

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** WORKSHOP PRACTICES II  
**CODE NO. :** ASM200 **SEMESTER:** 3  
**PROGRAM:** AUTOMOTIVE TECHNICIAN – SERVICE & MANAGEMENT  
**AUTHOR:** STEPHEN KENT  
**DATE:** AUGUST 2001 **PREVIOUS OUTLINE DATED:** JUNE 99

**APPROVED:**

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**DEAN**

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**DATE**

**TOTAL CREDITS:** 2.0  
**PREREQUISITE(S):** ASM112  
**LENGTH OF COURSE:** 16 WEEKS **TOTAL CREDIT HOURS:** 32

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For additional information, please contact Kitty DeRosario, Dean,  
School of Technology, Engineering & Technical Trades  
(705) 759-2554, Ext.642*

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COURSE NUMBER

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COURSE NAME**I. COURSE DESCRIPTION:**

This course deals with the study and interrelationship of mobile air conditioning design and control systems. It will also outline the use of receiver dryers, accumulator dryers and types of compressors. The Student will observe the proper testing of system operating pressures as well as perform an A/C performance test. They will also be introduced to Gas Metal Arc Welding equipment including machine set up and producing welds on lap and tee joints.

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

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

1. Explain the construction and operation of automotive air conditioning systems.  
Potential Elements of the Performance:
  - Draw & label a simple A/C system.
  - Describe 3 methods of heat transfer.
  - Compare & contrast R12 with R134A refrigerant.
  - Outline refrigerant oils used in R12 and R134A systems.
  - Explain the temperature and humidity relationship.
  - Interpret the difference between a fixed orifice and a expansion valve system.
  - Describe the construction and operation of A/C compressors; axial, radial & variable displacement.
  - Explain the purpose and function of the following components; evaporator, condenser, receiver dryer, accumulator dryer, hoses, lines and fittings.
  - Outline refrigerant waste laws.
  
2. Explain the purpose & construction of A/C system control valves.  
Potential Elements of the Performance:
  - Describe low and high pressure cut out valves.
  - Explain low temperature lock out necessity.
  - Outline low charge protection valves.
  - List & describe two types of evaporator temperature control valves, expansion valve and fixed orifice.
  - Discuss the interrelationship between cycling clutch control and low & high pressure cutouts.

**LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE**

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COURSE NUMBER

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COURSE NAME**CONTINUED.....**

3. Inspect and test air conditioning systems with the prescribed service tools and equipment.  
Potential Elements of the Performance:
  - Outline major differences in testing R12 and R134A systems.
  - Perform 4 methods of A/C leak detection, dye, high pressure nitrogen. Electronic and propane.
  - Recover and recharge an A/C system
  - Perform an A/C system performance test
  - Identify the location and type of service valves used.
  
4. Outline the fundamentals of gas metal arc welding process.  
Potential Elements of the Performance:
  - Describe electrical polarity.
  - Explain the sources of power.
  - Exhibit knowledge and understanding of the gas shielding process.
  - Describe the construction and operation of wire feeders.
  - Explain wire types including, wire size and wire specifications.
  
5. Prepare a gas metal arc welding machine to produce welds on various thickness of metal.  
Potential Elements of the Performance:
  - Clean metal in preparation for effective welds.
  - Outline equipment settings and trial bead results.
  - Explain gun angle and travel speeds.
  - Describe wire drive speed and gas flow rate.
  
6. Produce gas metal arc welds and diagnose defects.  
Potential Elements of the Performance:
  - Produce weld deposits on lap and tee joints.
  - Perform adjustments to voltage, wire speed, gas flow and electrode stick-out.
  - Describe and diagnose defective welds.

**III. TOPICS:**

1. Construction and operation of automotive air conditioning.
2. Purpose and construction of automotive air conditioning control valves.
3. Inspection and testing of air conditioning systems.
4. Fundamentals of gas metal arc welding.
5. Preparation of gas metal arc welding machines.
6. Production of gas metal arc welds and diagnosis of defects.

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

Modern Automotive Technology – Text & Workbook

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**

**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 (Student 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                          |
| R (Repeat)   | 59% or below  | 0.00                          |
| CR (Credit)  | Credit for diploma requirements has been awarded.   |                               |
| S            | Satisfactory achievement in field placement or non-graded subject areas.  |                               |
| X            | A temporary grade. This is used in limited situations with extenuating circumstances giving a student additional time to complete the requirements for a course (see <i>Policies &amp; Procedures Manual - Deferred Grades and Make-up</i> ). |                               |
| NR           | Grade not reported to Registrar's office. This is used to facilitate transcript preparation when, for extenuating circumstances, it has been impossible for the faculty member to report grades.  |                               |

## 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, 717, or 491 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.

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.

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COURSE NAME

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the instructor. Credit for prior learning will be given upon successful completion of the following:

**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.