

Automotive Technology I Course Competencies

Demonstrating Workplace Readiness Skills: Personal Qualities and People Skills

1. Demonstrate positive work ethic.
2. Demonstrate integrity.
3. Demonstrate teamwork skills.
4. Demonstrate self-representation skills.
5. Demonstrate diversity awareness.
6. Demonstrate conflict-resolution skills.
7. Demonstrate creativity and resourcefulness.

Demonstrating Workplace Readiness Skills: Professional Knowledge and Skills

8. Demonstrate effective speaking and listening skills.
9. Demonstrate effective reading and writing skills.
10. Demonstrate critical-thinking and problem-solving skills.
11. Demonstrate healthy behaviors and safety skills.
12. Demonstrate an understanding of workplace organizations, systems, and climates.
13. Demonstrate lifelong-learning skills.
14. Demonstrate job-acquisition and advancement skills.
15. Demonstrate time-, task-, and resource-management skills.
16. Demonstrate job-specific mathematics skills.
17. Demonstrate customer-service skills.

Demonstrating Workplace Readiness Skills: Technology Knowledge and Skills

18. Demonstrate proficiency with technologies common to a specific occupation.
19. Demonstrate information technology skills.
20. Demonstrate an understanding of Internet use and security issues.
21. Demonstrate telecommunications skills.

Examining All Aspects of an Industry

22. Examine aspects of planning within an industry/organization.
23. Examine aspects of management within an industry/organization.
24. Examine aspects of financial responsibility within an industry/organization.
25. Examine technical and production skills required of workers within an industry/organization.
26. Examine principles of technology that underlie an industry/organization.
27. Examine labor issues related to an industry/organization.
28. Examine community issues related to an industry/organization.
29. Examine health, safety, and environmental issues related to an industry/organization.

Addressing Elements of Student Life

30. Identify the purposes and goals of the student organization.
31. Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
32. Demonstrate leadership skills through participation in student organization activities, such as meetings, programs, and projects.
33. Identify Internet safety issues and procedures for complying with acceptable use standards.

ENGINE REPAIR

General

34. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
35. Verify operation of the instrument panel engine warning indicators.
36. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action
37. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert.

38. Identify hybrid vehicle internal combustion engine service precautions. (**CAUTION:** Students should not work directly with high-voltage sources.)

Lubrication and Cooling Systems

39. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action.

40. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.

41. Remove, inspect, and replace thermostat and gasket/seal.

42. Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.

43. Perform engine oil and filter change.

AUTOMATIC TRANSMISSION AND TRANSAXLE

General

44. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.

45. Check fluid level in a transmission or a transaxle equipped with a dip-stick.

46. Check fluid level in a transmission or a transaxle not equipped with a dip-stick.

47. Check transmission fluid condition; check for leaks.

In-Vehicle Transmission/Transaxle

48. Inspect for leakage at external seals, gaskets, and bushings.

49. Inspect power train mounts.

50. Drain and replace fluid and filter(s).

MANUAL DRIVE TRAIN AND AXLES

General

51. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.

52. Drain and refill manual transmission/transaxle and final drive unit.

53. Check fluid condition; check for leaks.

Clutch

54. Check and adjust clutch master cylinder fluid level.

55. Check for system leaks.

Differential Case Assembly

56. Check and adjust differential housing fluid level.

57. Drain and refill differential housing.

Drive Axles

58. Inspect and replace drive axle wheel studs.

SUSPENSION AND STEERING SYSTEMS

General

59. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.

Related Suspension and Steering Service

60. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.

61. Determine proper power steering fluid type; inspect fluid level and condition.

62. Inspect for power steering fluid leakage; determine necessary action.

63. Remove, inspect, replace, and adjust power steering pump drive belt.

64. Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.

65. Inspect tie rod ends (sockets), tie rod sleeves, and clamps.

66. Inspect upper and lower control arms, bushings, and shafts.

67. Inspect and replace rebound and jounce bumpers.

68. Inspect track bar, strut rods/radius arms, and related mounts and bushings.

69. Inspect upper and lower ball joints (with or without wear indicators).

70. Inspect suspension system coil springs and spring insulators (silencers).

71. Inspect suspension system torsion bars and mounts.
72. Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.
73. Inspect strut cartridge or assembly.
74. Inspect front strut bearing and mount.
75. Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms.
76. Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts.
77. Inspect, remove, and replace shock absorbers; inspect mounts and bushings.
78. Inspect electric power-assisted steering.

