

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: Basic Electricity

CODE NO. : MPF100

SEMESTER: ONE

PROGRAM: Motive Power Programs

AUTHOR: Dan Tregonning

DATE: September 2013

**PREVIOUS OUTLINE
DATED:**

September
2012

APPROVED:

CHAIR

DATE

TOTAL CREDITS: FOUR

PREREQUISITE(S): NIL

HOURS/WEEK: SEVEN

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For additional information, please contact Corey Meunier, Chair
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I. COURSE DESCRIPTION:

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.

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: 2nd Canadian Ed.

Author: Erjavec

Publisher: Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory in the Shop:

- shop coat or coveralls
- CSA approved steel toe boots (high top)
- CSA approved safety glasses

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 – 50% of the final grade is comprised of term tests
- Assignments – 10% of the final grade is comprised of a number of technical reports
- Shop – 40% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude

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

The following semester grades will be assigned to students:

| Grade | <u>Definition</u> | <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. |

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 on the portal form part of this course outline.