

**DEPARTMENT – INDUSTRY PARTNER TRAINING**  
**THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – FALL 2024**  
**SEPTEMBER 3, 2024 - OCTOBER 25, 2024**  
**HES362 VB31– ENGINE DIAGNOSTICS/REPAIR –**  
**1.5 CREDITS (40 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.

|                      |                   |                |  |
|----------------------|-------------------|----------------|--|
| <b>INSTRUCTOR:</b>   | Peter Scheidegger | <b>PHONE:</b>  | Office: 780-835-6757<br>Cell: 780-897-9298 |
| <b>OFFICE:</b>       | FPS 110           | <b>E-MAIL:</b> | PScheidegger@nwpolytech.ca                 |
| <b>OFFICE HOURS:</b> | 8 AM to 4:30 PM   |                |  |

**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.

**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**

#### ***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.

## **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: 1.5 / Contact Hours: 40

**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 Diagnostics/Repair** ..... 40 / 240 hours = 17 %  
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.

**GRADING CHART:**

| Alpha Grade | 4-Point<br>Equivalence | Percentage<br>Conversion<br>(unless otherwise<br>specified in the Course<br>Outline) | Descriptor |
|-------------|------------------------|--|------------|
| P           | 2.7 - 4.0              | 70-100   | Pass       |
| F           | 0 - 2.6                | 0-69   | Fail       |

**IMPORTANT GRADING AND PROGRAM INFORMATION:**

- Course grades will be assigned as a percentage
- 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 %**
- Failure to achieve a minimum grade of 70% will result in removal from the Think BIG program.

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

### **Machine Electronics**

- Machine Electronic Components
- Electronically Controlled Engines
- CAT ET
- Data View
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### **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 - Electrohydraulic 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

## **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 \*\*

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