South Central College

AST 2752 Engine Performance and Drivability

Common Course Outline

Course Information

Description This course emphasizes the accurate and efficient diagnosis and repair of drivability and emission system concerns associated with all aspects of engine operation. Particular attention will be placed on computerized engine management systems. (Prerequisite: Admission to the Automotive Service program)

Total Credits 2

Total Hours 48

Types of Instruction

Instruction Type	Credits/Hours
Lecture	1/16
Lab	1/32

Pre/Corequisites

Prerequisite Admission to the Automotive Service program

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

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 and demonstrate proper shop safety procedures

Learning Objectives

Exhibit professional conduct, act responsibly, and accept responsibility for the successful and timely completion of assignments
Identify and follow all shop operating and safety procedures

2. Describe the cause of engine performance and emission concerns - determine necessary action

Learning Objectives

Describe scan tool operation, retrieve diagnostic trouble codes, evaluate vehicle parameter identification data
Describe and test distributor, waste spark, and coil-on-plug ignition systems including analyzing ignition

waveforms
Describe and diagnose a drivability or emission concern caused by a problem in the positive crankcase ventilation system, exhaust gas recirculation system, or evaporative emission system
Describe and diagnose a drivability or emission concern caused by a problem with the catalytic converter, a converter efficiency code, or the secondary air injection system

3. Test the cause of engine performance and emission concerns - determine necessary action

Learning Objectives

Verify and analyze customer drivability or emission concern, review vehicle service history, and technical service bulletins
Analyze engine mechanical problems, perform a cylinder balance test, and check variable valve timing operation
Analyze no start condition, hard start, cold and warm performance complaint, engine misfire, poor fuel economy, and power loss conditions
Inspect and test computerized engine control system sensors, powertrain or engine control module operation, actuators, and circuits using a digital storage oscilloscope

4. Diagnose the cause of engine performance and emission concerns - determine necessary action

Learning Objectives

Evaluate and diagnose engine mechanical, electrical, fuel injection, ignition, and emission concerns
Diagnose the cause of emission or drivability concerns with and without stored or active diagnostic trouble codes, graph and interpret scan tool data
Diagnose drivability or emission problems caused by interrelated systems, e.g. security system, traction control, automatic transmission, and aftermarket accessories

5. Repair or replace components

Learning Objectives

Read and follow all required service manual procedures, caution statements, and technical service bulletins
Replace the faulty component following the procedure outlined in the service information
Determine if a component setup, coding, relearn, or system reprogram is required
Clear stored trouble codes and verify proper engine and emission system operation following the repair
Describe and perform an on-board diagnostic II monitor check to verify that the repair is complete