# Course Outline

Transportation

REVISED: July/2022

**Job Title**
Automotive Service Technician

**Career Pathway:**
Systems Diagnostics and Service

**Industry Sector:**
Transportation

**O*NET-SOC CODE:**
49-3023.00

**CBEDS Title:**
Automotive Service

**CBEDS No.:**
5668

## 79-70-40

## Hybrid Vehicles – Introduction

**Credits:** 0 **Hours:** 40

**Course Description:**
This competency-based course is designed to introduce hybrid vehicle systems and high voltage safety. It provides students with project-based experiences in automotive technologies including alternative and green vehicle technology. Instruction includes an introduction and safety, high voltage safety, basic automotive electricity, tools and equipment, engine diagnosis, troubleshooting, battery construciton, hybrid drive systems, hybrid supporting systems, and employability skills. The competencies in this course are aligned with the California High School Academic Content Standards and the California Career Technical Education Model Curriculum Standards.

**Prerequisites:**
Students must have a working knowledge of common electrical system repair and maintenance procedures, general engine performance issues as ignition system diagnosis, fuel, air induction and exhaust systems and computerized engine controls. Recommend completion of Auto Tech: Electrical & Electronics/1 (79-90-61) and Auto Tech: Engine Performance 1 (79-90-69). An assessmet will be administered by the instructor to evaluate student acceptance into the course.

**NOTE:** For Perkins purposes this course has been designated as an **introductory** course.

This course **cannot** be repeated once a student receives a Certificate of Completion.

Los Angeles Unified School District
Division of Adult and Career Education
Instructional and Couseling Services Unit
Adult Curriculum Office
www.wearedace.org

## *COURSE OUTLINE COMPETENCY-BASED COMPONENTS*

A course outline reflects the essential intent and content of the course described. Acceptable course outlines have six components. (Education Code Section 52506). Course outlines for all apportionment classes, including those in jails, state hospitals, and convalescent hospitals, contain the six required elements:

(EC 52504; 5CCR 10508 [b]; Adult Education Handbook for California [1977], Section 100)

| **COURSE OUTLINE COMPONENTS** | **LOCATION** |
|---|---|
| **GOALS AND PURPOSES** | Cover |

The educational goals or purposes of every course are clearly stated and the class periods are devoted to instruction. The course should be broad enough in scope and should have sufficient educational worth to justify the expenditure of public funds.

The goals and purpose of a course are stated in the COURSE DESCRIPTION. Course descriptions state the major emphasis and content of a course, and are written to be understandable by a prospective student.

| **PERFORMANCE OBJECTIVES OR COMPETENCIES** | pp. 7-13 |
|---|---|

Objectives should be delineated and described in terms of measurable results for the student and include the possible ways in which the objectives contribute to the student's acquisition of skills and competencies.

Performance Objectives are sequentially listed in the COMPETENCY-BASED COMPONENTS section of the course outline. Competency Areas are units of instruction based on related competencies. Competency Statements are competency area goals that together define the framework and purpose of a course. Competencies fall on a continuum between goals and performance objectives and denote the outcome of instruction.

Competency-based instruction tells a student before instruction what skills or knowledge they will demonstrate after instruction. Competency-based education provides instruction which enables each student to attain individual goals as measured against pre-stated standards.

Competency-based instruction provides immediate and continual repetition. In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies. Curriculum, instruction and assessment in competency-based education are: explicit, known, agreed upon, integrated, performance oriented, and adaptive.

## *COURSE OUTLINE COMPETENCY-BASED COMPONENTS (continued)*

| COURSE OUTLINE COMPONENTS | LOCATION |
|---|---|
| **INSTRUCTIONAL STRATEGIES** | p. 15 |
| Instructional techniques or methods could include laboratory techniques, lecture method, small-group discussion, grouping plans, and other strategies used in the classroom.<br><br>Instructional strategies for this course are listed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructional strategies and activities for a course should be selected so that the overall teaching approach takes into account the instructional standards of a particular program, i.e., English as a Second Language, Programs for Adults with Disabilities. | |
| **UNITS OF STUDY, WITH APPROXIMATE HOURS ALLOTTED FOR EACH UNIT** | Cover |
| The approximate time devoted to each instructional unit within the course, as well as the total hours for the course, is indicated. The time in class is consistent with the needs of the student, and the length of the class should be that it ensures the student will learn at an optimum level.<br><br>Units of study, with approximate hours allotted for each unit are listed in the COMPETENCY AREA STATEMENT(S) of the course outline. The total hours of the course, including work-based learning hours (community classroom and cooperative vocational education) is listed on the cover of every CBE course outline. Each Competency Area listed within a CBE outline is assigned hours of instruction per unit. | pp. 7-13 |
| **EVALUATION PROCEDURES** | pp. 15 |
| The evaluation describes measurable evaluation criteria clearly within the reach of the student. The evaluation indicates anticipated improvement in performances as well as anticipated skills and competencies to be achieved.<br><br>Evaluation procedures are detailed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructors monitor students' progress on a continuing basis, assessing students on attainment of objectives identified in the course outline through a variety of formal and informal tests (applied performance procedures, observations, and simulations), paper and pencil exams, and standardized tests. | |
| **REPETITION POLICY THAT PREVENTS PERPETUATION OF STUDENT ENROLLMENT** | Cover |
| After a student has completed all the objectives of the course, he or she should not be allowed to reenroll in the course. There is, therefore, a need for a statement about the conditions for possible repetition of a course to prevent perpetuation of students in a particular program for an indefinite period of time. | |

## *ACKNOWLEDGMENTS*

Thanks to JUAN SOLTERO and LUZ GRANADOS for developing and editing this curriculum. Acknowledgment is also given to ERICA ROSARIO for designing the original artwork for the course covers.

