

**J. Sargeant Reynolds Community College
Course Content Summary**

Course Prefix and Number: AUT 233 **Credits:** 4

Course Title: Hybrid Electric Vehicle Technology

Course Description:

Presents technologies used in hybrid electrical vehicles (HEV), includes safety, theory, diagnosis, and component replacement. Covers automotive electronics; theory, operation and testing. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.4 credits

General Course Purpose:

This course provides instruction on the construction, operation, inspection, maintenance, service, repair, and diagnosis of a HEV. Safe handling of high voltage (HV) systems will be stressed throughout the course. Initial instruction will focus on diagnosing and replacement of the HV battery with additional instruction on the diagnosis and repair of the power electronics and supporting systems.

Course Prerequisites and Co-requisites:

Prerequisite: AUT 197 and AUT 249

Student Learning Outcomes:

Upon completing the course, the student will be able to

- Identify and describe the operation of hybrid and electric vehicle drive systems
- Demonstrate proper, safe procedures for disabling the HV battery systems
- Analyze data to determine faults in a HV battery system, including the system main relays (contactors)
- Identify and perform proper steps to remove and replace a HV battery pack
- Identify unique procedures required to safely perform maintenance on a hybrid and electric vehicle (EV)
- Diagnose and repair power electronics and inverters

Major Topics to Be Included:

- EV and HEV history
- High Voltage Safety Systems and Safety Procedures
- Automotive Electronics; Theory, Operation, Diagnosis and Testing
- Motor/Generator Theory and Operation
- Inverter Functions
- HEV Transmission Operation
- Battery Construction and Technologies
- HEV Regenerative Braking, Modes and Operation
- HEV Climate Control Systems

Effective Date/Updated: January 19, 2023