

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

**ACADEMIC AFFAIRS**

Course Number: AUTO 210 Department: Automotive Technology

Course Title: Gasoline Engine Service Semester: Spring Year: 1997

**Objectives/Competencies**

<b>Course Objective</b>	<b>Competencies</b>
1. Recognize precision measuring instruments in the diagnosis and repair of select engine components.	<ol style="list-style-type: none"><li>1. Measure piston skirt outside diameter using an outside micrometer.</li><li>2. Measure cylinder bore I.D. using an inside micrometer and/or telescoping gauge.</li><li>3. Measuring valve stem to guide clearance using a sliding caliper.</li><li>4. Determining crankshaft or camshaft end play using a dial indicator.</li><li>5. Measuring cylinder bore taper using a cylinder bore gauge and/or telescoping gauge.</li><li>6. Applying proper torque to a nut or bolt using three types of torque wrenches.</li><li>7. Using a feeler gauge to measure small clearances or gaps.</li><li>8. Use pressure and vacuum gauges to determine overall condition of an engine.</li><li>9. Measure connecting rod and main bearing clearances using plastigage.</li></ol>

Course Objective	Competencies
<p>2. Introduce the students to the library of technical information available and familiarize them with its importance.</p>	<ol style="list-style-type: none"> <li>1. Find tolerances and specifications in service manuals and specification books.</li> <li>2. Locate and follow service diagnostic procedures in power train control emission diagnostic manuals and service manuals.</li> <li>3. Read and understand electrical schematics in electrical vacuum troubleshooting manuals.</li> <li>4. Locate and follow specific diagnostic pin point test step procedures.</li> <li>5. Determine specific vehicle service information including service history using electronic communication.</li> </ol>
<p>3. The student should develop an understanding of block inspection and measurement.</p>	<ol style="list-style-type: none"> <li>1. Identify the different types of cylinder block construction.</li> <li>2. Recognize the points to look for during diagnosis and inspection.</li> <li>3. Detect cracks in blocks using magnetic detection and dye penetrant.</li> <li>4. Measure cylinder block for warpage.</li> <li>5. Visually inspect a cylinder wall for pitting, cracks, scuffing or scoring.</li> <li>6. Identify the wear patterns caused by minor and major thrust forces.</li> <li>7. Measure out of roundness, taper and cylinder wear.</li> </ol>
<p>4. The student should develop an understanding of the</p>	<ol style="list-style-type: none"> <li>1. Identify the different types of cylinder head construction.</li> <li>2. Be able to diagnose and inspect cylinder heads.</li> </ol>

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<p>internal combustion engine cylinder head.</p>	<ol style="list-style-type: none"> <li>3. Be able to measure cylinder head flatness.</li> <li>4. Identify the different types of hydraulic lifters.</li> <li>5. Recognize the different types of rocker arm assemblies.</li> <li>6. Identify and know the difference between types of camshafts.</li> <li>7. Recognize the types and how to inspect valve guides.</li> <li>8. Be able to inspect a valve face or seat.</li> <li>9. Explain the reason for multivalve chamber design.</li> </ol>
<ol style="list-style-type: none"> <li>5. The student should develop an understanding of cylinder head, valve, and valve train service.</li> </ol>	<ol style="list-style-type: none"> <li>1. Recondition or replace the valve guides as required.</li> <li>2. Replace a damaged valve seat insert.</li> <li>3. Grind valve seats to meet specifications.</li> <li>4. Inspect and measure the valves to determine their condition.</li> <li>5. Grind the valves to meet specifications.</li> <li>6. Inspect a cylinder head for cracks, erosion and damage.</li> </ol>
<ol style="list-style-type: none"> <li>6. The students should develop an understanding of servicing cylinder block components.</li> </ol>	<ol style="list-style-type: none"> <li>1. Install a rear main bearing oil seal.</li> <li>2. Hone or deglaze cylinder walls to a 60 degree cross hatch pattern.</li> <li>3. Remove cylinder wall ridge.</li> <li>4. Measuring camshaft run out and lobe height.</li> <li>5. Measuring main bore alignment.</li> <li>6. Describe engine balancing.</li> <li>7. Inspect and service harmonic balancer.</li> <li>8. Replace camshaft and crankshaft timing gears.</li> <li>9. Replace timing chain sprockets and chain tensioner.</li> </ol>

Course Objective	Competencies
<p>7. The student should develop an understanding of lubrication system principles and service.</p> <p>8. The student should develop an understanding of cooling system principles and service.</p> <p>9. The student should develop an understanding of engine final assembly installation and break in.</p>	<p>10. Measuring crankshaft main and rod bearing journal size, taper, out of round and run-out.</p> <ol style="list-style-type: none"> <li>1. Describe the function of the lubrication system.</li> <li>2. List the components of the lubrication system.</li> <li>3. Describe the engine oil ratings and additives.</li> <li>4. Describe the design and operation of the lubrication system and its components.</li> <li>5. Describe the PCV system.</li> <li>6. Diagnose lubrication system problems and replace the faulty components.</li> </ol> <ol style="list-style-type: none"> <li>1. Describe the functions of the cooling system.</li> <li>2. List the components of a liquid cooling system.</li> <li>3. Describe the operation of the liquid cooling system and its components.</li> <li>4. Describe the kinds of problems that cooling systems may develop.</li> <li>5. Diagnose and test a cooling system and its components to identify faults.</li> <li>6. Repair or replace faulty components to restore normal cooling system operation.</li> </ol> <ol style="list-style-type: none"> <li>1. Identify the proper way to assemble a crankshaft.</li> <li>2. Identify the correct way to install piston and rings.</li> <li>3. Identify the proper way to install connecting rods and bearings.</li> </ol>

<b>Course Objective</b>	<b>Competencies</b>
	<ol style="list-style-type: none"><li>4. Complete the final assembly of the engine.</li><li>5. Demonstrate the proper torquing procedures for engine fasteners.</li><li>6. Prelubricate the engine.</li><li>7. Perform engine start up procedures.</li><li>8. Perform engine break in procedures.</li></ol>