



# COURSE OUTLINE

## AST711



Prepared: Stephen Kent    Approved: Corey Meunier

<b>Course Code: Title</b>	AST711: AIR CONDITIONING SYSTEMS
<b>Program Number: Name</b>	6068: AUTO SERV TN LEVEL 2
<b>Department:</b>	MOTIVE POWER APPRENTICESHIP
<b>Semester/Term:</b>	18S
<b>Course Description:</b>	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.
<b>Total Credits:</b>	4
<b>Hours/Week:</b>	0
<b>Total Hours:</b>	30
<b>Essential Employability Skills (EES):</b>	<ul style="list-style-type: none"><li>#1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.</li><li>#2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.</li><li>#3. Execute mathematical operations accurately.</li><li>#4. Apply a systematic approach to solve problems.</li><li>#5. Use a variety of thinking skills to anticipate and solve problems.</li><li>#6. Locate, select, organize, and document information using appropriate technology and information systems.</li><li>#7. Analyze, evaluate, and apply relevant information from a variety of sources.</li><li>#8. Show respect for the diverse opinions, values, belief systems, and contributions of others.</li><li>#9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</li><li>#10. Manage the use of time and other resources to complete projects.</li><li>#11. Take responsibility for ones own actions, decisions, and consequences.</li></ul>
<b>Course Evaluation:</b>	Passing Grade: 50%, D
<b>Other Course Evaluation &amp;</b>	V. EVALUATION PROCESS/GRADING SYSTEM:

<b>Assessment Requirements:</b>	<p>The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated:  Classroom 70% of the final grade is comprised of term tests  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)</p> <p>The following semester grades will be assigned to students:</p> <p>Grade  Definition Grade Point Equivalent  A+ 90 - 100% 4.00  A 80 - 89%  B 70 - 79% 3.00  C 60 - 69% 2.00  D 50 - 59% 1.00  F (Fail) 49% 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.</p>						
<b>Evaluation Process and Grading System:</b>	<table border="1"> <thead> <tr> <th>Evaluation Type</th><th>Evaluation Weight</th></tr> </thead> <tbody> <tr> <td>shop</td><td>30%</td></tr> <tr> <td>Theory Tests</td><td>70%</td></tr> </tbody> </table>	Evaluation Type	Evaluation Weight	shop	30%	Theory Tests	70%
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<b>Books and Required Resources:</b>	<p>Automotive Technology: A Systems Approach by Erjavec  Publisher: Thomson Nelson Learning Canada Edition: 3rd Canadian</p>						
<b>Course Outcomes and Learning Objectives:</b>	<p><b>Course Outcome 1.</b></p> <p>Explain the construction and operation of automotive air conditioning systems.</p> <p><b>Learning Objectives 1.</b></p> <p>Potential Elements of the Performance:</p> <ul style="list-style-type: none"> <li>- Draw &amp; label a simple A/C system.</li> <li>- Describe 3 methods of heat transfer.</li> <li>- Compare &amp; contrast R12 with R134A refrigerant.</li> <li>- Outline refrigerant oils used in R12 and R134A systems.</li> <li>- Explain the temperature and humidity relationship.</li> <li>- Interpret the difference between a fixed orifice and a expansion valve system.</li> <li>- Describe the construction and operation of A/C compressors, axial, radial &amp; variable displacement.</li> <li>- Explain the purpose and function of the following components, evaporator, condenser, receiver dryer, accumulator dryer, hoses, lines and fittings.</li> <li>- Outline refrigerant waste laws.</li> </ul> <p><b>Course Outcome 2.</b></p>						

Explain the purpose & construction of A/C system control valves.

## **Learning Objectives 2.**

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.

## **Course Outcome 3.**

Inspect and test air conditioning systems with the prescribed service tools and equipment.

## **Learning Objectives 3.**

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.

## **Course Outcome 4.**

Describe Workplace Hazardous Information Safety

## **Learning Objectives 4.**

Potential Elements of the Performance:

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

## **Course Outcome 5.**

Describe the Occupational Health and Safety Act

## **Learning Objectives 5.**

Potential Elements of the Performance:

- Legislation
- Obligation of the employer

## **Course Outcome 6.**

Describe the Repair and Storage Lien Act

### **Learning Objectives 6.**

Potential Elements of the Performance:

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

### **Course Outcome 7.**

Describe the Workplace Safety Insurance Board

### **Learning Objectives 7.**

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

**Date:**

Tuesday, April 24, 2018

Please refer to the course outline addendum on the Learning Management System for further information.