REV UP COMMUNITY COLLEGES

Electric Vehicle Competency-Based Framework

Statewide Competencies Designed to Strengthen Workforce Readiness

ICCB

· IN PROUD PARTNERSHIP WITH ·

EdSystems
EDUCATION SYSTEMS CENTER at NORTHERN ILLINOIS UNIVERSITY

IGEN
Illinois Green Economy Network
A Community College Partnership

Public Comment Request

Electric Vehicle Pathways Competencies

Along with industry and workforce partners, the Illinois Community College Board (ICCB) and the Illinois Green Economy Network (IGEN) have developed a set of electric vehicle pathway competencies aimed at preparing students and workers for the rapidly evolving automotive technology landscape.

This public comment period invites feedback from educators, employers, technicians, manufacturers, workforce leaders, and other stakeholders. Input will help ensure these competencies are aligned with real-world needs and ready for statewide adoption.

Background

From August 2025 through January 2026, Education Systems Center at Northern Illinois University (EdSystems) provided technical assistance to ICCB and the Illinois Green Economy Network (IGEN) and participating community colleges to support the development of competencies and levels of mastery for programs in basic electric vehicle safety, light-duty hybrid/electric vehicle service, and hybrid/diesel equipment technology. Through this collaborative workgroup, partners drafted and refined competencies based on real workforce needs and benchmarked them against industry-recognized credentials to ensure alignment with national certification standards and employer expectations. Input from educators, employers, and subject-matter experts was then synthesized to shape both the competency definitions and their associated mastery levels.
The competency framework is designed to strengthen workforce readiness across both emerging electric vehicle technologies and traditional automotive systems. It ensures that training programs align with current industry standards and certification requirements, while also supporting consistent, scalable adoption across community colleges and regional training partners. Together, these competencies create a flexible foundation that can be updated over time as automotive technologies and service practices continue to evolve.

In Spring 2026, IGEN and EdSystems will launch a dedicated workgroup to create aligned competencies and mastery levels for the AAS Automotive Technology program, building on the electric vehicle competency framework and ensuring coherence across degree pathways and statewide adoption.

Overview of Competency Areas

The final draft competency framework is organized into four major areas that together build the knowledge, skills, and professional capacities required for safe, industry-aligned service of electric and hybrid vehicles.

AC/DC Electronics

This section establishes the electrical foundations needed for electric and hybrid vehicle work. It introduces core AC and DC circuit principles and emphasizes proper use of diagnostic tools such as multimeters. Learners build the essential literacy required to interpret wiring diagrams, analyze circuit behavior, and handle high-voltage components safely before advancing into more complex system diagnostics.

Foundational Knowledge (Location, Function, Purpose)

This section focuses on understanding how electric and hybrid vehicle systems are structured and how key components function. Competencies include high-voltage safety, battery theory and shutdown procedures, thermal management systems, and drivetrain terminology. Students learn to identify components, interpret service information, recognize hazards, and understand the purpose and operation of each system, forming a critical bridge between basic electrical theory and applied service tasks.

Application (Service & Repair)

The Application section builds on earlier knowledge to develop hands-on service and diagnostic skills essential for real-world shop environments. Learners practice powering down high-voltage systems, interpreting battery and charging system data, servicing thermal management and HVAC systems, and diagnosing drivetrain performance issues. Competencies progress from basic service steps to advanced diagnostics and repair workflows, ensuring students can safely perform OEM-specified procedures and operate high-voltage tools and equipment with confidence.

Essential Employability Skills

This section emphasizes the communication, problem-solving, and customer-service skills necessary for workplace success. Students learn to document findings clearly, communicate effectively with customers and team members, and apply critical thinking to evaluate data and make informed repair decisions. These skills ensure that technicians not only perform technical tasks well but also contribute positively to shop operations and customer experience.

Request for Public Comment

Stakeholders are invited to review the draft competencies and provide feedback on their clarity, alignment with industry needs, relevance to current service practices, completeness, scalability, and any gaps or improvements needed. This input will directly guide the final revisions and statewide implementation of the competencies. You will be directed to a Google Forms survey with 15 questions that is estimated to take approximately 10 minutes to complete.

Click or Scan!

Please share your public comments using this code

Electric Vehicle Competencies for Review

AC/DC Electronics

AC Circuits

Competency Definition	Key Performance Indicators
I can work with series, parallel, and series/parallel circuits, and explain how inductors, capacitors, and circuit protection devices work in AC circuits.	• Demonstrate the ability to analyze and construct series, parallel, and combination circuits, accurately predicting voltage, current, and resistance values. • Accurately interpret wiring diagrams and perform system-level diagnostics using foundational principles of automotive electricity.

