

**NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
AUT 233 – HYBRID ELECTRIC VEHICLE TECHNOLOGY (4 CR.)**

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.

General Course Purpose

This course will introduce students to the technologies used in hybrid electric vehicles. The course will cover various HEV powertrain design platforms and the various modes of vehicle propulsion. Students will become familiar with HEV: safety, electric motors/generators, power inverter systems, battery technologies, braking systems and climate control systems.

Course Prerequisites/Corequisites

Prerequisite: AUT 242. For established automotive technicians current ASE A6 Electrical/Electronic Systems certification is recommended. For non-automotive students a strong background in electricity and electronics is recommended. The ability to read, write, and speak the English language.

Course Objectives

Upon completion of this course, the student should be able to:

- Safely handle and service HEV high voltage systems
- Perform repairs to automotive electronically controlled systems
- Identify and describe the different HEV powertrain systems and propulsion modes
- Describe the theory and operation of HEV components
- Diagnose and test HEV systems and related electronic systems
- Remove and install HEV components; inverter assemblies and high voltage batteries
- Explain the operating principles of HEV regenerative brake systems
- Describe how a HEV air conditioning compressor operates

Major Topics to be Included

- Electric vehicle and hybrid electric vehicle 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