

**DEPARTMENT OF TRANSPORTATION TRADES
THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – SPRING 2023**

APRIL 24, 2023 – JUNE 16, 2023

HES321 VA32 ENGINE FUEL SYSTEMS – 3.0 (88 HOURS)

INSTRUCTOR: Delbert Lubeck **PHONE:** 780.978.0419
OFFICE: FPS 112 **E-MAIL:** dlubeck@nwpolytech.ca
OFFICE HOURS: 8.00am to 4.30pm

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

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.

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

DELIVERY MODE(S): In Person Delivery

TRANSFERABILITY: None.

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/DPC = _____ x 30%

Shop Total _____ x 25%

HES321 VA32 FINAL MARK = _____ %

| NORTHWESTERN POLYTECHNIC | | | |
|---------------------------------|---------------------------|------------------------------|--|
| GRADING CONVERSION CHART | | | |
| Alpha Grade | 4-point Equivalent | Percentage Guidelines | Designation |
| A⁺ | 4.0 | 90 – 100 | EXCELLENT |
| A | 4.0 | 85 – 89 | |
| A⁻ | 3.7 | 80 – 84 | FIRST CLASS STANDING |
| B⁺ | 3.3 | 77 – 79 | |
| B | 3.0 | 73 – 76 | GOOD |
| B⁻ | 2.7 | 70 – 72 | |
| F | 0.0 | 67 – 69 | FAIL |
| F | 0.0 | 63 – 66 | |
| F | 0.0 | 60 – 62 | |
| F | 0.0 | 55 – 59 | |
| F | 0.0 | 50 – 54 | |
| F | 0.0 | 0 – 49 | |
| WF | 0.0 | 0 | FAIL, withdrawal after the deadline |

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 <http://www.nwpolytech.ca/about/administration/policies/>. **

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