

Minnesota State College Southeast

AUTO 1138: Engine and Diesel Performance Lab

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: *.*

Lab Hours/Week: 6

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: None

This course utilizes hands on testing of automotive computer systems including sensors and control devices. It will include feedback carburation and fuel injection. Skills will be developed to utilize basic engine mechanical tests that will lead to analyzing engine condition and performance. (Prerequisites: AUTO1105, AUTO1106, AUTO1118, AUTO1208, AUTO1228 or instructor approval) (3 Credits: 0 lecture/6 lab)

B. COURSE EFFECTIVE DATES: 04/27/1998 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Safety Requirements
2. General Engine Diagnosis
3. Computerized Engine Controls Diagnosis and Repair
4. Ignition System Diagnosis and Repair
5. Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair
6. Emissions Control Systems Diagnosis and Repair
7. Engine Related Service

D. LEARNING OUTCOMES (General)

1. Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.
2. Identify and interpret engine performance concern; determine necessary action. P-1
3. Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins. P-1
4. Diagnose abnormal engine noise or vibration concerns; determine necessary action P-2
5. Perform cylinder power balance test; determine necessary action. P-1
6. Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with an oscilloscope and/or engine diagnostic equipment; determine necessary action. P-
7. Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action. P-1
8. Verify correct camshaft timing. P-2
9. Check for module communication errors using a scan tool. P-2
10. Inspect and test computerized engine control system sensors, powertrain control module (PCM) actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action. P-1
11. Obtain and interpret scan tool data. P-1
12. Inspect and test ignition primary circuit wiring and solid state components; perform necessary action. P-2
13. Inspect, test and service distributor. P-3
14. Inspect and test ignition system pick-up sensor or triggering devices; perform necessary action. P-1
15. Inspect and test cold enrichment system and components; perform necessary action. P-3
16. Test the operation of turbocharger/supercharger systems; determine necessary action. P-3
17. Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action. P-2
18. Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action. P-3
19. Interpret evaporative emission related diagnostic trouble codes (DTCs); determine necessary action. P-1
20. Adjust valves on engines with mechanical or hydraulic lifters. P-1
21. Remove and replace timing belt; verify correct camshaft timing. P-1
22. Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action. P-1
23. Perform safety procedures
24. Maintain an orderly work area
25. Exhibit professionalism

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted