



**DEPARTMENT OF HEAVY EQUIPMENT**  
**HEAVY EQUIPMENT SERVICE COURSE OUTLINE – WINTER 2014**  
**MARCH 3 – APRIL 25, 2014**  
**HES511 POWER TRAIN II – 3.5 (96 HOURS)**

**INSTRUCTOR:** Rudy Hrynkiw                      **PHONE:** 780.835.6757  
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**OFFICE HOURS:** 8.00am to 4.30pm

**PREREQUISITE(S)/COREQUISITE:** Successful completion of Semesters 1 through 4.

**REQUIRED TEXT/RESOURCE MATERIALS:**

**Caterpillar Material**

***Power Train 1.***

Unit 2: Couplings

Lesson 2 – Torque Converters and Torque Dividers

Unit 3: Transmissions

Lesson 2 – Power Shift Transmissions

Lesson 3 – Power Shift Transmission Control Systems

***Power Train 2***

Unit 1: Differentials

Lesson 5 – Differential Steering

Lesson 6 – Steering Clutch and Brake

Unit 2: Brakes

Lesson 3 – Retarding and Traction Control

Unit 3: Undercarriage

Lesson 1 – Undercarriage Components

Lesson 2 – Undercarriage Wear and Operation

Lesson 3 – Track and Shoe Options

Unit 4: Final Drives, Chain Drives, and Tires

***Caterpillar Service Industry continued . . .***

Lesson 1 – Final Drives

Lesson 2 – Chain Drives and Tires

**Alberta Apprenticeship and Industry Training Individual Learning Modules  
Heavy Equipment Technician (HET)**

- 190302aA – Wheeled Equipment Steering Fundamentals and Service – Part A
- 190302aB – Wheeled Equipment Steering Fundamentals and Service – Part B
- 190302b – Suspension System Fundamentals and Service
- 190302cA – Off-Road Equipment Accessories and Attachments – Part A
- 190302cB – Off-Road Equipment Accessories and Attachments – Part A
- 190303a – Gearing Principles
- 190303b – Torque Converter Fundamentals and Service
- 190303c – Powershift and Automatic Transmission Mechanical/Electronic Components
- 190303d – Powershift and Automatic Transmission Control and Shifting
- 190303e – Hydraulic Retarder Fundamentals
- 190303f – Powershift and Automatic Transmission Testing and Service
- 190303gA – Tracked Equipment Steer Fundamentals and Service – Part A
- 190303gB – Tracked Equipment Steer Fundamentals and Service – Part B
- 190303hA – Undercarriage System Fundamentals and Service – Part A
- 190303hB – Undercarriage System Fundamentals and Service – Part B
- 190303i – Final Drive Fundamentals and Service (Off-Road)

**CALENDAR DESCRIPTION:** Power train drives that have a hydraulic component to them will be covered in this course. Torque converters, gearing principles, power shift and automatic transmissions are covered in relation to operation, diagnostics and service procedures. Also included are hydraulic retarders, tracked equipment steering and undercarriage fundamentals and service. Final drive operation and service, differentials as applied to off-road will also be discussed. Wheeled equipment steering and suspension as well as off-road equipment accessories and attachments will be discussed in reference to off-road machines.

Delivery Option: Fairview Campus Only

**CREDIT/CONTACT HOURS:** Credits: 3.5 / Contact Hours: 96.

**DELIVERY MODE(S):** Lecture and lab.

**TRANSFERABILITY:** None.

**GRADING CRITERIA:** Students must complete all required courses with a grade point average of no less than 2.7 and no failing (F) grades. A passing grade in this course is a **minimum of 70%.**

**Power Train II** ..... **96 / 240 hours = 40 %**  
**of Semester 5 mark**

**Exams Average =** \_\_\_\_\_ **x 45%**

**Class Assignments/Quizzes =** \_\_\_\_\_ **x 30%**

**Shop Total** \_\_\_\_\_ **x 25%**

**HES511 FINAL MARK =** \_\_\_\_\_ **%**

GRANDE PRAIRIE REGIONAL COLLEGE			
GRADING CONVERSION CHART			
Alpha Grade	4-point Equivalent	Percentage Guidelines	Designation
A <sup>+</sup>	4.0	90 – 100	EXCELLENT
A	4.0	85 – 89	
A <sup>-</sup>	3.7	80 – 84	FIRST CLASS STANDING
B <sup>+</sup>	3.3	77 – 79	
B	3.0	73 – 76	GOOD
B <sup>-</sup>	2.7	70 – 72	
F	0.0	67 – 69	FAIL
F	0.0	63 – 66	
F	0.0	60 – 62	
F	0.0	55 – 59	
F	0.0	50 – 54	
F	0.0	0 – 49	
WF	0.0	0	FAIL, withdrawal after the deadline

## **STUDENT RESPONSIBILITIES:**

This is an adult education environment. Enrolment at Grande Prairie Regional College assumes that the student will become a responsible citizen of the College. As such, each student will display a positive work ethic, take pride in and assist in the maintenance and preservation of Institute property, and assume responsibility for his/her education by researching academic requirements and policies, demonstrating courtesy and respect toward others; and respecting instructor expectations concerning attendance, classroom and shop rules, safety, assignments, deadlines and appointments. Students are learning skills to prepare them for the work environment.

Following the guidelines in “Student Rights and Responsibilities” in the GPRC College calendar assist us all in maintaining an adult learning environment. 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](http://www.gprc.ab.ca/downloads/documents/StudentRightsandResponsibilities.pdf).

## **STATEMENT ON PLAGIARISM AND CHEATING:**

Refer to the Student Conduct section of the GPRC Calendar at <http://www.gprc.ab.ca/programs/calendar/> Pages 44 to 46 or the College Policy on Student Misconduct: Plagiarism and Cheating at <http://www.gprc.ab.ca/about/administration/policies/>. \*\*

\*\*Note: all Academic and Administrative policies are available on the same page.

## **COURSE SCHEDULE/TENTATIVE TIMELINE:**

- Transmissions and Torque Converters
- Undercarriage Systems
- Final Drives
- Track Equipment Steering
- Wheeled Equipment Steering
- Off-Road Suspension & Off-Road Attachments
- Power Steering