NORTHWESTERN POLYTECHNIC

DEPARTMENT OF TRANSPORTATION TRADES
THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – SPRING 2024
APRIL 29 – JUNE 21, 2024
HES321 VA33 ENGINE FUEL SYSTEMS – 3.0 (88 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:	Jeremy Parker	**PHONE:**	Office 780.978-6795 Cell 780-834-8553
OFFICE:	FPS 112	**E-MAIL:**	jparker@nwpolytech.ca

OFFICE HOURS: 8 AM to 4:30 PM

CALENDAR DESCRIPTION: With a focus on Caterpillar fuels systems, this course will examine diesel fuel and storage, combination processes, starting aids, the fuel injection system, system service, fuel nozzles and injectors, tune-up and engine performance analysis, and emergency shutdown systems. Electronic fuel and engine management systems will be emphasized.

PREREQUISITE(S)/COREQUISITE:
Successful completion of Blocks 1 and 2 and HES190, 290 & 390 work placements.
Please read all modules before they are presented in class.

REQUIRED TEXT/RESOURCE MATERIALS:

Caterpillar Material

Cat Engine Fundamentals

Unit 5: Mechanical Fuel Systems

Lesson 1: Mechanical Fuel System Components and Operation

Lesson 2: Remove and Inspect Mechanical Fuel System Components

Unit 1: Diesel Fuel

Lesson 1: Fuel Selection and Maintenance

Lesson 2: The Basics of Fuels

Unit 2: Fuel Lines and Nozzles

Lesson 1: Introduction to Nozzles and Fuel Lines

Lesson 2: Fuel Nozzle Testing

Unit 3: Governors and Fuel Systems

Lesson 1: Low Pressure Fuel Systems

Lesson 2: Governors

Lesson 3: New Scroll Fuel System

Lesson 4: 3406B/C Timing Advance Unit

Unit 4: 1.1 and 1.2 Mechanical Unit Injection Systems

Lesson 1: Introduction to 1.1 and 1.2 MUI Fuel Systems

Lesson 2: Injector Synchronization

Lesson 3: Fuel Settings

Lesson 4: Fuel Injector Timing

Unit 5: Electronic Fuel Systems

Lesson 1: Hydraulic Electronic Unit Injections (HEUI) Fuel Systems

Lesson 2: Mechanical Electronic Unit Injections (MEUI) Fuel Systems

Lesson 3: Common Rail Fuel Systems

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

190203a – Diesel Fuel and Storage Tanks (Machine & Bulk Storage)

190203b – Combustion Process and Starting Aids

190203c – Fuel System Service

190203d – Basic Mechanical Fuel Injection System

190203e – Advanced Mechanical Fuel Injection Systems

190203f – Basic Diesel Engine & Fuel System Testing & Adjusting

190203g – Emergency Shutdown Systems

190204a – Electronic Fuel System Fundamentals

190204b – Electronically Controlled Fuel Injection Systems

190204c – Electronic Fuel System Diagnosis

190204d – Emission Control/After Treatment Systems

DELIVERY MODE:
In person – Onsite. This course is delivered in person at the NWP Fairview campus.

- NWP reserves the right to change the course delivery.

LEARNING OUTCOMES:

TRANSFERABILITY: None

CREDIT/CONTACT HOURS: Credits: 3.0 / Contact Hours: 88

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%.**

Engine Fuel Systems ..... 88 / 240 hours = 36 %
of Semester 3 mark

Exams Average =	_____	**x 45%**
Class Assignments/Quizzes =	_____	**x 30%**
Shop Total	_____	**x 25%**

HES 321 VB31 FINAL MARK = _____ %

Grades for this course will be assigned as a percentage.

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:

Refer to the Student Conduct section of the NWP Calendar at http://www.nwpolytech.ca/programs/calendar/ Pages 44 to 46 or the College Policy on Student Misconduct: Plagiarism and Cheating at **

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