

MODULE MEC2030: LUBRICATION & COOLING**Level:** Intermediate**Theme:** Propulsion Systems**Prerequisite:** MEC1040 Engine Fundamentals**Module Description:** Students diagnose, maintain and service the lubrication and cooling systems of a typical four-cycle gasoline engine.**Module Parameters:** Access to pressure tester, hand tools and related resources.**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 safe work practices when working with vehicle engine fluids 	<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"> appropriate selection of personal and vehicle protective equipment when working with engine fluids maintaining an organized and tidy workplace using correct tools and materials in a safe and efficient manner using appropriate fluids for oil changes/cooling systems ensuring used fluids are placed in appropriate marked containers and stored correctly. <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Lubrication & Cooling, Part 1, MEC2030-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 on each criteria</i></p>	10
<ul style="list-style-type: none"> identify and describe functions and operations of engine cooling and lubrication system components 	<ul style="list-style-type: none"> observed performance related to: <ul style="list-style-type: none"> engine cooling and lubrication system components identification description of properties of coolants and lubricating oils selection and use of resources including service manuals. <p><i>Assessment Tool</i> <i>Task Assessment Checklist: Lubrication & Cooling, Part 2, MEC2030-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 on each criteria</i></p>	35

MODULE MEC2030: LUBRICATION & COOLING (continued)

Concept	Specific Learner Expectations	Notes
<p>Identification/ Functions (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe the design and operation of a: <ul style="list-style-type: none"> – gear and rotor-type oil pump – pressure regulator or relief valve – oil pressure sensor gauge or indicator – oil level and change indicator • identify possible cause of low/high oil pressure and high levels of oil consumption under normal operating conditions • explain the function of the cooling system • describe the relationship between the percentage of antifreeze and water to the coolant’s freezing and boiling points • identify the most appropriate percentage of antifreeze to meet local conditions • describe the design and operation of a: <ul style="list-style-type: none"> – radiator and cap – thermostat – water pump – radiator – fan – hoses – recovery tank – block heater • identify possible causes for engine overheating or running cold under normal operating conditions. 	<p>Provide sample pumps for students to examine.</p> <p>Examine a direct clutch and electric fan assembly.</p> <p>If activities are not done on live units, have students perform them on shop units.</p>
<p>Inspect/Service</p>	<ul style="list-style-type: none"> • demonstrate how to: <ul style="list-style-type: none"> – inspect engine for oil leaks owing to gasket/seal failure – replace seal/gaskets if necessary – disassemble and inspect a gear or rotor pump for pitting and galling or abnormal wear – test oil pressure sensor; gauge/light circuit service if necessary – test temperature sensing system; service if necessary – inspect hoses for cracks, soft spots and leaks; replace if necessary – test thermostat; replace if necessary 	<p>Students, at some point, should have the opportunity to remove and replace an oil and water pump, radiator, thermostat, fan and fan belt.</p>

MODULE MEC2030: LUBRICATION & COOLING (continued)

Concept	Specific Learner Expectations	Notes
Inspect/Service (continued)	<i>The student should:</i> <ul style="list-style-type: none">– inspect water pump for leaks and bearing condition– inspect radiator fan– inspect radiator for leaks, blockages; replace if necessary– check condition and tension of fan belt; replace if necessary.	
Careers	<ul style="list-style-type: none">• identify further education and work opportunities related to aftermarket parts supply and rebuilding.	