

I. COURSE DESCRIPTION:**ASM200-2 Workshop Practices II**

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 complete assignments using computer based automotive systems – i.e. Shop Key and All Data computerized systems to retrieve repair data and perform shop management duties such as work orders and client database.

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. Produce Labor Estimates.
Potential Elements of the Performance:
 - Explain where to find the labor time guide within the system.
 - Describe the difference between warranty & retail.
 - Produce labor estimates for assigned warranty and retail jobs.
5. Provide repair related specifications.
Potential Elements of the Performance:
 - Access and print off wheel tightening torques, engine tightening, fluid capacity and engine general specifications.
6. Provide Repair Data.
Potential Elements of the Performance:
 - Access electrical wiring diagrams.
 - Access diagnostic trouble codes.
 - Produce repair related disassembly and reassembly information for assigned operations.

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. Produce Labor Estimates.
5. Provide Repair Related Specifications.
6. Provide Repair Data.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

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:

Grade	Definition	Grade Point Equivalent
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 703 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.

<include any other special notes appropriate to your course>

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.