

# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



## COURSE OUTLINE

**COURSE TITLE:** Electrical / Electronics 2

**CODE NO. :** MPT233 **SEMESTER:** FOUR

**PROGRAM:** Motive Power Technician – Advanced Repair

**AUTHOR:** Jamie Schmidt

**DATE:** Dec 2016 **PREVIOUS OUTLINE DATED:** Dec 2015

**APPROVED:** *"Corey Meunier"* Jan '17  
CHAIR

**TOTAL CREDITS:** FOUR

**PREREQUISITE(S):** MPF103 & MPT201

**HOURS/WEEK:**

**Copyright ©2017 The Sault College of Applied Arts & Technology**  
*Reproduction of this document by any means, in whole or in part, without prior written permission of Sault College of Applied Arts & Technology is prohibited.*  
**For additional information, please contact Corey Meunier, Chair**  
**School of Technology & Skilled Trades**  
**(705) 759-2554, Ext. 2610**

**I. COURSE DESCRIPTION:**

In this course you will diagnose and repair vehicle lighting and accessory systems following manufactures procedures. You will also perform diagnostic and repair procedures on distributor less ignition systems. Restraint systems will be studied with an emphasis on safe working practices. An introduction into multiplexing systems used in buses, trucks, heavy equipment and automobiles will be provided.

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. *Explain the principles of operation of vehicle on board computers.***

Potential Elements of the Performance:

Describe and explain:

- onboard computers
- multiplexing
- fibre optics
- data bus communication lines
- CAN bus
- central processing unit (CPU)
- random access memory (RAM)
- read only memory (ROM)

**2. *Perform data retrieval with appropriate test equipment.***

Potential Elements of the Performance:

- Utilize laptops and industry standard scan tool equipment
- Operate oscilloscopes to measure voltage and current
- Record, review and analyze vehicle data

**3. *Perform analysis and diagnostic procedures using electronic service tools***

Potential Elements of the Performance:

- Extract wave form trace of fuel pump current using an oscilloscope
- Interpret an oscilloscope voltage pattern from a hall effect and magnetic pulse generator
- Observe CAN bus communication using an oscilloscope
- Ping modules
- Perform voltage drop testing and interpret results
- Verify vehicle network integrity using a DVOM
- Demonstrate proficiency with a DVOM
- Utilize electronic service tools and manufactures service literature to diagnose accessory and lighting systems

**4. *Inspect, test and explain safe handling procedures for restraint system components.***

Potential Elements of the Performance:

- safely disable restraint systems
- perform system tests using scan tools, DVOM and specific test equipment

**5. *Identify, locate and test ignition system circuits and components.***

Potential Elements of the Performance:

Identify and test:

- Coils
- Modules
- Sensors
- Wiring
- KV meter test
- Scope testing

**III. TOPICS:**

1. Computer Fundamentals
2. Diagnostic test equipment
3. Electrical diagnostics
4. Restraint systems
5. Ignition Systems

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

**Title:** Heavy Duty Truck Systems

**Edition:** 4th ed., 12959#

**Author:** Bennett

**Publisher:** Thomson Nelson Learning Canada

**Title:** Automotive Technology: A Systems Approach/AST Test Prep

**Edition:** 06 ed., 17810#

**Author:** Erjavec

**Publisher:** Thomson Nelson Learning Canada

Pens, pencils, calculator, 3-ring binder

The following items are mandatory for entry to the shop:

- Approved 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 – 35% of the final grade is comprised of term tests
- Assignments – 10% of the final grade is comprised of a number of technical reports
- Shop – 45% 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)

**NOTE: All assignments will be in typed format. NO hand written assignments will be accepted.**

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.	

## 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.**

Eye, Face and Foot Personal Protection Equipment (P.P.E):

Students are required to wear appropriate Personal Protection Equipment (P.P.E) in designated areas at all times. The designated areas for eye and foot protection in the Motive Power areas are: C1073 (Automotive), C1000, C1010, and C1040 (Truck/Coach and Heavy Equipment) and C1120 (Marine and Small Engines). Appropriate P.P.E must also be worn when facing hazards outside of these designated areas.

Minimum Eye Protection:

All protective eye wear shall meet the requirements of:

C.S.A. - Z94.3 or A.N.S.I. - Z87.1 +.

Approved safety glasses (lens and frames) shall have side protection such as wrap around design or fixed side shields.

Minimum Foot Protection:

1. Boot height- minimum 5 ½" uppers, measured from the top of the sole.
2. CSA Green Patch rating.

**VII. COURSE OUTLINE ADDENDUM:**

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