Western Technical College

32404313 Basic Maintenance

Course Outcome Summary

Course Information

Description	Covers the diagnosis, maintenance and repair of the heating and cooling systems, tires and wheel balancing, vehicle safety, service and shop management and parts distribution. Automotive shop safety practices are also stressed.
Career Cluster	Transportation, Distribution and Logistics
Instructional Level	Technical Diploma Courses
Total Credits	3
Total Hours	108

Pre/Corequisites

Pre/Corequisite 32404302 Intro to Auto Technology

Textbooks

Fundamentals of Automotive Technology. 3rd Edition. Copyright 2023. VanGelder, Kirk. Publisher: Jones & Bartlett Publishers. **ISBN-13**: 978-1-284-23035-2. Required.

Learner Supplies

Uniform: Three short sleeve, black/red shirts with embroidered name. **Vendor:** Campus Shop. Required.

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor:** To be discussed in class. Required.

Six inch ankle high, quality leather work shoes - $75.00-100.00. **Vendor:** To be discussed in class. Required.

Pocket knife, six inch metal pocket ruler (English/metric measurement), small pocket flashlight, and pocket flat head screwdriver - $20.00. **Vendor:** To be discussed in class. Required.

Success Abilities

1. Live Responsibly: Develop Resilience

Program Outcomes

1. Demonstrate professionalism appropriate for the auto service industry
2. Perform diagnosis, service, and repair of automotive internal combustion engines
3. Perform diagnosis, service, and repair of automotive automatic transmission/transaxle systems
4. Perform diagnosis, service, and repair of automotive manual drive train and axle systems
5. Perform diagnosis, service, and repair of automotive steering and suspension systems
6. Perform diagnosis, service, and repair of automotive electrical and electronic systems
7. Perform diagnosis, service, and repair of automotive heating and air conditioning systems

Course Competencies

1. Perform vehicle inspection.

Assessment Strategies

1.1. Skill Demonstration
1.2. Written Product

Criteria

You will know you are successful when:

1.1. You inspect fluids (oil, coolant, brake, fuel, etc.) for condition, level, and leaks.
1.2. You select, handle, store, and fill low fluid levels with proper fluid type.
1.3. You inspect and replace air filters, housings, and intake duct work.
1.4. You inspect tires for condition, abnormal wear patterns, correct size, application, & proper air pressure.
1.5. You inspect auxiliary coolers (oil, power steering, automatic transmission).

Learning Objectives

1.a. Inspect fluid levels and condition.
1.b. Inspect for fluid leaks.
1.c. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed action.
1.d. Inspect tire condition; identify tire wear patterns; check for correct tire size, application (load and speed ratings), and air pressure as listed on the tire information placard/label.
1.e. Select, handle, store, and fill brake fluids to proper level; use proper fluid type per manufacturer specification.
1.f. Inspect, service, or replace air filters, filter housings, and intake duct work.

2. Evaluate engine cooling system.

Assessment Strategies

2.1. Skill Demonstration
2.2. Written Objective Test
2.3. Written Product

Criteria

You will know you are successful when:

2.1. You perform the following cooling system inspections: coolant level, condition, visual inspection of components, pressure and dye tests.
2.2. You identify causes of overheating.

Learning Objectives

2.a. Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, heater core, and galley plugs; determine needed action.

2.b. Identify causes of engine overheating.
2.c. Inspect and test fan(s), fan clutch(electrical or mechanical), fan shroud, and air dams;determine needed action.
2.d. Inspect engine cooling and heater systems hoses; perform needed action.
2.e. Inspect and test heater control valve(s); perform necessary action.

3. Perform engine cooling system maintenance.

Assessment Strategies

3.1. Skill Demonstration
3.2. Written Product

Criteria

You will know you are successful when:

3.1. You perform cooling system service which includes, inspecting & testing coolant, drain, flush, refill, and bleed air from system.
3.2. You inspect (including pulley alignment) and replace drive belt components including belt, tensioners and pulleys.

Learning Objectives

3.a. Inspect and/or test coolant; drain and recover coolant; flush and refill cooling system; use proper fluid type per manufacturer specification; bleed air as required.
3.b. Inspect, replace, and/or adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.