Levels of Mastery

Developing	Developed	Highly Developed
Identifies AC circuit types and basic components and performs simple voltage/current/resistance predictions with guidance.	Accurately analyzes and constructs AC series, parallel, and combination circuits and independently interprets wiring diagrams for system-level diagnostics.	Evaluates complex AC circuit behavior, including reactance, impedance, and component interaction, to diagnose and resolve issues across integrated systems.

DC Circuits

Competency Definition	Key Performance Indicators
I can work with series, parallel, and series/parallel circuits, and explain how inductors, capacitors, and circuit protection devices work in DC circuits.	• Demonstrate the ability to analyze and construct series, parallel, and combination circuits, accurately predicting voltage, current, and resistance values. • Identify and explain the operation of circuit protection devices (e.g., fuses, circuit breakers) in DC circuits, ensuring safe and reliable system performance. • Diagnose and repair battery and starting system issues, including testing components and circuits for proper operation.*

Levels of Mastery

Developing	Developed	Highly Developed
Identifies DC series/parallel/combination circuits and basic protection devices and completes simple V/I/R calculations with guidance.	Accurately analyzes and constructs DC circuits, selects/explains appropriate protection devices, and independently tests/repairs basic battery and starting systems.	Optimizes DC system reliability and safety (fault isolation, protection coordination) and leads complex diagnostics across interconnected DC subsystems.

*Source: Instructional Standard for ASE Program Accreditation

AC/DC Electronics (Cont.)

Basic Electronic Systems

Competency Definition	Key Performance Indicators
I can apply basic electronic and electrical principles, including proper multimeter usage, and understand applications to modern day automotive vehicles.	• Demonstrate proficiency in applying fundamental electricity principles to diagnose, service, and optimize modern automotive systems. • Describe safe handling procedures associated with high voltage A/C compressors and wiring. • Demonstrate knowledge of special multimeters, insulated tools, and other test equipment required for use in high voltage/electric vehicle circuits.

Levels of Mastery

Developing	Developed	Highly Developed
Uses a multimeter and basic test equipment with guidance to apply foundational electrical concepts to simple automotive systems while following directed safety practices.	Independently selects and operates appropriate test tools, consistently applies fundamental electricity principles to diagnose/service systems, and documents results accurately.	Designs efficient test strategies that improve accuracy and throughput, connects theory to measurable performance gains, and mentors others in safe measurement around HV A/C components.

Foundational Knowledge

Location, Function, Purpose

Basic EV Health and Safety

Competency Definition	Key Performance Indicators
I can explain how to work safely on hybrid and electric vehicles by identifying hazardous materials, and describing the process and purpose for safety gear, powering down high-voltage systems properly, and using tools correctly.	• Identify the needed safety equipment to service an electric or hybrid vehicle. • Demonstrate ability to identify which components and circuits contain high voltage.* • Demonstrate knowledge of high voltage system and component coloring, warning labels, lights, signage, and lock-out/tag-out procedures.* • Describe the purpose and correct use of PPE and safety gear (including insulated gloves, face protection, HV-rated tools, and lockout/tagout devices) and demonstrate when each is required.

Levels of Mastery

Developing	Developed	Highly Developed
Identifies required PPE/ HV tools and hazard labels, locates HV components with assistance, and follows basic power-down and lockout/tagout steps under supervision.	Independently selects correct PPE/tools, accurately identifies HV circuits/ components, and executes OEM-specified shutdown and verification procedures with proper documentation.	Audits and improves HV safety workflows, leads training and emergency-response readiness, and ensures consistent adherence to lockout/tagout and verification across teams.

Battery Theory

Competency Definition	Key Performance Indicators
I can explain how to measure and verify a high-voltage battery for the process for safe shutdown procedures and removal.	• Demonstrate how to properly perform an HV battery service disconnect procedure. • Demonstrate knowledge of the use of a live-dead-live test to verify isolation of the high voltage traction battery. • Demonstrate knowledge of proper procedures used to disconnect/ isolate the high voltage traction battery. • Describe the purpose and steps of high-voltage battery shutdown procedures, including isolation, verification of zero potential, and required PPE and safety precautions.

Levels of Mastery

Developing	Developed	Highly Developed
Performs HV battery disconnect and live-dead-live verification steps with guidance, using PPE and following basic shutdown procedures.	Independently executes full shutdown, isolation, verification, and documentation procedures for HV batteries using OEM-specified steps.	Troubleshoots complex isolation or shutdown issues, improves safety workflows, and trains others in advanced HV battery service practices.

*Source: Instructional Standard for ASE Program Accreditation

Foundational Knowledge - Location, Function, Purpose (Cont.)

