

College: A Saddleback College
Division/School: TS Advanced Technology and Applied Science
Department: AUTO Automotive Technology
Program: ZZZZZZ
Subject: AABENC Adult Education - Adult Basic Education

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

BRIEF DESCRIPTION

Catalog Description:

The electric vehicle electric and electronic systems 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:

None

Corequisite:

None

Recommended Preparation:

AUTO 100, AUTO 101, AUTO 105

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 electric and electronic systems will be covered which includes the diagnosis, repair and service of current electric vehicles.

COURSE CONTENT
(Topics Covered)

Lecture Topics:

- I. Introduction to the electric vehicle
- II. Electric vehicle safety procedures and equipment
- III. Electric vehicle battery assembly
- IV. Electric vehicle contactor and relay systems
- V. Battery wiring and installation
- VI. Electric vehicle wiring diagrams and assembly instructions
- VII. Electric motor installation and testing
- VIII. Drivetrain assembly and testing
- IX. Electric vehicle conversion systems
- X. Electric vehicle brake systems and installation
- XI. Electric vehicle wheels and tires
- XII. Electric vehicle hub and axle bearings

Lab/Learning Center Content:

- I. Introduction to the electric vehicle powertrain assembly procedures
- II. Electric vehicle safety procedures and equipment
- III. Electric vehicle battery assembly
- IV. Install battery management system controller
- V. Electric vehicle contactor and relay installation
- VI. Install battery wiring and components
- VII. Use of electric vehicle assembly wiring diagrams
- VIII. Install electric motor
- IX. Install electric vehicle brake system
- X. Install electric vehicle wheels and tires
- XI. Install electric vehicle hub and axle bearings
- XII. Install vehicle accessories and test for correct operation

COURSE CONTENT
(Learning Objectives)

Students participating in this class will:

1. Explain the safety procedures to use when working on or diagnosing electric high voltage vehicle systems.
2. Demonstrate the correct procedures to diagnose a alternating current or direct current electric drive motor.
3. Describe the operation and diagnosis of the electric vehicle regeneration braking system.
4. Explain the operation, diagnosis and repair of electric vehicle contactors and main relay systems.
5. Demonstrate the correct procedures to use electric vehicle wiring diagrams for diagnosis and repair of electric vehicle systems.
6. Explain the correct procedures to mount, balance and remove tire and wheel assemblies for electric vehicles.
7. Explain the operation of the main electric vehicle powertrain components and their function.
8. Explain the main battery system operation, function and diagnosis for a specific electric vehicle.

COURSE CONTENT
(Student Learning Outcomes)

Students completing this course satisfactorily will be able to:

1. Install the drive motor into an electric vehicle.
2. Install the battery controller into an electric vehicle.
3. Install the front wheel hub and bearing assembly following industry standards.
4. Explain the electric vehicle safety procedures when working on high voltage systems.
5. Assemble an electric vehicle battery following manufacturers procedures.

COURSE CONTENT
(Methods of Evaluation)

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

1. Writing Assignments
 - short answers
 - 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 technical 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. Design a preventive maintenance guide and record keeping system for an automobile.
- IV. Demonstrate proper and safe usage of tools and equipment while working in the lab.
- V. Solve minor repair problems and service operations on an automobile.

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.

AUTO 105

- I. Identify all components in the modern automotive power train.
- II. Describe the operating theory of all components in the power train system.
- III. Diagnose, evaluate and repair all components used in modern power train system.