



**COURSE DESCRIPTION:**

- I. In this course, you will be introduced to the basics of electricity and how it can be applied to Heavy Equipment, Truck Coach and Automotive industry. You will be able to identify, inspect and test basic electrical circuits as well as inspect, test, service and replace batteries. You will learn to use digital multi-meters to perform basic electrical measurements and perform basic electrical repairs such as soldering, heat shrink installation and terminal installation.

Students will be required to follow proper safety procedures when performing the above tasks according to both Sault College Motive Power Department Standards and Vehicle Manufacturers safety regulations and specifications.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. ***Define the purpose, fundamentals and principles of electricity.***

Potential Elements of the Performance:

Describe:

- Atomic structure
- Conductors and insulators
- Magnetism
- Electron and conventional theories
- Sources of electricity
- Ohm's Law, Kirchhoff's Law, Watts Law
- Current flow, heat and resistance
- Systems International (S.I.) System
- Voltage
- Amperage
- resistance
- Wattage
- Series, Parallel and series parallel circuit characteristics

2. ***Perform basic electrical repairs.***

Potential Elements of the Performance:

- Cleaning
- Splicing
- Crimping
- Soldering
- Corrosion protection
- Weather proofing
- Terminal repair

**3. *Identify, inspect, and test basic electrical components and systems in compliance with manufacturers' recommendations.***

Potential Elements of the Performance:

- Identify circuit components and test circuit protection devices
- Demonstrate the ability to measure voltage, current and resistance using a DVOM (digital volt ohm meter)
- Perform maintenance on a DVOM including testing and replacing internal circuit protection and batteries

**4. *Describe the construction, operation, types, styles and application of electromagnetic devices.***

Potential Elements of the Performance:

Describe the fundamentals of:

- power generation
  - alternators
  - generators
- electric motors
- solenoids
- relays
- coils
- stepper motors
- switches

**5. *Perform inspection and testing procedures on batteries following manufacturers' recommendations.***

Potential Elements of the Performance:

- Identify and use appropriate personal protection when servicing batteries.
- Perform visual inspection on batteries
- Perform cleaning of battery terminals and battery case
- Perform state of charge, high rate discharge and conductance testing
- Describe the construction, operation, types, styles and application of batteries
- Charge batteries

**III. TOPICS:**

1. Basic Electricity
2. Diagnostic test equipment
3. Electromagnetic devices and circuit components
4. Battery Fundamentals
5. Circuit repair and protection

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

**Title:** Heavy Duty Truck Systems

**Edition:** 5th ed.,

**Author:** Bennett

**Publisher:** Thomson Nelson Learning Canada

**Title:** Automotive Technology: A Systems Approach

**Edition:** 2<sup>nd</sup> Canadian Ed.

**Author:** Erjavec

**Publisher:** Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory in the Shop:

- CSA approved steel toe boots (high top)
- CSA approved safety glasses
- Approved coveralls

**V. EVALUATION PROCESS/GRADING SYSTEM:**

The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated:

- Classroom – 45% of the final grade is comprised of term tests
- Assignments – 10% of the final grade is comprised of a number of technical reports
- Shop – 35% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude
- Employability Skills – 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player.

**(Student will be given notice of test and assignment dates in advance)**

The following semester grades will be assigned to students:

| <b>Grade</b> | <b><u>Definition</u></b> | <i>Grade Point Equivalent</i> |
|--------------|--------------------------|-------------------------------|
| A+           | 90 – 100%                | 4.00                          |
| A            | 80 – 89%                 | 3.00                          |
| B            | 70 - 79%                 | 2.00                          |
| C            | 60 - 69%                 | 1.00                          |
| D            | 50 – 59%                 | 0.00                          |
| F (Fail)     | 49% and below            |                               |

|             |  |
|-------------|--|
| CR (Credit) | Credit for diploma requirements has been awarded.  |
| S           | Satisfactory achievement in field /clinical placement or non-graded subject area.  |
| U           | Unsatisfactory achievement in field/clinical placement or non-graded subject area.   |
| X           | A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course. |
| NR          | Grade not reported to Registrar's office.  |
| W           | Student has withdrawn from the course without academic penalty.  |

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

**VI. SPECIAL NOTES:****Attendance:**

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

*It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.*

**Cell phones are not allowed  
to be on in the classrooms or shop areas.**

**VII. COURSE OUTLINE ADDENDUM:**

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.