



**LONG BEACH CITY COLLEGE
AUTO MECHANICS 483
CLASS # 33806
ADVANCED HYBRID ELECTRIC VEHICLE
DIAGNOSTICS & REPAIR
SPRING 2012**

SUBJECT MATTER AREA	Advanced Transportation
COURSE NUMBER	AMECH 483
SECTION NUMBER	33806
ROOM #	JJ 111
COURSE TITLE	Advanced Hybrid Electric Vehicle Diagnosis & Repair
UNITS	3.0
DAYS/HOURS	T-Th 12:30pm - 5:20pm
INSTRUCTOR	Pete Sparks
OFFICE	MM130C
PHONE	(562) 938-3005
EMAIL	psparks@lbcc.edu
OFFICE HOURS	T-Th 12:00pm - 12:30pm
PREREQUISITE	None required
COURSE LENGTH	1/9/2012 – 3/9/2012 (9 weeks)
FINAL EXAM DATE	3/8/2012 (Thursday) 1:00 PM
CATALOGUE DESCRIPTION	This course increases the student's skill and knowledge and provides updated information in electric vehicle technology. The course emphasizes OEM (original equipment manufacturer) electric vehicle conversion programs and dedicated OEM EVs, continued EV component knowledge, hybrid-electric vehicles, Fuel Cell EV's and advances in battery and charger technologies. Appropriate safety related instructions will be included in each segment.
TEXTBOOKS & CLASS MATERIALS	“Hybrid Electric Vehicle Technology” by Automotive Research and Design – ISBN 978-0-8269-0066-1 (Required) (1) 2” White 3-ring binder with sleeves (1) Set Avery 10-tab dividers # 600085 OSHA approved safety glasses
OUTCOMES	1. Categorize different types of Advanced Hybrid Electric Vehicles. 2. Scrutinize safety concerns of HEV's. 3. Formulate a plan diagnose and repair a HEV.

OBJECTIVES

1. Describe the different types advanced technology electric vehicles.
2. Demonstrate safety procedures required for electric vehicles.
3. Propose an improved high technology traction battery pack.
4. Identify the appropriate energy requirements for a specific HEV; including motor size, voltage/ampere/hour requirements, battery charging system, rolling resistance factors and aerodynamics.
5. Identify and repair electrical/electronic problems with an OEM HEV or advanced technology/hybrid-EV conversion.
6. Monitor an advanced technology HEV's operation for one week logging miles traveled, energy consumed, cost of operation per mile.
7. Calculate the break-even point for a given hybrid-EV purchase or conversion.
8. Diagnose & repair a hybrid electric vehicle in class.

METHODOLOGIES

Lectures will provide direct exposure to course content and secondary information related to course content. Lectures are often accompanied with related informational handouts. The laboratory activities are designed for the practical application of course topics and concepts. Demonstrations will be used in various laboratory settings. They are designed to provide visual and organizational information in regards to the course's theoretical concepts as well as to techniques and procedural sequences. Students are encouraged to participate in class discussions, comparing and contrasting various theories and techniques. *Students MUST supplement their instruction and enhance their basic skills through 5 additional hours of outside class exercises at the Technology Center (Welding/Sheet Metal Building). PowerPoint presentations may be used to provide supplemental information to the lectures. Videos, slides, and digital projections are used to supplement class content, enhance lectures, and provide a basis for discussion of various content issues. Students will work in teams to solve problems presented in class lecture or laboratory settings in order to practice effective collaboration and communication skills.

EVALUATION CRITERIA

Your grades will be based on the following:

Chapter Assignments	90 points
Final exam	25 points
Notebook	50 points
Supplemental Learning (5 hours)	50 points
Lab performance	50 points

GRADING

A	90 – 100%
B	80 – 89%
C	65 – 79%
D	50 – 64%
F	0 – 49%

Note: Students whose attendance and class participation is excellent will receive consideration if their grade percentage falls between cut points.

SHOP SUPPLIES AND DRESS

Students are expected to dress appropriately to work safely in a shop environment. **SAFETY GLASSES** are **MANDATORY** and should be worn **AT ALL TIMES** while in the shop. Shop towels will not be provided. Open toed shoes or sandals will not be allowed.

COURSE OUTLINE & ASSIGNMENTS

1. Chapter 1 – Introduction to HEV Technology

Assignment: Complete the “Trade Test” at the end of the chapter.

2. Chapter 2 – High Voltage Electrical Safety

Assignment: Complete the “Trade Test” at the end of the chapter.

3. Chapter 3 – High Voltage Vehicle Safety Systems

Assignment: Complete the “Trade Test” at the end of the chapter.

4. Chapter 4 -- Hybrid Engines

Assignment: Complete the “Trade Test” at the end of the chapter.

5. Chapter 6 – Permanent Magnet Electric Machines

Assignment: Complete the “Trade Test” at the end of the chapter.

6. Chapter 7 – Power Inverter Systems

Assignment: Complete the “Trade Test” at the end of the chapter.

7. Chapter 9 – DC to DC Converter Systems

Assignment: Complete the “Trade Test” at the end of the chapter.

8. Chapter 13 – Nickel-Metal Hydride Technology

Assignment: Complete the “Trade Test” at the end of the chapter.

9. Chapter 15 – Hybrid Vehicle Braking Systems

Assignment: Complete the “Trade Test” at the end of the chapter.