

# **SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

## **COURSE OUTLINE**

**COURSE TITLE:** BASIC AUTOMOTIVE SKILLS

**CODE NO. :** ASM101 **SEMESTER:** 1

**PROGRAM:** AUTOMOTIVE TECHNICIAN – SERVICE & MANAGEMENT

**AUTHOR:** DAN TREGONNING

**DATE:** AUGUST 2003 **PREVIOUS OUTLINE DATED:** AUGUST 2002

**APPROVED:**

		_____ DEAN	_____ DATE
<b>TOTAL CREDITS:</b>	16		
<b>PREREQUISITE(S):</b>	N/A		
<b>HOURS/WEEK:</b>	12		

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School of Technology, Skilled Trades & Natural Resources  
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- I. COURSE DESCRIPTION:** In this course, the student will be introduced to the motive power industry. It will focus at the introductory level on the history of the transportation industry, including relevant legislation. General concepts of principles of operation in motive power will be introduced focusing on automotive components and the use of basic automotive service skills. An introduction to relevant scientific concepts will be explored, such as Newton's First Law and Bernoulli's Principle. This course will also focus on principles and practices important to a successful business in today's market, including safety and environmental practices.

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

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

1. Understand an introduction to the history of the automotive industry, including career opportunities and successful business practices.  
Potential Elements of the Performance:
  - Identify the significant historical events of the automotive industry
  - Interpret the motive power career opportunities chart
  - Identify successful motive power business practices
2. Gain the knowledge to identify automotive body and frame types  
Potential Elements of the Performance:
  - List and describe the different body and frames used in the automotive industry
3. Use the correct safety and environmental practices associated in an automotive shop  
Potential Elements of the Performance:
  - List the safety equipment required to operate an automotive shop
  - Describe the potential dangers associated with the automotive repair industry
  - Outline the proper procedures to defuse potentially hazardous situations in the work place
  - Exhibit knowledge and understanding of the WHMIS Safety Act
  - Demonstrate the proper method of raising and lowering vehicles using hoists, jacks and safety stands
  - Demonstrate proper use of cleaning equipment
  - Explain the laws and proper handling of air conditioning refrigerants
  - Describe vehicle emission laws

4. Demonstrate and explain the basic automotive skills required to safely and properly use common and specialty tools, precision measuring equipment and fastening devices used in the automotive industry.

Potential Elements of the Performance:

- Describe which tool is appropriate for the task being performed
- Show competency in safely handling the tools necessary for specific applications
- Explain why precision measuring tools are required in the automotive workplace
- Demonstrate proficiency in accurately taking measurements and reading the measuring tools
- Describe the proper terminology of fastener nomenclature
- Select the proper type, size and grade of fastener for the job being performed
- Remove broken fasteners from components
- Explain the proper steps required to restore threads in a stripped threaded hole

5. Identify automotive components used in electrical, fuel, engine, gear train, suspension, steering, emission and braking systems.

Potential Elements of the Performance:

- Tag and label major internal combustion engine stationary and moving components
- Identify engine sub-system components; oil pump, water pump and valve train
- List and describe electrical cranking, ignition, charging and lighting system components
- Describe fuel system components such as fuel pumps, tanks, lines, filters, carburetors, fuel injectors, diesel distributor pumps and nozzles
- List and describe emission control devices
- Outline clutches, transmissions, transaxles and differentials
- Name and describe suspension and steering assemblies
- List and identify the major braking system components; pedal, booster, master cylinder, calipers, wheel cylinders, combination valve, rotors and drums

6. Explain the basic operating principles of electricity, gasoline and diesel fuel, emission control, compression and spark ignition engines – two & four stroke, gear trains, suspensions, steering systems and brakes.

Potential Elements of the Performance:

- Describe Ohm's Law
- Outline atomic structure and the flow of electrons
- List and explain the sources of electricity
- Compare and contrast gasoline and diesel fuel
- List how emission control devices reduce or eliminate emissions
- State the 2 and 4 stroke theories
- Differentiate between spark and compression ignition engines
- Explain the need and use of clutches, transmission and differentials
- Summarize the necessity of suspension and steering systems
- Describe how the brake system stops the vehicle step by step, from pedal application to the stopping of the vehicle

7. Understand scientific concepts related to the automotive industry

Potential Elements of the Performance:

Define: Pascal's Law, Boyles, Law, Charles Law, Heat Transfer, Expansion, Convection, Conduction, Radiation, Contraction, Ohm's Law, Kichoff's Law, Magnetism, Induction, Bernoulli's Theory and the Laws of Levers

8. Access proper service information and techniques to perform minor maintenance of under hood components

Potential Elements of the Performance:

- Use manuals to extract pertinent information
- Operate the computer to receive repair procedure out of the "All Data System:
- Perform engine oil and filter inspection and replacement  
Inspect air filter, belts, hoses and fluids

**III. TOPICS:**

1. Introduction to the history of the automotive industry, including career opportunities and successful business practices.
2. Body and frame identification
3. Automotive shop safety and environmental procedures
4. Basic automotive skills to safely and properly use automotive related tools, precision measuring equipment and fastening devices
5. Automotive components: electrical, fuel, engine, emissions, gear train, suspension, steering and brakes
6. Basic principles of operation; electricity, fuels, engines, emission, gear trains, suspensions, steering systems and brakes
7. Scientific concepts related to the automotive industry
8. Service information and techniques to perform minor maintenance of under hood components

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

Modern Automotive Technology

Pens, pencils, calculator, 3-ring binder

\*shop coat or coveralls

\*CSA approved steel toe boots (high top)

\*CSA approved safety glasses

\* these items mandatory for shop

**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 – 60% of the final grade is comprised of term tests (40%) and a final examination (20%)**

**Assignments – 10% of the final grade is comprised of a number of technical reports**

**Shop – 30% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude  
(Students will be given notice of test and assignment dates in advance)**

The following semester grades will be assigned to students in postsecondary courses:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
F (Fail)	59% 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:

### Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1204 or call Extension 493 so that support services can be arranged for you.

### Retention of course outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course outline amendments:

The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.