

**RARITAN VALLEY COMMUNITY COLLEGE
ACADEMIC COURSE OUTLINE**

AUTC 226 xEV Level Two: High-Voltage Vehicle Technician

I. Basic Course Information

- A. Course Number and Title: AUTC 226 xEV Level Two: High-Voltage Vehicle Technician
- B. New or Modified Course: New
- C. Date of Proposal: Fall 2025
- D. **Effective Term: Fall 2026**
- E. Sponsoring Departments: Science and Engineering
- F. Semester Credit Hours: 3
- G. Weekly Contact Hours: 5
Lecture: 2
Laboratory: 3
Out of class student work per week: 5.5
- H. Prerequisite:
AUTC 225 – xEV Level One: Electrically Aware Person
- I. Additional Fees: Yes
 - o Electric Vehicle Fundamentals (EVF) Certification
 - o xEV Level Two Certification exam
 - o CPR Certification

II. Catalog Description

(Prerequisite: AUTC 225 xEV Level One: Electrically Aware Person) This course will prepare students to take the ASE Electrified Propulsion Vehicle (xEV) Level Two: High-Voltage Vehicle Technician certification. In this course, students will learn how to maintain electrically safe working conditions, including safety awareness when working on or near Electrified Propulsion Vehicles and their high-voltage components and when setting up and preparing an xEV for repair. This course will explain the construction, operation, and repair of electrically powered high-voltage vehicles and their components, will provide safety training to identify the hazards and to reduce risks in order to maintain an electrically safe working area, and will distinguish the different batteries and battery types of the electrified propulsion vehicle (xEV). This course is essential for service professionals, technicians, and automotive specialists.

III. Statement of Course Need

- A. With the increase in the number of hybrid and electric vehicles on the road, there is significant demand for automotive technicians who can safely service and repair these vehicles.
- B. Lab assignments for the course will cover the tasks required by the ASE xEV Level Two High-Voltage Vehicle Technician standards. Students will learn how to evaluate and classify high voltage systems, isolate, secure, and re-start high voltage, work on de-energized systems, and assess risks of high voltage vehicles that were in an accident.
- C. This course is not intended for transfer.

IV. Place of Course in College Curriculum

- A. Free Elective
- B. This course meets a program requirement for the Hybrid and Electric Vehicles Certificate of Completion.
- C. Course transferability; for New Jersey schools go to the NJ Transfer website, www.njtransfer.org. For all other colleges and universities go to their individual sites.

V. Outline of Course Content

- A. Electric vehicles
 - a. Introduction to electric vehicle components & systems
 - b. Electric and electronic principles
 - c. Electric vehicle technology
- B. Purpose and definitions
 - a. Purpose of the xEV
 - b. Working individual definitions
 - i. Level Two – High-Voltage Vehicle Technician
- C. General requirements for electrical safety-related work practices
 - a. Risks associated with electric vehicle repair including electrocution, arc flash, & arc blast
 - b. Equipotential bonding line
 - c. Loss of isolation circuit
 - d. Aiding persons subjected to high voltage
 - e. Personal protective equipment (PPE)
 - f. Physical barriers, signage, and boundary guarding
 - i. Shop safety alerting techniques
- D. Establishing an electrically safe working condition
 - a. Level Two knowledge and skills
 - i. Maintenance and applications of all PPE

- ii. Safety training & proficiency certification for the EV applications
 - b. Employer responsibilities
 - i. Provide emergency response training and equipment in the case of an electrocution or injury
 - ii. Provide first aid training and skills assessment including CPR
 - iii. Provide safety training and proficiency certification for EV applications
 - iv. Shops shall align with existing safety requirements and regulations
- E. Safety related work practices
 - a. High voltage lithium-ion batteries and systems
 - i. Electrical isolation and handling procedures of battery
 - ii. Accident risks
 - b. Procedures for handling batteries weighing 1000 to > 3500 pounds
 - c. Wiring/cabling –SAE standards for nominal system voltage up to 1000V (AC rms or DC)
 - d. High voltage capacitors > 400 V DC
 - e. Working on or near electric vehicles
- F. De-Energizing
 - a. De-energizing procedure
 - b. Prior to service or repair
 - c. Safety steps prior to making contact
 - d. Absence of voltage verification process
 - e. High voltage interlock (HVIL)
 - f. Lockout/Tagout
 - g. One hand rule
 - h. Do not work alone
 - i. Do not back-probe high voltage connectors
 - j. Plan and document work
- G. Test instruments and equipment for electric vehicle applications
 - a. Test tool, leads, & probes standards, inspection, and use
 - b. Types of equipment and use models to support safety
 - c. Transients on electric vehicles
- H. ASE xEV Level Two Certification

VI. A. Course Learning Outcomes

At the completion of the course, students will be able to:

1. Evaluate and classify the high voltage battery and systems
2. Explain the different test instruments, tools, and equipment and their safety
3. Isolate, secure, and re-start the high voltage system
4. Perform general work on de-energized high voltage systems
5. Perform lab experiments and tasks to competent skill level as listed on the ASE xEV curriculum standards.
6. Identify techniques to troubleshoot and solve problems related to the high voltage vehicle technician (GE-4)

7. Apply quantitative reasoning to problems with the safety of the high voltage vehicle technician (GE-2)
8. Discuss issues involving the high voltage vehicle technician (GE-1)

B. Assessment Instruments

1. lectures
2. demonstrations
3. laboratory work
4. instructional videos/DVDs
5. laboratory performance
6. examinations
7. ASE xEV Standards

VII. Grade Determinants

- A. lab performance
- B. examinations
- C. class participation
- D. technical writing
- E. interactive simulations

Primary formats, modes, and methods for teaching and learning that may be used in the course:

- A. lecture/discussion
- B. small-group work
- C. group discussion
- D. computer-assisted instruction
- E. laboratory
- F. simulation/role playing
- G. demonstration
- H. student collaboration

VIII. Text and Materials

- A. ASE xEV standards <https://www.ase.com/ev>
- B. Electric & Hybrid Vehicles 3rd Edition, *Copyright 2024*, Tom Denton & Hayley Pells, ISBN 9781032556796
- C. Electric Vehicles: A Systems Approach, *Copyright 2024*, Sean Bennet, ISBN 978-1-68584-267-3
- D. Students will be required to wear clothing appropriate for auto shop safety at all classes. Students are required to wear a standard industry uniform. Safety glasses will also be required at all classes.

- E. The Automotive Program utilizes online curriculum and online industry service and repair information from the following sources:
 - AllData
 - Snap On Industries III. Shop Key Pro
 - Motologic
- F. Various Automotive Magazines
- G. Students are provided the use of RVCC technology during the course

Please note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

IX. Resources

- A. Reference books
- B. AllData
- C. Shop Key Pro
- D. Motologic
- E. Snap On Industries
- F. NAPA Pro-Link
- G. Published Automotive Magazines
- H. Lab/Shop Tools and Equipment
- I. CDX Interactive Courseware
- J. Safety equipment
- K. Lubricants and various automotive fluids
- L. Sample automotive system components
- M. Instructional videos/DVDs
- N. Auto mechanics shop facility at RVCC workforce building
- O. CCAR
- P. Electude
- Q. ASE xEV standards

X. Check One: Honors Course N/A