Print Date: 7/14/14

Course Objectives/Course Outline
Spokane Community College

Course Title: **Diagnosis of Hybrids**
Prefix and Course Number: **AUTO 228**

Course Learning Outcomes:
By the end of this course, a student should be able to:

- Differentiate between hybrid battery types and their use.
- Diagnose and repair regenerative brake systems.
- Diagnose and repair manual transmissions.
- Diagnose and repair continuously variable transmissions.
- Diagnose and repair power trains.
- Diagnose and repair cold start emission controls.
- Diagnose and repair electric power assist brakes.
- Diagnose fuel system problems.
- Perform routine maintenance procedures.

Course Outline:

I. Hybrid Batteries and Battery Service
   A. Objectives
   B. Key Terms
   C. Introduction
   D. Evolution of Battery Technology
   E. The Role of the HV Battery in the Hybrid System
   F. Nickel-Metal Hydride Technology
   G. Role of the Auxiliary Battery in the Hybrid System
   H. Lead-Acid Technology
II. Regenerative Braking Systems
   A. Principles of Regenerative Braking
   B. Regenerative Braking
   C. How the Regenerative Braking Systems Works
   D. Deceleration Rates
III. Hybrid Vehicle Transmissions and Transaxles
   A. Manual versus Automatic
   B. Why a Transmission is Necessary
   C. Manual Transaxles
   D. Conventional Automatic Transmissions
   E. Continuously Variable Transmissions
IV. Honda Hybrid Vehicles
   A. Objectives/Key Terms
   B. Background
   C. Body/Interior Features
   D. Power Train Features
   E. Safety Procedures
   F. Service Features
V. Toyota/Lexus Hybrid Vehicles
   A. Objectives/Key Terms
   B. Toyota Prius
   C. Cold-Start Emission Controls
   D. Fuel System Components

- E. High-Voltage Battery Pack
- F. The Toyota Hybrid System
- G. Lexus RX400h/Toyota Highlander Hybrid
- H. Toyota Camry Hybrid
- I. Lexus GS450h
- J. Maintenance and Service Procedures

VI. Ford/Mercury Hybrid Vehicles
- A. Objectives/Key Terms
- B. Introduction
- C. Full Hybrid
- D. Electronic Traction Motor
- E. Generator Motor
- F. High-Voltage Battery Pack
- G. Electronic Controller
- H. Electric Power Assist Steering (EPAS)
- I. Regenerative Braking System (RBS)
- J. Service Procedures

VII. General Motors Hybrid Vehicles
- A. Objectives/Key Terms
- B. Introduction
- C. Chevrolet/GMC Parellel Hybrid Truck
- D. Saturn VUE and Chevrolet Malibu Hybrids
- E. General Motors Two-Mode Hybrid