Wheels and Tires

79. Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action.
80. Rotate tires according to manufacturer's recommendations.
81. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
82. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
83. Inspect tire and wheel assembly for air loss; perform necessary action.
84. Repair tire using internal patch.

BRAKES

General

85. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
86. Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS).

Hydraulic System

87. Check master cylinder for external leaks and proper operation.
88. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action.
89. Select, handle, store, and fill brake fluids to proper level.
90. Test brake fluid for contamination.

Drum Brakes

91. Remove, clean, inspect, and measure brake drum diameter; determine necessary action.
92. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.
93. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.
94. Install wheel and torque lug nuts.

Disc Brakes

95. Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action
96. Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.
97. Remove, inspect, and replace pads and retaining hardware; determine necessary action.
98. Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks.
99. Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action.
100. Remove and reinstall rotor.
101. Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.
102. Retract and re-adjust caliper piston on an integral parking brake system.
103. Check brake pad wear indicator; determine necessary action.
104. Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations.

Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)

105. Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings.
106. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.
107. Check parking brake operation and parking brake indicator light system operation; determine necessary action.
108. Check operation of brake stop light system.

ELECTRICAL/ELECTRONIC SYSTEMS

General

109. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
110. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law).
111. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance.
112. Check operation of electrical circuits with a test light
113. Check operation of electrical circuits with fused jumper wires.
114. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
115. Perform solder repair of electrical wiring.

Battery Service

116. Perform battery state-of-charge test; determine necessary action.
117. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
118. Maintain or restore electronic memory functions.
119. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
120. Perform slow/fast battery charge according to manufacturer's recommendations.
121. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.

Starting System

122. Perform starter current draw test; determine necessary action.

Charging System

123. Perform charging system output test; determine necessary action
124. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment.

Lighting Systems

125. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed.

Accessories

126. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
127. Verify windshield wiper and washer operation; replace wiper blades.

HEATING AND AIR CONDITIONING

General

128. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.

Refrigeration System Components

129. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.

Heating, Ventilation, and Engine Cooling Systems

130. Inspect engine cooling and heater systems hoses; perform necessary action.

ENGINE PERFORMANCE

General

131. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.

132. Verify engine operating temperature.

Fuel, Air Induction, and Exhaust Systems

133. Replace fuel filter(s).

134. Inspect, service, or replace air filters, filter housings, and intake duct work.

135. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action.

136. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed.

137. Check and refill diesel exhaust fluid (DEF).

REQUIRED SUPPLEMENTAL TASKS

Shop and Personal Safety

138. Identify general shop safety rules and procedures.

139. Utilize safe procedures for handling of tools and equipment.

140. Identify and use proper placement of floor jacks and jack stands.

141. Identify and use proper procedures for safe lift operation.

142. Utilize proper ventilation procedures for working within the lab/shop area.

143. Identify marked safety areas.

144. Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.

145. Identify the location and use of eye wash stations.

146. Identify the location of the posted evacuation routes.

147. Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.

148. Identify and wear appropriate clothing for lab/shop activities.

149. Secure hair and jewelry for lab/shop activities.

150. Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.

151. Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).

152. Locate and demonstrate knowledge of material safety data sheets (MSDS).

Tools and Equipment

153. Identify tools and their usage in automotive applications.

154. Identify standard and metric designation.

155. Demonstrate safe handling and use of appropriate tools.

156. Demonstrate proper cleaning, storage, and maintenance of tools and equipment.

157. Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).

Preparing Vehicle for Service

158. Identify information needed and the service requested on a repair order.

159. Identify purpose and demonstrate proper use of fender covers, mats.

160. Demonstrate use of the three Cs (i.e., Concern, Cause, and Correction).

161. Review vehicle service history.

162. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.

Preparing Vehicle for Customer

163. Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).