



**I. COURSE DESCRIPTION:**

This course is designed to teach the students the fundamentals of automotive electrical systems on all types of on-road and off-road and stationary equipment used in the Commercial Vehicle and Equipment market. In this course students will be taught the laws of electricity pertaining to alternating current (AC) and direct current (DC). The students will be taught how to use the different types of test equipment and how to properly test electrical circuits and components. Students will learn how to calculate the electrical requirements to build and repair electrical circuits and circuit protection for vehicles and equipment. The course will also cover the construction, theory of operation and testing of the major electrical and electronic components such as batteries relays, solenoids, switching devices and cables necessary for the operational design of such equipment.

**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 characteristics of both Ac and DC electricity, and electrical circuits used on Heavy Equipment, Truck and Coach Systems and Farm Equipment Systems with.
2. Perform the required calculations for electricity based on Ohms Law, Kirchoff's Laws for voltage and amperage and Watt's Law for power as applied to series, parallel and series-parallel circuits.
3. Demonstrate the proper usage of the testing equipment required to analyze and test electrical and electronic systems and circuits and components.
4. Diagnose electrical/ electronic wiring system problems and perform wire connector terminal repair procedures according to manufacturer standards.
5. Interpret Manufacturer electrical schematics essential to the proper repair of electrical circuits.
6. Perform open circuit and voltage drop tests on Heavy equipment and heavy truck batteries and battery cables

7. Perform a DC battery load test on batteries using conventional battery load testers and electronic impedance load testers according to Manufacturers' safe working and handling procedures and specifications.

### III. TOPICS:

1. Introduction to Electricity
2. Electrical Laws
3. Electrical Test Equipment
4. Electrical Circuits and Calculations
5. Electrical Circuit and Protection Devices
6. Electrical Circuit Repair
7. Electromagnetic Devices
8. Battery Fundamentals, and service and safe handling procedures

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

Hand outs provided by instructor as well as text books requested by department as per booklist.

Text Book: Heavy Duty Truck Systems

Edition: 4<sup>th</sup> ed., 12959#

Author: Bennett

Publisher: Thomson Nelson Learning Canada

Pens, Pencils, Calculator and 3 Ring Binder

### V. EVALUATION PROCESS/GRADING SYSTEM:

***Students will be tested on the material covered per apprenticeship curriculum by multiple choice questions, assignments, and practical tests. The weigh factor for each area of testing will be as follows:***

|                 |      |
|-----------------|------|
| Theory Tests    | 50 % |
| Practical Tests | 30 % |
| Assignments     | 20 % |

This evaluation can change depending on the emphasis placed on each of the above testing procedures.

The following semester grades will be assigned to students:

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

**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.

Late Arrivals for Class

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will only be granted admission to the room at the Instructors discretion.

Failure to show up for a Test either theory or practical will result in an "F" grade unless prior arrangements have been made with the Instructor.

Re-writes of theory tests are only allowed at the Instructors discretion and any Student that re-writes a test will be given a maximum of 60%.

**VII. COURSE OUTLINE ADDENDUM:**

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

**VIII. USE OF CELL PHONES IN CLASSROOM:**

**Cell phones will not be allowed to be turned on in the classroom during regular teaching periods and students breaking this rule will be asked to leave the classroom.**