

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



Sault College

**COURSE OUTLINE**

**COURSE TITLE:** Work Practices/ Air Conditioning

**CODE NO. :** AST701 **LEVEL:** 2

**PROGRAM:** AUTOMOTIVE SERVICE TECHNICIAN  
APPRENTICESHIP (6068)

**AUTHOR:** Dan Tregonning

**DATE:** June 08 **PREVIOUS OUTLINE DATED:**

**APPROVED:**

**“Corey Meunier”  
CHAIR**

**DATE**

**TOTAL CREDITS:**

**PREREQUISITE(S):**

**HOURS/WEEK:**

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*For additional information, please contact Corey Meunier, Chair  
School of Technology & Skilled Trades  
(705) 759-2554, Ext. 2610*

**I. COURSE DESCRIPTION:**

This course deals with the study and inter-relationship of mobile air conditioning design and control systems. It will also outline the use of receiver dryers, accumulator dryers and types of compressors. Students will observe the proper testing of system operating pressures as well as perform an A/C performance test. Students will also describe the pertinent information relating to Workplace Hazardous Materials Information Safety, Occupational Health and Safety Act, Repair and Storage Lien Act and Workplace Safety Insurance Board.

**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.

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. Describe Workplace Hazardous Information Safety

Potential Elements of the Performance:

- Right to know
- Legislation and safe handling of products
- Hazardous Materials and Material Safety Data Sheets

5. Describe the Occupational Health and Safety Act

Potential Elements of the Performance:

- Legislation
- Obligation of the employer

6. Describe the Repair and Storage Lien Act

Potential Elements of the Performance:

- Payments for repairs and storage
- Liens and disputes over liens

7. Describe the Workplace Safety Insurance Board

Potential Elements of the Performance

- Reporting accidents to company
- Reporting accidents to WSIB
- Requiring records and training requirements
- Accident prevention and safety precautions
- Personal protection equipment as well as housekeeping

### III. TOPICS:

1. Construction and operation of Air Conditioning
2. Air Conditioning Valves
3. Testing Air Conditioning Systems
4. Workplace Hazardous Information Safety
5. Occupational Health and Safety
6. Repair and Storage Lien Act
7. Workplace Safety Insurance Board

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

Automotive Technology – Text & Workbook

Pens, pencils, calculator, 3-ring binder

Items mandatory for 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 – 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:

<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:

### 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 professor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 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.

### Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

### Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. 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:**

Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. ADVANCE CREDIT TRANSFER:**

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.