

**DEPARTMENT OF TRANSPORTATION TRADES  
THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – SPRING 2023  
APRIL 24, 2023 – JUNE 16, 2023  
HES362 VA32– ENGINE DIAGNOSTICS/REPAIR –  
1.5 CREDITS (40 HOURS)**

**INSTRUCTOR:** Delbert Lubeck      **PHONE:** 780.835.6786  
**OFFICE:** FPS112      **E-MAIL:** dlubeck@nwpolytech.ca  
**OFFICE HOURS:** 8.00am to 4.30pm

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

**REQUIRED TEXT/RESOURCE MATERIALS:**

**Caterpillar Material**

***Engine Diagnostics and Repair:***

*Unit 1: Engine Diagnostics*

Lesson 1 – Caterpillar 7 – Step Diagnostic Process

*Unit 2: Engine Oil and Lubrication Systems.*

Lesson 1 – Introduction to Engine Oil

Lesson 2 – Engine Lubrication Systems

Lesson 3 – Lubrication System Testing and Troubleshooting

*Unit 3: Engine Air Induction Systems.*

Lesson 1 – Introduction to Air Induction Systems

Lesson 2 – Caterpillar Air Induction System Testing and Troubleshooting

*Unit 4: Engine Cooling Systems.*

Lesson 1 – Introduction to Cooling Systems

Lesson 2 – Cooling System Principles and Troubleshooting

Lesson 3 – Cooling System Maintenance

*Unit 5: Engine Fuel Systems.*

Lesson 1 – Low Pressure Fuel System Inspection and Testing

Lesson 2 – Mechanical Fuel Systems Troubleshooting

Lesson 3 – Mechanical Electronic Unit Injector (MEUI) Systems Troubleshooting  
Lesson 4 – Hydraulic Electronic Unit Injector (HEUI) Systems Troubleshooting  
Lesson 5 – Common Rail Fuel Systems Troubleshooting

**Machine Specific:**

As per available units.

**CALENDAR DESCRIPTION:** Primarily a lab-based course where the student's knowledge will be challenged and troubleshooting skills developed. Students will be required to successfully diagnose and repair engine faults in a real world setting.

**CREDIT/CONTACT HOURS:** Credits: 1.5 / Contact Hours: 40

**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%**.

**HES362 Engine Diagnostics / Repair ..... 40/240 hours = 17 %  
of Semester 3 mark**

**Exams Average = \_\_\_\_\_ x 30%**

**Class Assignments/Quizzes/DPC = \_\_\_\_\_ x 30%**

**Shop Total \_\_\_\_\_ x 40%**

**HES 362 VA32 FINAL MARK = \_\_\_\_\_ %**

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

### **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](http://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.

## **COURSE SCHEDULE/TENTATIVE TIMELINE:**

### **Machine Electronics**

- Machine Electronic Components
- Electronically Controlled Engines
- CAT ET
- Data View

### **Machine Diagnostics**

- Introduction to Diagnostics and Troubleshooting

### **Engine Diagnostics and Repair**

- Diagnosis and Troubleshooting
- Engine Oil and Lubrication Systems
- Engine Air Induction Systems
- Engine Cooling Systems
- Engine Fuel Systems

### **Machine Specific**

- 980K Wheel Loader - Electro Hydraulic Control System.
- Compact Construction Equipment.
- 320E Excavator.
- D5H Crawler
- D7E Crawler
- Articulated Dump Truck.
- Skid Steers
- M Series Motor Graders.
- Challenger Tractor
- IT Integrated Tool Carrier
- 426 Backhoe
- CP-54B Vibratory Compactor