

DEPARTMENT OF INDUSTRY PARTNER TRAINING
THINKBIG SERVICE TECHNICIAN COURSE OUTLINE – WINTER 2026
HES262 VA22- ELECTRICAL CIRCUITS - 1.5 CREDITS (2.5-0-2.5)
40 HOURS FOR 8 WEEKS

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: Richard McGrail
OFFICE: FPS 112
OFFICE HOURS: 8 AM to 4:30 PM

PHONE: 780-835-6778
E-MAIL: rmcgrail@nwpolytech.ca

CALENDAR DESCRIPTION:

Truck and machine electrical and accessory circuits are examined in this course. The topic covered in this course will be hydraulic brake systems including drum and disc brakes, brake boosters, parking brakes as well as electric brakes. The servicing of these systems will also be covered.

PREREQUISITE(S):

COREQUISITE:

REQUIRED TEXT/RESOURCE MATERIALS:

Caterpillar Material

Machine Electronics:

Unit 1: Electronic Control System Components

- Lesson 1 – Input and Output Components
- Lesson 2 – Pull Up Voltage and Diagnostics
- Lesson 3 – Electronic Control Modules (ECMS)

Unit 2: Diagnostic Tools

- Lesson 1 – Diagnostic Codes and Events
- Lesson 2 – Cat ET
- Lesson 3 – Scopemeter
- Lesson 4 – Earlier Monitoring Systems
- Lesson 5 – VIMS
- Lesson 6 – Current Monitoring Systems

Unit 3: Data Link Overview

- Lesson 1 – Data Link Overview
- Lesson 2 – CAN Data Link
- Lesson 3 – Cat Data Link (CDL)

Unit 4: Next Generation Electronic Architecture (NGEA)

- Lesson 1 – NGAE Overview
- Lesson 2 – Ethernet Communications
- Lesson 3 – NGAE Hardware

Alberta Apprenticeship and Industry Training Individual Learning Modules Heavy Equipment Technician (HET)

- 190302dA – Off-Road Electrical Circuit Fundamentals – Part A
- 190302dB - Off-Road Electrical Circuit Fundamentals – Part B
- 190302e – Off-Road Electrical Circuit Service
- 190404aA – Truck Electrical Circuit Fundamentals – Part A
- 190404aB – Truck Electrical Circuit Fundamentals – Part B
- 190404b – Truck Electrical Circuit Service

DELIVERY MODE(S):

In person – Onsite. This course is delivered in person at the NWP Fairview campus.

Note: NWP reserves the right to change the course delivery.

LEARNING OUTCOMES:

TRANSFERABILITY: None.

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 withdrawal from the Think BIG program.

EVALUATIONS:

Electrical Circuits

40 hours

Exams Average = _____ $\times 45\%$

Class Assignments / Quizzes = _____ $\times 30\%$

Shop Total _____ $\times 25\%$

FINAL MARK = _____ %

COURSE SCHEDULE/TENTATIVE TIMELINE:

Will be posted in the classroom.

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 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.

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 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.