

MODULE MEC3110: CLIMATE CONTROL**Level:** Advanced**Theme:** Guidance and Control Systems**Prerequisite:** MEC2030 Lubrication & Cooling**Module Description:** Students expand their knowledge of the purpose, operation and servicing of standard heating and air conditioning systems.**Module Parameters:** Access to air conditioning test equipment and related resources.**Note:** Work must be supervised and checked by certified technician when student is working with refrigerants.**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate established safety and care procedures when working with climate control systems identify the purpose and describe the functions of heater and air conditioning system components 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> observed performance related to: <ul style="list-style-type: none"> safety when working on climate control systems procedures followed when working with refrigerants safety and care used with vehicles, equipment, tools and materials. <p><i>Assessment Tool</i> <i>Assessment Checklist: Health and Safety, MECH&S</i></p> <p><i>Standard</i> <i>Performance rating of 3 on each criteria</i></p>	15
	<ul style="list-style-type: none"> measured performance related to: <ul style="list-style-type: none"> identification of the parts/components description of the function of heater and air conditioning description of how the components combine their functions to produce hot or cold air. <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Climate Control, Part 1, MEC3110-1</i></p> <p><i>Standard</i> <i>Performance rating of 3 on each criteria</i></p>	25

MODULE MEC3110: CLIMATE CONTROL (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> • perform inspection, diagnosis, service and repair procedures on heater and air conditioning systems • identify global concerns about the release of refrigerants into the atmosphere as well as the alternatives to standard refrigerants, and identify the required recycling procedures • demonstrate basic competencies. 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • observed performance related to: <ul style="list-style-type: none"> – inspection of climate control systems as outlined in service manuals and shop procedures – accurate diagnosis of climate control systems performance – repairs to climate control systems as outlined in manuals and procedures. <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Climate Control, Part 2, MEC3110-1</i></p> <p><i>Standard</i> <i>Performance rating of 3 on each criteria</i></p> <ul style="list-style-type: none"> • measured performance related to: <ul style="list-style-type: none"> – research into the effect of refrigerants on the ecosystem – research into alternate refrigerants – understanding of recycling laws and procedures. <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Climate Control, Part 3, MEC3110-1</i></p> <p><i>Standard</i> <i>Performance rating of 3 on each criteria</i></p> <ul style="list-style-type: none"> • observations of individual effort and interpersonal interaction during the learning process. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>40</p> <p>20</p> <p>Integrated throughout</p>

MODULE MEC3110: CLIMATE CONTROL (continued)

Concept	Specific Learner Expectations	Notes
Health/Safety Hazards	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • demonstrate knowledge of and follow lab safety procedures. • generate a list of safety concerns when working with refrigerants • outline the legal restrictions about the disposal and recycling of R-12 refrigerants • identify the safety and environmental concerns with R-12 and R-12 replacements. 	<p>Discuss legal restriction in disposal and reclaiming of R-12.</p> <p>Mixing refrigerants.</p> <p>Safety precautions when in contact with R-12 and when R-12 is in contact with open flame creating toxic gas.</p>
Identification/Function	<ul style="list-style-type: none"> • describe the operation of the heater: heat exchange, the operation of controls for fan speed, and air flow controls • identify components of an air conditioning system • describe refrigeration principles • describe air conditioning system operation. 	
Identify/Analyze	<ul style="list-style-type: none"> • identify the causes and repair procedures for standard heater operation malfunctions; e.g., blocked or leaking heater core, temperature cable adjustment, fan motor noise, vibration and speed abnormalities • show how to conduct a visual and tactile check of operation of the refrigerant system and assess the service needs. 	
Inspect/Service	<ul style="list-style-type: none"> • identify cause of malfunction in a climate control system and repair as required after consulting with the vehicle owner/teacher • pressure test the air conditioning refrigerant system and confirm the normalcy of system operation by comparing data with service manual • on A/C system, leak test, evacuate system, recharge, then leak test again. 	<p>In the case of equipment or facility shortage, a community partnership would be most helpful in delivering this module.</p> <p>Oil may need to be added.</p>
Careers	<ul style="list-style-type: none"> • identify and describe the demand for skills related to climate control systems. 	