Basic Thermal Management/ HVAC

Competency Definition	Key Performance Indicators
I can identify high- and low-voltage heating and cooling parts and check cooling systems in hybrid and electric vehicles.	• Identify high- and low-voltage heating and cooling parts and check cooling systems in hybrid and electric vehicles. • Identify and distinguish high-voltage and low-voltage heating and cooling components using OEM service information and visual cues. • Inspect and check EV thermal systems, including coolant levels, hoses, pumps, and heat exchangers, to assess system condition and detect faults.

Levels of Mastery

Developing	Developed	Highly Developed
Identifies thermal system components and performs basic inspections (coolant, hoses, pumps, exchangers) with guidance.	Independently distinguishes HV/LV components, performs complete system checks, and accurately documents thermal conditions and faults.	Diagnoses complex thermal interactions across EV systems, identifies root causes, and mentors others in advanced thermal management diagnostics.

Hybrid/ Electric Drivetrain Terminology

Competency Definition	Key Performance Indicators
I can recognize and describe the location, function and purpose of hybrid, electric, and hybrid-electric components on different types of electric/hybrid vehicles.	• Identify different types of hybrid and electric vehicles. • Locate and describe hybrid, electric, and hybrid-electric components on vehicles. • Correctly navigate service publications and wiring diagrams for hybrid, electric, and hybrid-electric vehicles. • Correctly identify the major battery technologies for application in appropriate industrial, commercial, and/or residential use. • Demonstrate knowledge of the testing and verification of ground circuit isolation between vehicle chassis ground and the high voltage circuits and components.*

Levels of Mastery

Developing	Developed	Highly Developed
Identifies hybrid/electric types and basic component locations with assistance and navigates service information at a basic level.	Independently locates and explains function and purpose of hybrid/electric components and uses service publications and diagrams effectively.	Integrates component knowledge to interpret platform-specific variations and leads others in ground-isolation and safety-critical identification tasks.

*Source: Instructional Standard for ASE Program Accreditation

Application

Service and Repair

Basic EV Service/Repair – Powering Down

Competency Definition	Key Performance Indicators
I can locate and use manufacturer service information to safely power down the high voltage battery.	• Locate procedures for safe disabling and re-enabling of high voltage systems on hybrid/electric vehicles.* • Access and interpret manufacturer service information to identify the required steps, tools, and safety precautions for high-voltage battery shutdown. • Follow OEM-specified shutdown and isolation procedures accurately, including applying lockout/tagout, isolating the battery, and confirming zero-voltage state. • Use appropriate PPE and HV-rated tools to safely perform the high-voltage power-down process while maintaining proper sequencing and documentation.

Levels of Mastery

Developing	Developed	Highly Developed
Locates OEM power-down procedures with guidance and performs basic shutdown and PPE steps under supervision.	Independently performs full HV shutdown, isolation, lockout/tagout, and zero-voltage verification sequences with correct documentation.	Anticipates interlocks or failure conditions, refines shutdown workflows, and trains others on advanced EV power-down procedures.

Intermediate Battery Data & Charging/EVSE Operation

Competency Definition	Key Performance Indicators
I can apply knowledge of systems, diagnostic tools and equipment to service and repair high voltage battery and charging systems.	• Use diagnostic tools and OEM service information to interpret data, identify faults, and determine appropriate service actions for high-voltage battery and charging systems. • Perform service and repair procedures on high-voltage battery and charging components—such as contactors, chargers, cooling systems, and HV cables—following manufacturer specifications and safety protocols. • Use HV-rated tools, PPE, and testing equipment correctly to verify system integrity, confirm repairs, and ensure safe operation of high-voltage battery and charging systems.

Levels of Mastery

Developing	Developed	Highly Developed
Reviews battery/charging data with guidance and performs routine checks using HV-rated tools and PPE under supervision.	Independently diagnoses battery/charging faults, performs repairs per OEM procedures, and verifies system integrity and safe operation.	Interprets complex data patterns to predict failures, optimizes diagnostic strategies, and mentors others in advanced EVSE and battery-system service.

*Source: Instructional Standard for ASE Program Accreditation

Application - Service and Repair (Cont.)

Intermediate Thermal Management/ HVAC – Battery Cooling System Maintenance

Competency Definition	Key Performance Indicators
I can apply knowledge of different systems and operations to use diagnostic tools and equipment to service, repair and replace high-voltage HVAC and thermal management systems.	• Demonstrate how to conduct diagnostic and performance testing of HV HVAC components through scan tool diagnostics and service information procedures. • Use OEM service information and system knowledge to identify components, understand operation, and locate test points within high-voltage HVAC and thermal management systems. • Select and correctly operate diagnostic tools and specialist equipment—including scan tools, pressure/temperature sensors, leak detection tools, and HV-safe instruments—to evaluate system performance and pinpoint faults. • Perform service, repair, and replacement procedures on high-voltage HVAC and thermal management components while following HV safety protocols, verifying system integrity, and documenting test results and repairs accurately.