4. Repair cooling system.

Assessment Strategies

4.1. Written Product
4.2. Skill Demonstration

Criteria

You will know you are successful when:

4.1. You remove cooling system components including, water pump, radiator, thermostat, seals, and hoses.
4.2. You inspect cooling system components including, water pump, radiator, thermostat, seals, and hoses.
4.3. You re-install cooling system components including, water pump, radiator, thermostat, seals, and hoses.

Learning Objectives

4.a. Inspect, remove, and replace water pump.
4.b. Remove and replace radiator.
4.c. Remove, inspect, and replace thermostat and gasket/seal.
4.d. Inspect and replace cooling system hoses.

5. Perform engine lubrication system maintenance.

Assessment Strategies

5.1. Skill Demonstration
5.2. Written Product

Criteria

You will know you are successful when:

5.1. You perform engine oil and filter change using proper fluid type.
5.2. you ensure maintenance indicators are reset.

Learning Objectives

5.a. Perform engine oil and filter change; use proper fluid type per manufacturer specification.
5.b. Inspect auxiliary coolers (oil); determine needed action.
5.c. Reset maintenance indicators as required.

6. Perform tire service procedures.

Assessment Strategies

6.1. Skill Demonstration
6.2. Written Product
6.3. Written Objective Test

Criteria

You will know you are successful when:

6.1. You dismount, inspect, remount, balance, inspect for air loss, install wheel and torque lug nuts.
6.2. You perform tire repair in accordance with best industry practices.
6.3. You perform tire rotation including TPMS equipped vehicles.
6.4. You identify the difference between indirect and direct TPMS systems.
6.5. You perform steps required to remove and replace sensors, calibrate/re-learn system, and confirm system operation.

Learning Objectives

6.a. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
6.b. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
6.c. Inspect tire and wheel assembly for air loss; perform needed action.
6.d. Repair tire following vehicle manufacturer approved procedure.
6.e. Install wheel and torque lug nuts.
6.f. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure.
6.g. Rotate tires according to manufacturer’s recommendation including vehicles equipped with tire pressure monitoring systems (TPMS)
6.h. Identify indirect and direct tire pressure monitoring system (TPMS); calibrate system; verify operation of instrument panel lamps.

7. Perform steering and suspension system maintenance.

Assessment Strategies

7.1. Skill Demonstration
7.2. Written Product

Criteria

You will know you are successful when:

7.1. You inspect power steering fluid level, condition, select proper fluid type, flush, fill, and bleed power steering system.
7.2. You lubricate chassis components.

Learning Objectives

7.a. Inspect power steering fluid level and condition, determine proper power steering fluid type.
7.b. Inspect auxiliary coolers(power steering); determine necessary action.
7.c. Flush, fill, and bleed power steering system; use proper fluid type per manufacturer specification.
7.d. Remove, inspect, replace, and adjust power steering pump drive belt.
7.e. Lubricate steering and suspension components as needed.

8. Perform automatic and manual drive systems maintenance.

Assessment Strategies

8.1. Skill Demonstration
8.2. Written Product

Criteria

You will know you are successful when:

8.1. You check fluid condition, level, and leaks of the following components: Manual transmission/transaxle, automatic transmission/transaxle with and without dipsticks, transfer case,& front/rear differentials.

Adjust fluid level or drain and refill if needed.

8.2. You flush automatic transmission/transaxle fluid & replace filter (if needed) using the proper fluid type.

8.3. You lubricate driveshaft u-joints.

Learning Objectives

8.a. Inspect auxiliary coolers(transmission); determine necessary action.

8.b. Check fluid condition; check for leaks; determine needed action in manual transmission/transaxle

8.c. Check fluid level in a (automatic) transmission or a transaxle equipped with a dip-stick.

8.d. Check fluid level in a (automatic) transmission or a transaxle not equipped with a dip-stick.

8.e. Check and adjust transfer case fluid level.

8.f. Check and adjust front and/or rear differential fluid level.

8.g. Lubricate driveshaft u-joints.

8.h. Check and adjust differential case fluid level; use proper fluid type per manufacturer specification.

8.i. Drain and refill transfer case using correct fluid.

8.j. Drain and refill manual transmission/transaxle using correct fluid.

8.k. Drain and replace fluid and filter(s); use proper fluid type per manufacturer specification in automatic transmission

8.l. Flush automatic transmission/transaxle fluid using correct fluid.