

DEPARTMENT – INDUSTRY PARTNER TRAINING

THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – WINTER 2025 HES321 VB31 - ENGINE FUEL SYSTEMS - 3.0 CREDITS (88 HOURS) IN 8 WEEKS (5.5-0-5.5)

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: Peter Scheidegger

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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:

REQUIRED TEXT/RESOURCE MATERIALS:

Caterpillar Material

Cat Fuel Systems

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

EVALUATION:

Engine Fuel Systems 88 hours

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

HES 321 VB31 FINAL MARK = _____ %

GRADING CRITERIA:

Students must complete all required courses with no failing (F) grades. A passing grade in this course is a **minimum of 70%**. Grades for this course will be assigned as a percentage. Failure to achieve a minimum grade of 70% will result in removal from the Think BIG program.

STUDENT RESPONSIBILITIES:

This is an adult education environment. Enrolment at Northwestern Polytechnic assumes that the student will become a responsible citizen of NWP. 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. Non-academic misconduct, including the possession, use, or distribution of intoxicants, will be addressed through the Student Rights and Responsibilities policy.

Students are expected to attend all class and shop hours. Students who miss more than 21 hours or 3 days of classes may be removed from the course.

Absences will be monitored and recorded by the instructors.

- Upon reaching 7 hours missed time in a single semester the student will be required to meet with the instructor.
- Upon reaching 14 hours missed time in a single semester the student will be required to meet with the instructor and the program Chair.
- Upon reaching 21 hours missed time in a single semester the student will be required to meet with the instructor, program Chair, and the Dean to evaluate the students' ability successfully continue in the Think BIG program.

STATEMENT ON ACADEMIC MISCONDUCT:

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available at

<https://www.nwpolytech.ca/about/administration/policies/index.html>

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