J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: AUT 254 **Credits:** 4

Course Title: Plug-in Hybrid Vehicles

Course Description: Covers plug-in hybrid electric vehicle systems, extended-range electric vehicle systems, and advanced automotive electronics. Teaches theory, function, and operation of each plug-in hybrid vehicle system and provides students an opportunity to perform diagnostic procedures and maintenance on these vehicles. Focuses on safety. Prerequisites: Experience in the automotive repair field, AUT 241, AUT 242, AUT 245, and AUT 230 or approval of the program head. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose: This course, which is required for the Hybrid and Electric Technology Career Studies Certificate, addresses the rapidly emerging automotive technology of plug-in hybrid vehicles, which automotive technicians are now being required to service. The course was developed with funding provided by a grant from the Department of Energy.

Course Prerequisites and Co-requisites:
Prerequisites: Experience in the automotive repair field, AUT 241, AUT 242, AUT 245, and AUT 230. These prerequisites may be waived only with approval of the program head.

Student Learning Outcomes:
Upon completing the course, the student will be able to
a. Demonstrate knowledge of safety in all areas of plug-in hybrid vehicle maintenance;
b. Explain principles of operation for plug-in hybrid vehicle systems;

c. Plug-in hybrid vehicle batteries and battery service
    1. Introduction
    2. Battery technology
    3. High-voltage battery in the plug-in hybrid system
    4. Auxiliary battery in the hybrid system
    5. Lithium-ion battery technology
d. Electric motors, generators, and controls
    1. Fundamentals of magnetism, electromagnetism, and electromagnetic induction
    2. Electric motors
    3. Brushless motors