

**DEPARTMENT OF TRANSPORTATION TRADES
THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – WINTER 2023
JANUARY 3 – FEBRUARY 24, 2023
HES 511-VB43 POWER TRAIN II – 3.5 CREDITS (96 HOURS)**

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

INSTRUCTOR: Rob Young **PHONE:** 780.835.6786
OFFICE: FTI 225 **E-MAIL:** robyoung@nwpolytech.ca
OFFICE HOURS: 8.30 AM to 4:30 PM

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.

PREREQUISITE(S)/COREQUISITE: Successful completion of Blocks 1 through 3.
Please read all modules before they are presented in class

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 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

Lesson 1 – Final Drives

Lesson 2 – Chain Drives and Tires

Machine Hydraulic Systems

Unit 1: Pilot Operated Hydraulic Systems.

Lesson 2: 950H Pilot Operated Command Control Steering System.

Unit 2: Load Sensing, Pressure Compensated Hydraulic System

Lesson 3: 950H HMU Steering Hydraulic System.

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 B

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)
- 190303jA - Drive Axle and Carrier Fundamentals and Service (Off Road) – Part A
- 190303JB - Drive Axle and Carrier Fundamentals and Service (Off Road) – Part B
- 190303k – Clutch Fundamentals and Service (Off Road).

DELIVERY MODE(S): In person delivery.

Note: NWP reserves the right to change the course delivery.

COURSE OBJECTIVES:

LEARNING OUTCOMES:

TRANSFERABILITY: None.

EVALUATIONS:

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/DPC = _____ x 30%

Shop Total _____ x 25%

HES511 VA42 FINAL MARK = _____ %

Alpha Grade	4-point Equivalent	Percentage Guidelines		Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	90-100		C+	2.3	67-69
A	4.0	85-89		C	2.0	63-66
A-	3.7	80-84		C-	1.7	60-62
B+	3.3	77-79		D+	1.3	55-59
B	3.0	73-76		D	1.0	50-54
B-	2.7	70-72		F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

STUDENT RESPONSIBILITIES: This is an adult education environment. Enrolment at Northwestern Polytechnic 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 NWP College calendar assist us all in maintaining an adult learning environment. Please refer to the Student Rights and Responsibilities policy in the Northwestern Polytechnic Calendar or at www.nwpolytech.ca/downloads/documents/StudentRightsandResponsibilities.pdf.

STATEMENT ON PLAGIARISM AND CHEATING:

Cheating and plagiarism will not be tolerated and there will be penalties. For a more precise definition of plagiarism and its consequences, refer to the Student Conduct section of the Northwestern Polytechnic Calendar at <https://www.nwpolytech.ca/programs/calendar/> or the Student Rights and Responsibilities policy which can be found at <https://www.nwpolytech.ca/about/administration/policies/index.html>.

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

Additional Information (Optional):