

Course Code: AFD 234

Course Title: Vehicle High-Voltage Systems

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: 1-2-2

Credit Hour Distribution:

Lecture: 1

Lab: 2

Clinical: 0

Total: 2

General Course Information

Catalog Description

Operation, diagnosis, and service of high-voltage hybrid-electric and full-electric vehicle powertrains and HVAC systems, with an emphasis on high-voltage safety and HV component service.

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; gain an ability to safely inspect and service high voltage components; and demonstrate an understanding of special service tools and safe work practices.

Minimum Placement Levels

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

Prerequisites

Credit or concurrent enrollment in AFD 119 and AFD 231

Methods of Evaluation

The minimum number of evaluations include: 4 quizzes, 12 lab exercises, 2 written exams, and 1 lab practical exam.

Instructional Materials and Additional Supplies

None.

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
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 vehicle. 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	5	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. 	4	10	0
Hybrid and EV Cooling Systems	<ol style="list-style-type: none"> 1. Demonstrate how to identify cooling system circuits and their operating pressures on hybrid and EVs. 2. Perform a coolant leak test on a battery or inverter cooling system circuit using manufacturer-specified procedures. 	2	3	0
Hybrid and EV HVAC Systems	<ol style="list-style-type: none"> 1. Identify HV heater and air conditioning components. 2. Demonstrate how to conduct diagnostic and performance testing of HV HVAC components through scan tool diagnostics and service information procedures. 	3	3	0
Hybrid and EV Drive Units	<ol style="list-style-type: none"> 1. Demonstrate how to inspect hybrid and EV drive units for proper operation and maintenance. 2. Demonstrate how to service final drive gear oil on a hybrid or EV drive unit. 3. Conduct testing and service of a hybrid or EV drive unit. 	3	9	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	30	0