

DEPARTMENT OF TRANSPORTATION TRADES
THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – FALL 2023
AUGUST 28, 2023 - OCTOBER 20, 2023
HES321 VB31 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: Rob Young

PHONE: Office 780.835.6730

OFFICE: FPS 108

E-MAIL: robyoung@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.