

Anoka Technical College

AUTO 2183: Fuel & Ignition Management Systems & Service

A. COURSE DESCRIPTION

Credits: 6

Lecture Hours/Week: 2

Lab Hours/Week: 8

OJT Hours/Week: *.*

Prerequisites:

This course requires all three of these prerequisites

AUTO 1000 - Orientation and Safety

AUTO 1010 - General Automotive Service

AUTO 1167 - Vehicle Electronics

Corequisites: AUTO 2005 and AUTO 2005

MnTC Goals: None

This course covers the description, operation, diagnosis, and service procedures related to automotive fuel, emission, and ignition systems and the interaction of these systems. The history and evolution of these vehicle systems will be addressed to provide a path to understand the technology currently in use. The automobile industry's impact on emissions and the technology changes undergone to reduce these emissions is also addressed. Computer controls of these systems will be covered in detail as will the understanding and interpreting of drive-ability related service information, procedures, and schematics. (Prerequisites: AUTO 1000, AUTO 1010 and AUTO 1167)(2 credits lecture/4 credits lab)

B. COURSE EFFECTIVE DATES: 06/24/1999 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Automotive emissions and impact on environment
2. History, evolution, and diagnosis of automotive emission controls
3. Four cycle engine operation
4. History, evolution, and diagnosis of automotive fuel and ignition systems
5. Computerized engine control input sensor operation
6. Computerized engine control output system operation
7. Computerized engine control scan tool based testing and diagnosis

D. LEARNING OUTCOMES (General)

1. Explain the source and effects of automotive emission pollutants.
2. Describe the purpose and operation of automotive emission control systems.
3. Distinguish the impact on vehicle emissions, performance, and fuel economy when an emission system failure occurs.
4. Describe each cycle of the four-stroke cycle engine and name the major engine components used and what they do.
5. Measure engine vacuum using vacuum gauge and interpret readings.
6. Perform cylinder balance testing and evaluate results.
7. Perform dry and we static engine compression testing and evaluate results.
8. Perform dynamic engine compression test and evaluate results.
9. Measure exhaust backpressure and accurately interpret results.
10. Test gasoline sample for alcohol content and Reid Vapor Pressure and evaluate test results.
11. Identify and describe purpose of individual components that are contained in a fuel injected delivery system.
12. Perform fuel pump electrical and mechanical system testing.
13. Evaluate fuel injection fuel pump test results.
14. Demonstrate understanding of open loop vs. closed loop fuel system operation and their impact on fuel trim.
15. Identify, describe, and test individual components that are contained in the ignition system and evaluate test results.
16. Explain operation and purpose of exhaust oxygen and Air Fuel Ratio (AFR) sensors.
17. Identify and describe the purpose and operation of the other computerized engine control system input sensors that impact the fuel and ignition systems.
18. Use a digital multimeter (DMM) and scan tool to measure and monitor normal and faulted input sensor values.
19. Compare and explain operation of computer system output control devices.
20. Employ a DMM to accurately measure engine control module voltage supply and ground levels.
21. Accurately operate a scan tool to access diagnostic trouble codes (DTCs).
22. Diagnose an "engine cranks but will not start" vehicle condition.
23. Diagnose a "malfunction indicator lamp (MIL) is on" vehicle condition.

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

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted