Course Information Form (CIF)

Course Code: AFD 231

Course Title: Fuel and Emissions Diagnosis

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 47.0604
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 3-2-4
Credit Hour Distribution:

Lecture: 3	Lab: 2	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Diagnosis and service of electronic and computer systems using appropriate tools; analysis of fuel systems; vehicle adjustments; assessment of operation and maintenance of emission control systems. Drivability diagnosis emphasized.

General Course Objectives

Students will learn the latest techniques for automotive fuel and ignition systems.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement into CCS 098	Placement into MAT 060

Prerequisites

Credit in AFD 111 or AFD 298

Methods of Evaluation

The minimum number of evaluation methods will include: 2 exams, 5 quizzes, and 1 lab practical.

Instructional Materials and Additional Supplies

Advanced Engine Performance Diagnosis, Halderman, Pearson, 2015. 0133515052

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.
- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Operation and Function of the Automotive Oscilloscope	1. Operate an automotive oscilloscope. 2. Demonstrate the operation of a handheld oscilloscope.	1	1	0
Automotive Ignition Diagnosis by Oscilloscope and Scan Tool	1. Interpret the primary pattern for coil, condenser, points, and bypass resistance malfunctions. 2. Interpret the secondary pattern for rotor, cap, ignition wires, and spark plug malfunctions. 3. Interpret the patterns of solid state ignition systems.	2	1	0
Faulty Component Replacement and Tune-up Procedures	1. Analyze all ignition system components. 2. Test all malfunctioning components and compare to factory specifications. 3. Read and interpret automotive tune-up manuals.	2	2	0
Fuel Delivery Systems	1. Analyze fuel storage systems. 2. Analyze fuel delivery systems, both electric and mechanical. 3. Analyze fuel monitoring systems.	6	5	0
On-Board Diagnostic (OBD) II Emissions Systems	1. Analyze OBD II emissions data. 2. Use OBD II emissions data to make a correct diagnosis. 3. Repair the system using a scan tool.	5	5	0
Emission Control Systems and Devices	1. Explain the theory of the five major families of emission control systems. 2. Identify the major pollutants emitted by the internal combustion engine. 3. Identify alternative fuel sources.	8	4	0
Emission Control System Testing for Proper Operation	1. Test the following emission systems for proper regulation: a) positive crankcase ventilation (PCV), b) spark timing control, c) air injection, d) exhaust gas recirculation (EGR), e) catalytic converter, and f) enhanced evaporative emission control system (EVAP).	6	8	0
Fuel Injection Theory	1. Study the design and operation of fuel injection systems.	7	0	0
Electronic Fuel Injection Testing	1. Test fuel injection systems for: a) fuel delivery and pressure, b) on/off operation, c) injector flow, and d) electrical function.	8	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	30	0