

Course Code: AFM 252

Course Title: Engine Performance

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 47.0604

Repeatability: 0

Credit Hours

Catalog Notation: 6-4-8

Credit Hour Distribution:

Lecture: 6

Lab: 4

Clinical: 0

Total: 8

General Course Information

Catalog Description

Advanced study of automotive electrical and electronic circuitry emphasizing diagnosis and services of electronic ignition systems, fuel systems, and emission control systems. Driveability diagnosis emphasized. Students who successfully complete this course may receive current Ford Motor Company Certification in Engine Performance Theory and Operation, Engine Performance Diagnosing and Testing, and Advanced Engine Performance.

General Course Objectives

Students will be able to demonstrate understanding of the automotive ignition system and the exhaust and emission systems. The students will also be able to demonstrate an understanding of onboard diagnostics - second generation monitors that relate to the ignition, exhaust, and emission systems. Students will also be able to properly diagnose driveability concerns and properly maintain an engine.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement into CCS 098	Placement into MAT 059

Prerequisites

Credit in AFM 115 and AFM 117

Ford Certification in Area 34

Methods of Evaluation

Students will be given a minimum of 8 quizzes, 50 lab exercises, 8 web courses, 3 lab practical exams, and 3 Ford Certification exams.

Instructional Materials and Additional Supplies

Automotive Technology, ISBN 9781337794213

Course Content

General Learning Outcomes (GLOs)

- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- 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
Review of AFM 115 Basic Concepts: Ohm's Law, Circuits, and Systems	1. Demonstrate an understanding of basic electricity and its application to modern day automotive vehicles.	3	0	0
Review of Proper Usage of Test Equipment such as the Digital Volt Ohm Meter (DVOM) and Integrated Dynamics System (IDS)	1. Demonstrate an understanding of all electrical test equipment needed for fault finding.	3	4	0
Review Driveability Diagnosis: 1. Electronic Engine Controls, 2. Base Engine Causes of Driveability Concerns, 3. Non-Engine Causes of Driveability Concerns	1. Demonstrate knowledge of the principles of operation of the ignition system and the circuitry and components involved by answering questions given by the instructor.	3	0	0
Ignition Systems: 1. Battery, 2. Ignition Switch, 3. Primary and Secondary Windings, 4. Distributor Points, 5. Condenser, 6. Distributor Caps Rotor, 7. Advance and Retard Controls, 8. Spark Plugs, 9. Ignition Timing	1. Demonstrate an understanding of the basic ignition system by using proper diagnostic and maintenance procedures.	10	10	0
Electronic Ignitions: 1. Distributor Ignition (DI), 2. Distributor-less Ignition (EI), 3. Coil on Plug Ignition (COP)	1. Demonstrate an understanding of the principles of operation of electronic ignition systems and be able to troubleshoot and effect repairs on such systems using appropriate procedures and test equipment.	7	6	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Exhaust and Emission Systems: 1. Identify Emission Control Systems and Devices, 2. Test Emission Control System for Proper Operation	1. Explain the theory of emission controls and test the following: 1. Positive Crankcase Ventilation (PCV), 2. Spark Control, 3. Supplemental, 4. EGR, and 5. Catalytic Converter.	9	8	0
Fuel and Air Inlet Systems: 1. Results of Combustion, 2. Air/Fuel Mixing, 3. Cylinder Charging, 4. Intake Air Metering, 5. Fuel Delivery System, 6. Carburetor, 7. Fuel Injection, 8. Flex Fuel, 9. Intake System Diagnosis, 10. Fuel System Diagnosis	1. Demonstrate an understanding of the principles of the fuel and air inlet systems and be able to properly diagnose concerns of these ten systems.	10	10	0
Onboard Diagnostics II (OBD-II) Monitors: 1. Misfire Monitor, 2. Evaporative Monitor, 3. Exhaust Gas Recirculation (EGR) Monitor, 4. Catalyst and Heated Oxygen Sensor (HO2S) Monitors, 5. Evaporative Emission Monitor, 6. Secondary Air Monitor, 7. Comprehensive Component Monitor	1. Demonstrate an understanding of the operation and strategy of the OBD-II System including proper diagnosis.	12	2	0
Driveability Diagnosis: 1. Retrieve and Diagnose Onboard Diagnostics (OBDI) Codes, 2. Retrieve and Diagnose OBD-II Codes, 3. Diagnose No-code Driveability Concerns, 4. Diagnose Accessory-generated Driveability Concerns	1. Demonstrate an understanding of proper engine operation by evaluating and testing the electronic components of the power train to determine driveability concerns.	15	10	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Enhanced Inspection and Maintenance (I/M) Testing	1. Demonstrate understanding of the relationship of the five exhaust gases in diagnosis.	10	5	0
Engine Maintenance	1. Demonstrate proper maintenance techniques by bringing the automotive engine up to factory specifications by using: 1. Tuneup, 2. Injector cleaning, and 3. Intake/combustion chamber cleaning.	8	5	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
90	60	0