

DEPARTMENT OF TRANSPORTATION TRADES THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – FALL 2022 OCTOBER 24 – DECEMBER 16, 2022 HES 511-VA42 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	Percentage	Alpha	4-point	Percentage
	Equivalent	Guidelines	Grade	Equivalent	Guidelines
A+	4.0	90-100	C+	2.3	67-69
А	4.0	85-89	С	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
В	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/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):