

- I. COURSE DESCRIPTION:** You learn about the Air Brake Systems used on medium and heavy duty trucks, truck and trailers, and busses used in the on road commercial vehicle industry. They will have in depth training on pneumatic systems as related to the vehicle braking systems as well as in depth training on the mechanical components and pneumatic valves that are used to control the build up of the air pressure and the application of the air for the emergency parking and service brake systems of such vehicles. You will learn how to test and diagnose system problems related to the pneumatic side of the system and take part in the inspection and servicing of the mechanical foundation brakes used in these types of systems. You will also be taught the proper method of brake adjustment for all of the different types of slack adjuster used on these types of vehicles. You will be required to perform mechanical repairs and regular brake adjustment and service procedures according to manufacturer's specifications and the highway traffic act.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. State the regulations that govern the use of and operation of the CMVSS 121 Air Brake System used on All on road Air Brake Systems in respect to:
 - Requirements of the 121 Dual air brake system
 - Vehicle stopping distances
 - Relationship of vehicle weight factors and stopping distances
 - Vehicle speed factors and stopping distances
 - Importance of and use of front wheel brakesParking and Service brake systems

2. Describe the fundamental operation of an air brake system used on Buses, Highway truck, and Tractor Trailer combination vehicles according to the:
 - Principles of Pneumatics
 - Primary and Secondary brake circuits
 - Law of levers
 - Mechanical advantage
 - Coefficient of friction laws
 - Functions of the various air brake control valvesAir compressor purpose construction and operation

3. Remove and repair or overhaul the Mechanical Components used in the Wheel End of an Air Brake Vehicle or Trailer:
 - Inspect the S-cam and support bushing
 - Inspect the brake shoe and lining assemblies
 - Remove and replace or re-install brake shoe and return spring assemblies
 - Remove and replace or re-install the S-cam and bushings
4. Properly diagnose pneumatic problems within the Air brake Systems valves, delivery components and actuator components:
 - Trace air flow through the supply system
 - List components of primary system
 - Trace air flow through the primary system and list valves used
 - Trace air flow through the secondary system and list valves used
 - Trace air flow through the Parking brake system and list valves and components used
5. Properly and safely perform an Air Brake System Circle check and Systems build up test according to manufactures and Industry Specifications:
 - Perform visual check of front and rear axle brake external components
 - Perform air pressure build up tests and record their values
 - Perform air pressure leak down test and record pressure drop
 - Record operation and pressure of warning buzzer and light
6. Demonstrate the proper method of checking the slack adjuster for proper applied stroke distance according to brake chamber type and size:
 - Determine brake chamber size according to diameter of chamber
 - Identify brake chamber style eg. Long stroke normal stroke
 - Check pushrod stroke during a full brake application
 - Check smoothness of operation of slack adjuster during application and release
7. Properly and safely remove and install both parking brake chambers and service brake chamber according to manufactures specifications:
 - Use of proper tools for the task
 - Use of the safety cage required for safe removal
 - Check the A L Factor of the spring brake chamber

8. Properly and Safely install and adjust manual slack adjusters and automatic slack adjusters according to manufactures instructions and procedures:
 - Determine proper length of slack adjuster
 - Properly shim slack adjuster for center and side clearance
 - Properly install pushrod clevis and pin
 - Properly adjust slack adjuster and check operation

III. TOPICS:

1. Air Brake CMVSS 121 Dual System Regulations
2. Air Brake System fundamentals and operation according to CMFSS 121 System Standards
3. Air Brake System Configurations
4. Air Brake System Wheel End Mechanical Components
5. Air Brake System Pneumatic Supply and Delivery Components
6. Air Brake System Testing, Adjustments and Service requirements and Procedures
7. Air Brake Service and Parking Brake Chamber Installation
8. Automatic and Manual Slack Adjuster installation and adjustment

IV. REQUIRED RESOURCES/TEXTBOOKS/MATERIALS:

Title: Heavy Duty Truck Systems

Edition: 4th ed., 12959#

Author: Bennett

Publisher: Thomson Nelson Learning Canada

Title: Automotive Technology: A Systems Approach/AST Test Prep

Edition: 06 ed., 17810#

Author: Erjavec

Publisher: Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

Mandatory for entrance into the Shop:

- shop coat or coveralls
- CSA approved steel toe boots (high top)
- CSA approved safety glasses

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 – 60% of the final grade is comprised of term tests
- Assignments – 10% of the final grade is comprised of a number of technical reports
- Shop – 30% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude

(Student will be given notice of test and assignment dates in advance)

The following semester grades will be assigned to students:

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