

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: ELECTRICAL/ELECTRONIC AND EMISSION SYSTEMS

CODE NO. : AST608 **LEVEL:** ONE

PROGRAM: AUTOMOTIVE SERVICE TECHNICIAN APPRENTICESHIP (6067)

AUTHOR: JAMIE SCHMIDT

DATE: SEPT 2010 **PREVIOUS OUTLINE DATED:** MAY 2010

APPROVED:

“Corey Meunier”

CHAIR

DATE

TOTAL CREDITS: TWELVE

PREREQUISITE(S):

HOURS/WEEK:

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I. COURSE DESCRIPTION:

Students completing this course will gain a working knowledge of the purpose, principles of operation and applications of electrical and electronic concepts. Students will be introduced to electrical diagnostic equipment and procedures.

Intake and exhaust systems will be covered as well as an introduction to gasoline and diesel fuel systems. Vehicle emissions and emission control systems will be studied.

The curriculum for AST Level I apprenticeship training and has been approved by the Ministry of Training, Colleges and Universities.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. *Demonstrate a working knowledge of the purpose, principles of operation and applications of electrical concepts.*

Demonstrate a working knowledge of the purpose, construction and principles of operation of electromagnetic devices.

Demonstrate a working knowledge of the purpose, construction and applications of electronic devices.

Potential Elements of the Performance:

- Define the purpose, fundamentals and principles of electricity.
- Describe the application of electrical concepts.
- Define the purpose and fundamentals of electromagnetic devices.
- Describe the construction, types, styles and application of electromagnetic devices.
- Explain the principles of operation of electromagnetic devices.

2. *Demonstrate a working knowledge of the purpose, construction, principles of operation, performing inspection and testing of diagnostic test equipment.*

Potential Elements of the Performance:

- Define the purpose and fundamentals of diagnostic test equipment
- Describe the construction, types and application of diagnostic test equipment.
- Explain the principles of operation of diagnostic test equipment.
- Perform inspection and testing procedures using diagnostic test equipment following manufacturers' recommendations.

- Define the purpose and fundamentals of electronics.
- Describe the function, construction and application of electronic devices.

3. *Demonstrate a working knowledge of the purpose, construction, principles of operation, inspection and testing for batteries.*

Potential Elements of the Performance:

- Define the purpose and fundamentals of batteries.
- Describe the construction, types, styles and application of batteries.
- Explain the principles of operation of batteries.
- Perform inspection and testing procedures on batteries following manufacturers' recommendations.
- Perform assigned operations on batteries following manufacturers' recommendations.

4. *Demonstrate a working knowledge of performing circuit calculations to verify Ohm's, Watts and Kirchhoff's Laws.*

Potential Elements of the Performance:

- Define the purpose and fundamentals of electrical circuits.
- Describe the function, construction and application of electrical circuits.
- Perform circuit calculations to verify Ohm's, Watts and Kirchhoff's Laws.
- Perform assigned operations with meters for voltage, amperage and resistance tests.

5. *Demonstrate a working knowledge of the application of wiring schematics, locating electrical components and tracing electrical circuits.*

Demonstrate a working knowledge of the purpose, construction, principles of operation of circuit protection devices and their inspection and testing.

Potential Elements of the Performance:

- Define the purpose and fundamentals of electrical wiring schematics.
- Describe the function, construction, styles and application of manufacturers' wiring diagrams.
- Locate electrical components and trace electrical circuits of vehicle systems with the prescribed manufacturers' wiring diagrams.
- Describe the construction, types and application of circuit

repair and protection devices.

- Explain the principles of operation of circuit protection devices.
- Perform inspection and testing procedures on circuit repair and protection devices with the prescribed service tools and equipment following manufacturers' recommendations.

6. Demonstrate a working knowledge of the purpose, function and properties of fuels and the combustion of fuels.

Demonstrate a working knowledge of the purpose, construction, principles of operation, inspection and testing for intake and exhaust systems.

Demonstrate a working knowledge of the purpose, construction, applications of emission control systems. Locate and identify emission control components.

Potential Elements of the Performance:

- Define the purpose and fundamentals of fuels.
- Describe the function, composition and properties of fuels.
- Explain the combustion principles of fuels.

III. TOPICS:

1. Electrical fundamentals, electromagnetic device fundamentals, electrical / electronic diagnostic test equipment, electrical circuit calculation
2. Battery fundamentals, and testing
3. Applied electrical schematics
4. Circuit repair and protection devices
5. Fuel system fundamentals, intake and exhaust systems, emission control systems
6. Diesel fuel systems

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Automotive Technology a Systems Approach

V. EVALUATION PROCESS/GRADING SYSTEM:

Theory Testing	60%
Practical Application Exercises	30%
Notebook and Organizational Skills	10%

The following semester grades will be assigned to students:

Grade	Definition	<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. COURSE OUTLINE ADDENDUM:

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

VII. 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.

Eye, Face and Foot Personal Protection Equipment (PPE)

Students are required to wear appropriate Personal Protection Equipment (PPE) 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 PPE must also be worn when facing hazards outside of these designated areas.

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.

The minimum acceptable eye protection is a spectacle (class 1A on chart Z94.3). Dark tinted spectacles will not be accepted for general indoor use. Additional eye and face protection is required for specific hazards. Chart Z94.3 outlines the appropriate PPE for specific hazards.

Foot Protection:

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

Safety boots must be properly laced and not be worn or damaged as to impair their effectiveness.

