

Course Code: AFM 134

Course Title: Electrified Powertrains and Multiplex Systems

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 47.0614

Repeatability: 0

Credit Hours

Catalog Notation: 1-2-2

Credit Hour Distribution:

Lecture: 1

Lab: 2

Clinical: 0

Total: 2

General Course Information

Catalog Description

Operation, diagnosis, and service of modern high-voltage hybrid-electric and full-electric vehicle powertrains. High voltage safety and HV component service. Construction, operation, and diagnosis of electronic multiplexing networks used in automobiles.

General Course Objectives

Students will gain an understanding of hybrid, hybrid-electric, and electric vehicle fundamentals; identify different types of hybrid, hybrid-electric, and electric vehicles; identify and demonstrate high voltage safety; navigate Ford service publications and wiring diagrams; gain an ability to safely remove and replace a high voltage battery; demonstrate an understanding of special service tools; demonstrate the ability to properly program module software diagnosis; and perform intermittent network and module diagnosis.

Minimum Placement Levels

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

Prerequisites

Credit in AFM 115 and AFM 117

Methods of Evaluation

The minimum number of evaluations include: 2 quizzes, 24 lab exercises, 4 web-based courses, 3 written exams, and 1 lab practical exam.

Instructional Materials and Additional Supplies

- Ford Motor Company training material
- Automotive Technology: A Systems Approach, 978-1-3377-9421-3

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.
- **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
Hybrid, Electric, and Hybrid-Electric Fundamentals	<ol style="list-style-type: none"> 1. Identify different types of hybrid and electric vehicles. 2. Locate and describe hybrid, electric, and hybrid-electric components on vehicles. 3. Correctly navigate service publications and wiring diagrams for hybrid, electric, and hybrid-electric vehicles. 4. Identify and demonstrate high voltage safety precautions on hybrid, electric, and hybrid-electric vehicles. 	3	3	0
HV Battery and System Service	<ol style="list-style-type: none"> 1. Demonstrate how to properly leak test the HV battery for air and coolant loss. 2. Demonstrate how to properly perform an HV battery service disconnect procedure. 3. Remove and replace an HV battery. 	2	12	0
Diagnostic Tools and Equipment	<ol style="list-style-type: none"> 1. Demonstrate how to identify HV diagnostic trouble codes (DTC's). 2. Demonstrate an understanding of and use special service tools, which include: Integrated Diagnostic Software (IDS), HV hand tools, Vehicle Communication and Measurement Modules (VCMM), Ford Diagnostic and Repair Systems (FDRS), and service information (PTS). 	5	3	0
Advanced Electronics	<ol style="list-style-type: none"> 1. Demonstrate the ability to properly program modules software. 2. Diagnose module software-related concerns. 3. Diagnose hard fault module network concerns using Integrated Diagnostic Software advanced tool functions. 4. Perform intermittent network and module diagnosis. 	5	12	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	30	0