



El Camino College
COURSE OUTLINE OF RECORD – Official

Course Acronym:	ATEC
Course Number:	51
Descriptive Title:	Introduction to Alternative Fuel Vehicles
Division:	Industry and Technology
Department:	Automotive Technology
Course Disciplines:	Automotive Technology
Catalog Description:	This course provides an overview of alternative fuels and hybrid vehicles. Topics include a brief history of alternative fuels, pros and cons of each fuel, and discussions on whether an alternative fuel vehicle is right for the consumer. The background of different fuels and an overview of current and future fuel types will be explored.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	English 1
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	0
Outside Study Hours:	4
Total Course Hours:	36
Course Units:	2
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	Fall 2023
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	

	Other:
Student Learning Outcomes:	<p>SLO #1 Safety</p> <p>Analyze the hazards and risks associated with alternative fuels technologies and repair facilities.</p> <p>SLO #2 Fuel Types</p> <p>Describe advantages and disadvantages of five different types of alternative fuels. (Biodiesel, CNG, LNG, E85, and Hydrogen)</p> <p>SLO #3 Basic Operation</p> <p>Explain the basic operation of five alternative fuel vehicles.</p>
Course Objectives:	<ol style="list-style-type: none"> 1. Describe hazards associated with different types of alternative fuels types. 2. Chart the characteristics of different types of alternative fuels. 3. Identify various system components from various types of alternative fuel vehicles. 4. Summarize benefits and shortcomings of different types of fuels. 5. Identify which alternative fuels are most commonly used. 6. Evaluate the return on the cost of investment of alternative fuels vehicle. 7. Identify the correct application of different fuel types based off of each fuel types' limitations and benefits. 8. Develop an overview of the alternative fuels history, current status and projected outcomes.
Major Topics:	<p>I. History of alternative fuels (2 hours, lecture)</p> <ol style="list-style-type: none"> A. Electric vehicles B. Gaseous fuel vehicles C. Bio-diesel <p>II. Benchmark fuels: gasoline/diesel overview (3 hours, lecture)</p> <ol style="list-style-type: none"> A. Basics of internal combustion engine B. Basics of fuel delivery system C. Gasoline/diesel characteristics <p>III. Safety related to automotive fuels (2 hours, lecture)</p> <ol style="list-style-type: none"> A. Personal Protection Devices (PPD) B. What to do in case of an accident C. Safety issues related to operation and service of vehicles including alternative fuels <p>IV. Ethanol 85% (E85) description and comparison (3 hours, lecture)</p> <ol style="list-style-type: none"> A. Production and characteristics of Ethanol 85% (E85) B. Advantages and disadvantages of E85 usage C. Examples of vehicles using this fuel

V. Biodiesel description and comparison (3 hours, lecture)

- A. Production and characteristics of biodiesel
- B. Advantages and disadvantages of biodiesel
- C. Examples of vehicles using this fuel

VI. Propane description and comparison (3 hours, lecture)

- A. Production and characteristics of propane
- B. Advantages and disadvantages of propane
- C. Examples of vehicles using this fuel

VII. Compressed Natural Gas (CNG)/Liquified Natural Gas (LNG) description and comparison (3 hours, lecture)

- A. Production and characteristics of CNG/LNG
- B. Advantages and disadvantages of CNG/LNG
- C. Examples of vehicles using this fuel

VIII. Electric drive description and comparison (3 hours, lecture)

- A. Production and characteristics of electric drive systems
- B. Advantages and disadvantages of electric drive systems
- C. Examples of vehicles using this fuel

IX. Hydrogen description and comparison (4 hours, lecture)

- A. Production and characteristics of hydrogen
- B. Advantages and disadvantages of hydrogen
- C. Examples of vehicles using this fuel

X. Hybrids description and comparison (4 hours, lecture)

- A. Production and characteristics of hybrid drive systems
- B. Advantages and disadvantages of hybrid drive systems
- C. Examples of vehicles using these systems

XI. Future fuels (3 hours, lecture)

- A. State and Federal regulations
- B. What improvements will be made in current fuels/systems
- C. New technology on the horizon

XII. What fuel is right for the consumer? (3 hours, lecture)

- A. Cost associated with each fuel
- B. Costs associated for maintenance and repair of vehicles powered by alternative fuels
- C. Pros and cons of purchasing and maintaining an alternative fuel vehicle

Total Lecture Hours:	36
Total Laboratory Hours:	0
Total Hours:	36
Primary Method of Evaluation:	1) Substantial writing assignments
Typical Assignment Using Primary Method of Evaluation:	Complete a one-page writing assignment outlining the production and characteristics of hydrogen fuel used in alternative fuel vehicles. This topic can be on the chemistry, natural sources of, refining, distribution, economic factors, or various other aspects of hydrogen fuel. Submit the assignment to the instructor.
Critical Thinking Assignment 1:	In a group of two or three students, prepare a five-to-ten minute presentation analyzing alternative fuels or hybrid vehicles. Include the characteristics and operations associated with the system.
Critical Thinking Assignment 2:	Write a three-to four-page report listing five benefits and five disadvantages of alternative fuel vehicles. Argue the value of purchasing an alternative fuel vehicle based on these benefits and disadvantages. Include the positive and negative issues related to maintaining an alternatively fueled vehicle. Submit the report to the instructor.
Other Evaluation Methods:	Essay Exams Homework Problems Matching Items Multiple Choice Objective Exams Presentation Reading
Instructional Methods:	Discussion Lecture Multimedia presentations Role play/simulation
If other:	Internet Presentation/Resources
Work Outside of Class:	Answer questions Problem solving activity Required reading Study Written work (such as essay/composition/report/analysis/research)
If Other:	
Up-To-Date Representative Textbooks:	Nation Research Council. <u>Transitions to Alternative Vehicles and Fuels</u> . Academic Press. 2013. DISCIPLINE STANDARD
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	Electude: Simulation-based learning solutions for visual and kinesthetic learners
Requisite:	

Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	eligibility for English 1A
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	<p>Ability to prepare a written report on a class topic.</p> <p>Write a well-reasoned, well-supported expository essay that demonstrates application of the academic writing</p> <p>Ability to read course related materials.</p> <p>Summarize, analyze, evaluate, and synthesize college-level texts.</p>
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Edward Matykiewicz
Date:	09/04/2017
Original Board Approval Date:	
Last Reviewed and/or Revised by:	Edward Matykiewicz
Date:	03/08/2022
Last Board Approval Date:	06/20/2022

