DEPARTMENT OF HEAVY EQUIPMENT PROGRAMS

COURSE OUTLINE – FALL SEMESTER 1

HE 1300 HYDRAULIC BRAKE SYSTEMS – 3.5 (62 HOURS/16 WEEKS) 16 LECTURE – 46 LAB/SHOP)

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OFFICE HOURS:	Monday to Friday		

PREREQUISITE(S)/COREQUISITE:

English 20-1, English 20-2 or equivalent

Math 20-1, Math 20-2, Math 20-3 or equivalent

A 20-level Science or equivalent

Although a high school diploma is not required for entrance to this program, students should be aware that some employers may require a High School Diploma as a prerequisite to employment.

Applicants who do not meet these requirements may be admitted to the program but they will be required to pass the Apprenticeship & Industry Training (AIT) Trades Entrance Exam during the first semester, if choosing to pursue an apprenticeship

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

CALENDAR DESCRIPTION:
Apply scientific principles to braking system operation. Explain the operation of hydraulic drum and disc brake systems. Service hydraulic drum and disc brake systems. Explain power braking systems service procedures. Explain service procedures of parking brake systems. Explain service procedures of electric braking systems.

CREDIT/CONTACT HOURS: 3.5 Credits – 62 Contact Hours – 4 hours per week

DELIVERY MODE(S): Instructor led classroom theory (16 hours), instructor led lab/shop (46 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/StudentRightsandResponsbilities.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. Hydraulic Brake System Fundamentals 5Hours
Outcome: Apply scientific principles to braking system operation.
1. Explain braking principles with emphasis on heat, friction and hydraulic forces.
2. Explain brake fluids with regards to properties and handling procedures.

B. Hydraulic Brake System (Drum and Disc) .....14 Hours
Outcome: Explain the operation of hydraulic drum and disc brake systems.
1. Explain the principles of operation of drum brake systems.
2. Explain the principles of operation of disc brake systems.
3. Explain the construction and operation of master cylinders.
4. Explain the purpose and construction of brake lines and hoses.
5. Explain the construction and operation of wheel cylinders and calipers.
6. Explain the purpose and operation of the metering, proportioning and pressure differential valves.

C. Hydraulic Brake System Diagnosis and Service .....14 Hours
Outcome: Service hydraulic drum and disc brake systems.
1. List safety responsibilities required when servicing and repairing brake systems.
2. Diagnose brake system faults.
3. Service a typical drum brake assembly.
4. Service a typical disc brake assembly.
5. Describe reconditioning procedures required for master cylinders, wheel cylinders and brake calipers.
6. Demonstrate brake flushing and bleeding procedures on hydraulic brake systems.

D. Hydraulic Brake Booster System Fundamentals and Service ..... 20 Hours
Outcome: Explain power braking systems service procedures.

1. Identify common power assist braking systems.
2. Explain the principles of operation for vacuum brake booster systems.
3. Describe the diagnosis and repair procedures for vacuum brake booster systems.
4. Explain the principles of operation for air-over-hydraulic brake booster systems.
5. Describe the diagnosis and repair procedures for air-over-hydraulic brake booster systems.

6. Explain the principles of operation for hydraulic-over-hydraulic brake booster systems.
7. Describe the diagnosis and repair procedures for hydraulic-over-hydraulic brake booster systems.

E. Parking Brake System Fundamentals and Service ..... 5 Hours
Outcome: Explain service procedures of parking brake systems.
1. Explain the principles of operation for common parking brake systems.
2. Describe the adjusting procedures for common parking brake systems.
3. Describe repair procedures for common parking brake systems.

F. Electric Brake Fundamentals and Service ..... 4 Hours
Outcome: Explain service procedures of electric braking systems.
1. Explain the principles of operation for electric braking systems.
2. Identify basic electric braking system failures.