DEPARTMENT OF HEAVY EQUIPMENT PROGRAMS

COURSE OUTLINE – WINTER SEMESTER 2

HE 2200 ENGINE SYSTEMS – 4(60 HOURS/18 WEEKS) 15 LECTURE – 45 LAB/SHOP

INSTRUCTOR:	Gavin Winter	**PHONE:**	780 835 6695
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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 and 2nd Period Heavy Equipment Technician ILM Modules

CALENDAR DESCRIPTION:

Service air induction, exhaust systems and related components. Service turbo charged air induction systems. Service lubrication systems and related components. Service liquid and air-cooling systems and related components.

CREDIT/CONTACT HOURS: 4 Credits – 60 Contact Hours – 3 hours per week

DELIVERY MODE(S): Instructor led classroom theory (15 hours), instructor led lab/shop (45 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 and second 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. Air Induction and Exhaust Systems ..... 8 Hours
Outcome: Service air induction, exhaust systems and related components.
1. State the functions of an air induction system.
2. Identify and state the function of air induction system components.
3. State the function of an exhaust system.
4. Identify and explain the operation of exhaust system components.
5. Explain the service procedures for air induction and exhaust systems.
6. Explain the use of test equipment to measure air inlet restriction and exhaust backpressure.

B. Turbo Charged Air Systems .....12 Hours
Outcome: Service turbo charged air induction systems.
1. State the purposes for turbo charging the engine air induction system.
2. Explain the construction and operation of a turbo charged air induction system and components including Exhaust Gas Recirculation (EGR) systems.
3. Test, inspect and service a turbocharger.
4. Explain the function, construction and testing procedures for typical aftercoolers/intercoolers.
5. Explain the function of variable displacement turbo technology and wastegate systems.

C. Lubrication Systems and Crankcase Ventilation ..... 20 Hours
Outcome: Service lubrication systems and related components.
1. State the functions and characteristics of engine oil.
2. Describe the use of oil analysis as a diagnostic tool.
3. Explain the operating principles of a typical lubrication system and related components.
4. State the purpose of crankcase ventilation systems.
5. Perform lubrication system inspection and service.
6. Diagnose and repair faults related to lubrication systems and components.

D. Cooling Systems (Liquid and Air) .....20 Hours
Outcome: Service liquid and air-cooling systems and related components.
1. Explain the function of the engine cooling system.
2. Explain the operation and maintenance of an air-cooling system.

3. Explain the operation of a typical liquid cooling system and its components.
4. Perform engine liquid cooling system repair and maintenance.
5. Explain the functions and design features of temperature sensors and warning devices.