

Course Syllabus

AUTO-1440 - Hybrid Electric Vehicle Fundamentals

3.00 credits

Course Fee: \$105.00

Prerequisite: None

This course provides an introduction to Hybrid Electric Vehicles (HEV). Material covered includes hybrid batteries, regenerative braking, safety procedures, and hybrid maintenance and diagnostics. (4 contact hrs) South Campus.

Macomb Community College
Official Course Syllabus

Outcomes and Objectives

OUTCOME A: Upon completion of this course, students will be able to understand the components and characteristics that make up the different Hybrid Electric Vehicles (HEV) on the road today.

OBJECTIVES:

1. Given the different operating characteristics, identify the different types of Hybrid Electric Vehicles.
2. Given the vehicle make, demonstrate an understanding of the component operating characteristic of a Hybrid Electric Vehicle.

OUTCOME B.: Upon completion of this course, students will be able to diagnose a HEV drivability concern.

OBJECTIVES:

1. Given a scan tool, diagnose the trouble code and locate the proper flow chart to complete the repair.
2. Given a HEV, locate the power off switch to disable the high voltage battery system so repairs can be performed.

Course Assessments

A pretest and posttest will be given at the beginning and end of this course. It will be comprised of 10 questions covering the outcomes listed. The faculty will review the data and make corrections in course material covered if needed.

Course Content Outline

1. What is a hybrid vehicle?
 - a. Gas - electric

- b. Diesel - electric
 - c. ICE (Internal Combustion Engine) - hydraulic
 - d. Fuel cells
 - e. Flex fuel vehicles
 - f. CNG (Compressed Natural Gas)
 - g. Electric
 - h. Examples of hybrid vehicles
 - i. Series systems
 - j. Parallel systems
 - k. Series parallel systems
2. Alternative Fuels
 - a. Bio-diesel
 - b. CNG
 - c. Ethanol 85
 - d. Electric
 3. Hybrid batteries
 - a. Lithium
 - b. Lead acid
 - c. Nickel hydride
 4. Regenerative braking systems
 - a. Components
 - b. System operation
 5. HEV transmissions
 - a. Single speed
 - b. CVT (Continuously Variable Transmission)
 - c. Conventional automatic and manual
 6. HEV systems
 - a. Heating system
 - b. Air conditioning system
 - c. Power steering
 7. HEV safety procedures
 - a. Honda
 - b. Toyota
 - c. General Motors
 - d. Ford
 8. Diagnostic procedures
 - a. Scan Tools
 - b. Honda procedures
 - c. Toyota procedures
 - d. General Motors procedures
 - e. Ford procedures
 9. Electric motors
 - a. AC motors and operating characteristics
 - b. DC motors and operating characteristics
 10. HEV maintenance
 - a. Honda
 - b. Ford

- c. General Motors
- d. Toyota

Department Contacts

Faculty: Stan Urban
Associate Dean: Gerald Knesek

Academic Development Office Use Only

New Course Proposal CCA 05-06-0295

OAD: Christ Panos

11.30.06
