

College: A Saddleback College
Division/School: TS Advanced Technology and Applied Science
Department: AUTO Automotive Technology
Program: ZZZZZZ
Subject: ZZ ZZ

O F F I C I A L C O U R S E O U T L I N E

HISTORY AND STATUS

Course Status: L Launched
Course Originator: Clifford Meyer

Technical Change Date:
Technical Change Comment:

Comments:

BRIEF DESCRIPTION

Short Title: ELECTRIC VEHICLE
Full Title: ELECTRIC VEHICLE POWERTRAIN SERVICE, MAINTENANCE, REPAIR & D

BRIEF DESCRIPTION

Catalog Description:

The electric vehicle powertrain will be covered which includes the diagnosis, repair and service of current industry electric vehicles. This course includes "live" hands on lab assignments with electric vehicles.

Prerequisite:

None

Enrollment Limitation:

25

Corequisite:

None

Recommended Preparation:

AUTO 100, AUTO 101

COURSE FUNCTIONS

Course Prior to:

Course Classification: I Career Technical Education

SC/IVC GE Code:

CSU GE Code: TR Does not fit CSU GE Pattern,transferabl

IGETC GE Code:

UC Transferable Course:

Comparable SC/IVC:

Comparable CSU:

Comparable UC:

Comparable CCC

Baccalaureate:

TOP Code: 0948.40 Alternative Fuels and Advanced Transportation
Technology

SAM Code: B Advanced Occupational

CAN Number:

CID Number:

COURSE OPTIONS

Grading Option: GR Letter Grade or Pass/No Pass

Open Entry: N No

Fixed, Optional or Variable Units: F Fixed Units

Repeatability Status: N No

Repeatability Model:

Repeatability Limit: 0

Cross-Listed Courses: NONE

Cross-Listed Parent: No

COURSE VALUES

Method of Instruction:	L-L	Lecture/Lab Combination	
Maximum Enrollment:	25	Maximum WSCH:	150
Average Enrollment:	25	Average WSCH:	150

	Lecture	Lab	Learn Ctr	Total
WFCH	3.00	3.00	0.00	6.00
TFCH	49.80	49.80	0.00	99.60
TSCH	49.80	49.80	0.00	99.60
LHE	3.00	2.50	0.00	5.50
FTEF	20.00	16.67	0.00	36.67
UNITS	3.00	1.00	0.00	4.00

Schedule Description:

The electric vehicle powertrain will be covered which includes the diagnosis, repair and service of current electric vehicles.

COURSE CONTENT
(Topics Covered)

Lecture Topics:

- I. Electric vehicle history
- II. Electricity theory
- III. Battery design and theory
- IV. Battery management components
- V. Battery management systems
- VI. Circuits, watts and wiring
- VII. Contactors and relays
- VIII. Electrical vehicle charging systems
- IX. Electric vehicle components
- X. Electric vehicle conversion systems
- XI. Electric motor installation, service and diagnostics
- XII. Electric vehicle wiring diagram diagnostics

Lab/Learning Center Content:

- I. Shop safety
- II. Electric vehicle safety procedures
- III. Electric vehicle motor identification
- IV. Battery safety
- V. Battery charging and diagnostics
- VI. Installation of the battery and necessary components
- VII. Installing, diagnostics of contactors and relays
- VIII. Installation of the contactor and main system relay
- IX. Electric vehicle controller installation and diagnostics
- X. Electric motor diagnostics
- XI. Electric vehicle motor removal and installation procedures
- XII. Install the electric vehicle motor
- XIII. Electric vehicle wiring diagrams and diagnostic procedures
- XIV. Install the electric vehicle wiring and necessary components
- XV. Install the electric vehicle accessory wiring and components

COURSE CONTENT
(Learning Objectives)

Students participating in this class will:

1. Explain the operation of the battery management system.
2. Name all of the main electric vehicle system components.
3. Explain the safety procedures to be followed when working on a high voltage electric vehicle system.
4. Describe how to diagnose the electric vehicle battery management system.

COURSE CONTENT
(Student Learning Outcomes)

Students completing this course satisfactorily will be able to:

1. Describe the operation of the alternating current electric motor.
2. Explain the operation of the direct current electric motor.
3. Explain the different electric vehicle battery systems currently used in industry.
4. Explain the industry specific safety procedures to follow when servicing or repairing an electric vehicle.
5. Explain the operation of the electric vehicle contactor.

COURSE CONTENT
(Methods of Evaluation)

Evaluation of the student will be based upon the following items:

1. Writing Assignments

- short answers
- term or other paper(s)
- laboratory reports
- written assignments
- reading report(s)
- other (specify)
 - a. Evaluation of student's written assignments based on the course textbooks and material covered in class.
 - b. Evaluation of student's homework and written assignments based on specific assignments given by the instructor.
 - c. Evaluation of student's performance using Internet based automotive information system information when completing lab assignments or in class activity sheets.

2. Problem Solving Demonstrations

- exams
- quizzes
- homework problems
- laboratory report(s)
- other (specify)
 - a. Evaluation of student's classroom and lab participation and completion of course live lab assignments.
 - b. Evaluation of student's contributions in and contributions to group projects for

knowledge and accurate understanding. c. Evaluation of the student's understanding of course content during lab activities to confirm knowledge and understanding. d. Evaluation of student's contributions during class discussions to confirm knowledge and accurate understanding.

3. Skill Demonstrations

class performance(s)
performance (exam)
other (specify)

- a. Evaluation by student's classroom and lab participation and completion of course lab worksheets. b. Evaluation of student's contributions during class discussions for knowledge and accurate understanding. c. Evaluation of student's understanding of course content during live lab activities for knowledge and accurate understanding.

4. Examinations

multiple choice, true/false
matching items
completion
other (specify)

- a. Student's evaluation by quizzes and tests during the course for course knowledge. b. Student's evaluation of course content by a final exam for content, terminology, knowledge of subject matter, and the ability to understand automotive diagnostic procedures following industry standards.

COURSE CONTENT
(In and Out-of-Class Assignments)

1. Typical Reading Assignments:
 1. College-level text
 2. Switch vehicle project handbook
 3. Electric vehicle information reference manuals
 4. Use of computer-based Internet information systems for specifications
2. Typical Writing Assignments:
 1. Recording of specifications for repair procedures
 2. Job sheet work orders
3. Typical Oral Assignments:

Class discussion
4. Typical Other Assignments:

Practical work experience in the lab

COURSE CONTENT
(Other Requirements)

Textbooks / Supplies:
Switch Vehicles, Inc., Switch Vehicle Project Handbook, 1 Ed. Switch Vehicles,
Inc.. 2017

Material Fees: \$ 0.00 Transaction Code:

VALIDATION
(Corequisite, Limitation on Enrollment,
Prerequisite and Recommended Preparation)

Recommended Preparation:

AUTO 100

- I. Identify and define the major components of the automotive body, chassis and power train.
- II. Perform a comprehensive safety check of their automobile.
- III. Generate and design a preventative maintenance guide and record keeping system for their automobile.
- IV. Demonstrate proper and safe usage of tools and equipment to the instructor.
- V. Solves minor repair problems and service operations on their automobiles.

AUTO 101

- I. Analyze and repair problems pertaining to automotive starter and charging systems.
- II. Trace the flow of current through a basic electrical circuit.
- III. Utilize common diagnostic tools and equipment found within the industry.
- IV. Demonstrate the proper method for locating excessive electrical circuit resistance.
- V. Locate proper specifications from shop manuals in order to establish proper testing criteria.