



DEPARTMENT OF HEAVY EQUIPMENT PROGRAMS

COURSE OUTLINE – FALL SEMESTER 1

HE 1600 AIR BRAKES – 6.5(100 HOURS/16 WEEKS) 32 LECTURE – 68 LAB/SHOP

INSTRUCTOR: John Stiles

PHONE: 780 835 6623

OFFICE: FTI 218

E-MAIL: Jstiles2@gprc.ab.ca

OFFICE HOURS: Monday to Friday

PREREQUISITE(S)/COREQUISITE: High School Diploma, mature status as per AIT requirements.

REQUIRED TEXT/RESOURCE MATERIALS: 1st Period Heavy Equipment Technician ILM Modules

CALENDAR DESCRIPTION:

Explain the fundamental principles of operation of an air brake system. Explain the operating principles of air brake mechanical components. Explain the principles of operation of truck/tractor air brake systems. Explain the principles of trailer brake system component operation. Service and diagnose truck/tractor and trailer air brake systems. Describe the basic operation of an air antilock brake system.

CREDIT/CONTACT HOURS: 6.5 Credits – 100 Contact Hours – 6 hours per week

DELIVERY MODE(S): Instructor led classroom theory (32 hours), instructor led lab/shop (68 hours).

OBJECTIVES (OPTIONAL): The program has been developed to provide students with entry level skills as a Heavy Equipment Technician. After obtaining a requisite number of hours in the work force, the student would be eligible to continue with Alberta Apprenticeship and Industry training in the Heavy Equipment Technician trade towards journeyman certification.

TRANSFERABILITY: None

GRADING CRITERIA: A grade of 65% or higher is required to pass this course. Students must complete all required courses with a grade point average of no less than 2.0 and no failing (F) grades.

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A+	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A-	3.7	80 – 84	FIRST CLASS STANDING
B+	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B-	2.7	70 – 72	
C+	2.3	67 – 69	SATISFACTORY
C	2.0	65 – 66	
F	0.0	60 – 64	FAIL
F	0.0	55 – 59	
F	0.0	50 – 54	
F	0.0	0 – 49	
WF	0.0	0	FAIL, withdrawal after deadline

EVALUATIONS:

Theory portion will be made up of quizzes and tests worth 35%.

Shop portion will be made up of shop projects worth 65%.

Students who have successfully completed the program and also completed an acceptable Alberta Apprenticeship Prior Learning Assessment Application (fee payable to Alberta Apprenticeship) may have the opportunity to challenge the Alberta Apprenticeship and Industry Training (AIT) first year Heavy Equipment Technician apprentice exam.

STUDENT RESPONSIBILITIES:

Please refer to the Student Rights and Responsibilities policy in the Grande Prairie Regional College Calendar or at

www.gprc.ab.ca/downloads/documents/StudentRightsandResponsibilities.pdf

STATEMENT ON PLAGIARISM AND CHEATING:

Please refer to pages 49-50 of the College calendar regarding plagiarism, cheating and the resultant penalties. These are serious issues and will be dealt with severely.

COURSE SCHEDULE/TENTATIVE TIMELINE:

A. Air Brake System Fundamentals 10 Hours

Outcome: Explain the fundamental principles of operation of an air brake system.

1. Explain the principles of operation of an air brake system.
2. Develop a simple air brake system consisting of a compressor, reservoir, brake valve, steer axle and single drive axle brake chambers, and connecting lines.

B. Air Brake System Mechanical Components16 Hours

Outcome: Explain the operating principles of air brake mechanical components.

1. Explain the operating principles of a typical cam-operated foundation brake.
2. Explain the operating principles of a typical air disc foundation brake.

C. Truck/Tractor Air Brake System Components 26 Hours

Outcome: Explain the principles of operation of truck/tractor air brake systems.

1. Explain the functions and principles of operation of common air brake supply circuit components.
2. Explain the functions and principles of operation of common primary service brake circuit

components.

3. Explain the functions and principles of operation of common secondary service brake circuit components.
4. Explain the functions and principles of operation of common parking/emergency brake circuit components.
5. Explain the functions and principles of operation of common trailer control circuit components.

D. Trailer Air Brake System Components18 Hours

Outcome: Explain the principles of trailer brake system component operation.

1. Explain the functions and principles of operation of pre-CMVSS 121 single trailer brake circuit components.
2. Explain the functions and principles of operation of CMVSS 121 single trailer brake circuit components.
3. Explain functions and principles of operation of common components used on multiple trailer combinations.

E. Air Brake System Testing and Service20 Hours

Outcome: Service and diagnose truck/tractor and trailer air brake systems.

1. State the safety precautions that must be observed prior to performing air brake system testing and service.
2. Perform a visual inspection of the air brake system.
3. Perform air brake system testing.
4. Analyse test results and state possible causes for system malfunction.
5. Service cam-operated foundation brakes.

F. Air Antilock Brake System Fundamentals 10 Hours

Outcome: Describe the basic operation of an air antilock brake system.

1. List the advantages of operating a vehicle equipped with an antilock brake system.
2. Explain the operation of an antilock air brake system.
3. Identify typical system layout and component locations on a vehicle equipped with an antilock air brake system.
4. Describe antilock air brake system service precautions