Levels of Mastery

Developing	Developed	Highly Developed
Performs basic HV HVAC tests with guidance, identifies components from OEM information, and follows required HV safety practices.	Independently conducts diagnostic testing, locates faults, performs repairs, and verifies integrity of HVAC and thermal systems.	Diagnoses complex thermal issues across battery, cabin, and powertrain systems and optimizes diagnostic and repair workflows for the team.

Hybrid/Electric Drivetrains

Competency Definition	Key Performance Indicators
I can apply knowledge of system components, operation and diagnostic tools to determine hybrid/electric drivetrain faults.	• Identify key hybrid drivetrain components and explains their functions using OEM diagrams, service information, and system operation principles. • Use appropriate diagnostic tools and data—including scan tools, live data streams, and system tests—to evaluate hybrid drivetrain performance and isolate abnormal readings. • Interpret system data and inspection findings to accurately determine probable drivetrain faults and recommend appropriate next diagnostic or repair steps.

Levels of Mastery

Developing	Developed	Highly Developed
Identifies drivetrain components and gathers basic scan-tool data with guidance, offering preliminary diagnostic suggestions.	Independently analyzes live data, isolates drivetrain faults, and recommends appropriate diagnostic and repair actions.	Leads complex multi-system drivetrain diagnostics, models failure hypotheses, and mentors others on efficient troubleshooting workflows.

Application - Service and Repair (Cont.)

Hybrid/Electric Drivetrains Service and Repair

Competency Definition	Key Performance Indicators
I can use specialist equipment and tools to service and repair hybrid or electric drivetrains.	• Demonstrate how to inspect hybrid and EV drive units for proper operation and maintenance. • Perform proper tests with correct equipment on hybrid and electric vehicles. • Use appropriate tools and processes to check the operation of electronic control systems. • Demonstrate knowledge of high voltage/electric vehicle intake process, inspection, handling, and in-process monitoring for collision-damaged vehicles.* • Select and correctly use specialist tools and equipment—such as insulated tools, battery lift tables, scan tools, driveline fixtures, and HV test instruments—according to manufacturer procedures.

Levels of Mastery		
Developing	**Developed**	**Highly Developed**
Uses specialist tools with supervision to perform basic inspections and tests on hybrid/electric drivetrains.	Independently performs drivetrain inspections, testing, and component servicing using correct specialist tools and processes.	Oversees complex service and repair procedures, standardizes safety and tooling practices, and mentors others in drivetrain repair excellence.

*Source: Instructional Standard for ASE Program Accreditation

Essential Employability Skills

Communication

Competency Definition	Key Performance Indicators
I can effectively communicate and manage projects to meet customer needs by ensuring clarity, fostering collaboration, and maintaining alignment with project goals throughout the process.	• Demonstrate appropriate soft skills to describe the nature of a unit dysfunction and needed repairs. • Write and deliver reports and diagnose remedial actions for Company Owners and Customers. • Identify and illustrate excellent customer service skills, courteous telephone etiquette, and proficiency in answering and routing phone calls, taking messages, and ensuring their delivery.

Levels of Mastery

Developing	Developed	Highly Developed
Communicates findings with assistance and provides basic reports and customer interactions inconsistently.	Communicates clearly in reports and customer interactions and consistently demonstrates strong customer-service skills.	Leads communication across teams, facilitates collaboration, and coaches others in customer-focused communication standards.

Critical Thinking

Competency Definition	Key Performance Indicators
I can apply problem-solving skills to develop, evaluate, and improve solutions by using sound judgment and analytical reasoning in decision-making.	• Demonstrate ability to use various forms of Math and Science skills to evaluate options available and justify recommended solutions to technical problems. • Apply appropriate tests and diagnostic procedures to determine the best course of repair or installation of automotive parts, equipment and systems. • Apply strategies and procedures to engage in thinking that is informed by evidence or arrive at a workable solution. • Understand limitations on which systems, components, and circuits of a high voltage/electric vehicle a technician is capable of safely servicing based on their level of training and qualification.*

Levels of Mastery

Developing	Developed	Highly Developed
Uses basic math, science, and diagnostic steps with guidance and recognizes technician limitations when prompted.	Independently evaluates evidence, applies correct tests and procedures, and makes sound repair decisions within safety boundaries.	Develops advanced diagnostic strategies, anticipates complex system interactions, and mentors others in evidence-based technical reasoning.

*Source: Instructional Standard for ASE Program Accreditation

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