air brakes.**

Potential Elements of the Performance:

- Master cylinder, drums and shoes
- Wheel cylinders, discs, pads ,caliper
- Control devices
- Air supply system and subsystems
- Air brake chambers
- Slack adjusters
- Parking brakes

**4. Identify, inspect and service drum and disc brake system assemblies as applied to hydraulic and air brakes.**

Potential Elements of the Performance:

- Clean, lubricate and adjust hydraulic drum brake assemblies
- Clean, lubricate and adjust air drum and disc brake assemblies
- Inspect and test disc brake assemblies
- Service caliper slides and bushings
- Perform steel brake line fabrication, ISO and double inverted
- Bleed and flush hydraulic brake systems
- Inspect and adjust parking brakes
- Functional tests of air brake supply systems
- Inspect Heavy Duty wet multi disc brake assemblies

**III. TOPICS:**

1. Brake fundamentals
2. Brake components
3. Brake operation
- 4.. Service drum and disc brake system assemblies

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

**Title:** Heavy Duty Truck Systems

**Edition:** 5th ed.,

**Author:** Bennett

**Publisher:** Thomson Nelson Learning Canada

**Title:** Automotive Technology: A Systems Approach

**Edition:** 2<sup>nd</sup> 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.**

<b>(Students will be given notice of test and assignment dates in advance)</b>
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The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<b><i>Grade Point Equivalent</i></b>
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.	

#### 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. *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 to be on  
in the classrooms or shop areas.**

#### VII. **COURSE OUTLINE ADDENDUM:**

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