South Central College

AST 1622  Advanced Brakes

Course Outcome Summary

Course Information

Description
This course will cover anti-lock brake systems. Emphasis will be placed on system operation and controls. Diagnosis, repair, and maintenance of the various types of systems will also be included. (Prerequisite: Admission into the Automotive Service program and AST1112 or instructor approval)

Total Credits 2
Total Hours 48

Types of Instruction

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Pre/Corequisites

Admission into the Automotive Service program

Institutional Core Competencies

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Exhibit professionalism
   - Learning Objectives
     - Identify brake related health hazards
     - Identify brake-related safety procedures
     - Exhibit proper safety procedures

2. Explain hydraulic system operation
   - Learning Objectives
     - Describe metering, proportioning, and combination valve operation
     - Inspect brake lines and fittings for leaks, damage, or corrosion
     - Inspect flexible brake hoses
     - Depressurize high-pressure components of the electronic brake control system
3. Check parking brake operation and adjust as needed
   Learning Objectives
   Service parking brake cables and linkage
   Replace drum style parking brake shoes
   Adjust integrated caliper parking brake

4. Describe anti-lock brake system operation
   Learning Objectives
   Identify and inspect electronic brake control system components (ABS, TCS, ESC); determine needed action.
   Describe Traction Control System (TCS) operation
   Describe Electronic Stability Control (ESC) operation

5. Observe anti-lock brake system warning light(s) for proper operation
   Learning Objectives
   Inspect and test a brake warning light system
   Check the operation of the stop light system
   Perform a road test

6. Diagnose poor stopping, wheel lock-up, abnormal pedal feel, unwanted application, and noise concerns associated with the electronic brake control system; determine necessary action
   Learning Objectives
   Describe procedure for performing a road test to check brake system operation including an anti-lock brake system (ABS)
   Diagnose electronic brake control caused by vehicle modifications (tire size, curb height, final drive)
   Diagnose drum brake noise and performance problems
   Diagnose disc brake noise and performance problems
   Torque wheel lug nuts

7. Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action
   Learning Objectives
   Perform a basic operational test
   Perform a road test
   Remove and install electronic brake control system electrical / electronic and hydraulic components
   Test / diagnose / service electronic brake control system speed sensors (digital and analog) and toothed ring circuits with graphing multimeter (includes output signal, resistance, shorts to voltage / ground, and frequency data)
   Test / diagnose / service electronic brake control system speed sensors (digital and analog) and toothed ring circuits with digital oscilloscope (includes output signal, resistance, shorts to voltage / ground, and frequency data)
   Torque wheel lug nuts

8. Bleed electronic brake control system hydraulics per manufacturer procedure
   Learning Objectives
   Explain diagonally split brake system operation
   Select, handle, store, and install brake fluids to the proper level
   Check a master cylinder for internal and external leaks and proper operation
   Pressure bleed or flush a brake system
   Manually bleed or flush a brake system
   Fill anti-lock system master cylinder with recommended fluid per manufacturer procedures
   Torque wheel lug nuts
   Perform a road test

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