Department:

Automotive Technology

Course Description:

This course is designed to give students an introduction to the various types of hybrid electric vehicles (HEV). Topic areas include improvement of fuel economy, hybrid designs, HEV components, and the operation of the typical HEV.

Course Competencies:

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

1. Describe the major reasons for the development of electric and hybrid electric vehicles.
2. Describe the advantages and disadvantages of mild, medium and full hybrid vehicles.
3. Describe the four modes of operation of a typical hybrid vehicle.
4. Explain how fuel cells work and identify the various types of fuel cells.
5. Safely depower a hybrid electric vehicle.
6. Safely perform high-voltage disconnects.
7. Explain the unique service issues related to HEV high voltage systems.
8. Correctly use appropriate personal protective equipment (PPE).
9. Explain hazards while driving, moving, and hoisting a hybrid electric vehicle.
10. Identify alternative energy sources.

Course Content:

A. Introduction to Hybrid Vehicles
   1. Background, driving and owning a hybrid vehicle
   2. Classifications of hybrid electric vehicles
   3. Belt alternatives and starter systems
   4. Levels of hybrid vehicles

B. Hybrid Electric Vehicle Safety Procedures
   1. High voltage safety equipment
   2. First responder procedures
   3. Electric shock potential
   4. Vehicle fire
   5. Preventing current flow
   6. Emergency response

C. Fuel Cells and Advanced Technologies
   1. Electrolyte fuel cells
   2. Proton exchange membrane fuel design (PEM)
   3. Fuel cell technology
4. Polymer electrolyte fuel cell  
5. Fuel cell vehicle systems  
6. Hydraulic hybrid storage system  
7. Homogeneous Charge Compression Ignition (HCCI)  
8. Plug-in hybrid electric vehicles  
9. The future for electric vehicles  
10. Wind power  
11. Hydroelectric power

**Learning Assessments:**

Assessments may include quizzes, tests, projects, demonstrations of completed competencies, instructor observation, weekly assignments, and written papers.

**Instructional Materials:**

ISBN: 978-1-59070-618-9

**Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition**

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students must complete the “Disabilities Self-Identification Form” at this link: [https://highlandcc.edu/pages/disability-services](https://highlandcc.edu/pages/disability-services).

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.