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## *CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS*
## *Transportation Industry Sector*
## *Knowledge and Performance Anchor Standards*

**1.0 Academics**
Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Transportation academic alignment matrix for identification of standards.

**2.0 Communications**
Acquire and accurately use Transportation sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

**3.0 Career Planning and Management**
Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

**4.0 Technology**
Use existing and emerging technology to investigate, research, and produce products and services, including new information, as required in the Transportation sector workplace environment.

**5.0 Problem Solving and Critical Thinking**
Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Transportation sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

**6.0 Health and Safety**
Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Transportation sector workplace environment.

**7.0 Responsibility and Flexibility**
Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Transportation sector workplace environment and community settings.

**8.0 Ethics and Legal Responsibilities**
Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

**9.0 Leadership and Teamwork**
Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution as practiced in the SkillsUSA career technical student organization

**10.0 Technical Knowledge and Skills**
Apply essential technical knowledge and skills common to all pathways in the Transportation sector, following procedures when carrying out experiments or performing technical tasks.

**11.0 Demonstration and Application**
Demonstrate and apply the knowledge and skills contained in the Transportation anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through the SkillsUSA career technical student organization.

**C. Systems Diagnostics and Service Pathway**

The Systems Diagnostics and Service pathway prepares students for postsecondary education and employment in the transportation industry, which includes but is not limited to motor vehicles, rail systems, marine applications, and small-engine and specialty equipment.

Sample occupations associated with this pathway:

- Service Technician/Maintenance Worker/Shop Foreman
- Technical Writer
- Dispatcher
- Engineer
- Investigator/Inspector

C1.0 Demonstrate the practice of personal and occupational safety and protecting the environment by using materials and processes in accordance with manufacturer and industry standards.

C2.0 Practice the safe and appropriate use of tools, equipment, and work processes.

C3.0 Use scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems.

C4.0 Perform and document maintenance procedures in accordance with the recommendations of the manufacturer.

C5.0 Apply and understand appropriate business practices.

C6.0 Demonstrate the application, operation, maintenance, and diagnosis of engines, including but not limited to two- and four-stroke and supporting subsystems.

C7.0 Demonstrate the function, principles, and operation of electrical and electronic systems using manufacturer and industry standards.

C8.0 Demonstrate the function and principles of automotive drivetrain, steering and suspension, brake, and tire and wheel components and systems in accordance with national industry standards.

***CBE***
***Competency-Based Education***

## *COMPETENCY-BASED COMPONENTS*
## *for the Hybrid Vehicles - Introduction Course*

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| **A. INTRODUCTION**<br><br>Review, apply, and evaluate classroom and workplace policies and procedures used in accordance with federal, state, and local safety and environmental regulations.<br><br>(2 hours) | 1. Discuss the scope and propose of the course.<br>2. Discuss classroom policies and procedures.<br>3. Discuss and demonstrate Zoom, Schoology and basic computer skills.<br>4. Assess students' basic knowledge in electrical principles and engine performance.<br>5. Discuss the different occupations in the Transportation Industry Sector, which have an impact on the role of the auto technicians.<br>6. Discuss the opportunities available for promoting gender equity and the representation of non-traditional populations in automotive science.<br>7. Describe the role of the Automotive Service Education Foundation as it applies to the automotive industry. | **Career Ready Practice:**<br>1, 2, 3, 5, 7, 9, 10<br><br>**CTE Anchor:**<br>Anchor 1.0<br>Communications: 2.1, 2.4<br>Career Planning and Management: 3.1, 3.2, 3.3, 3.4, 3.7<br>Problem Solving and Critical Thinking Skills: 5.1<br>Responsibility and Flexibility: 7.8<br>Leadership and Teamwork: 9.5, 9.6<br>Technical Knowledge and Skills: 10.1, 10.4<br><br>**CTE Pathway:**<br>C5.1, C5.3, C5.6 |
| **B. SAFETY - GENERAL**<br><br>Understand safety procedures and techniques in the auto repair and maintenance sector. | 1. Discuss classroom and workplace first aid and emergency procedures.<br>2. Discuss the California Occupational Safety and Health Administration (Cal/OSHA) workplace requirements for auto technicians.<br>3. Discuss the impact of Environmental Protection Agency (EPA) legislation on Transportation Industry Sector practices in protecting and preserving the environment.<br>4. Discuss the impact of California Air Resources Board (ARB) legislation on Transportation Industry Sector.<br>5. Discuss the Bureau of Automotive Repair (BAR) standards for | **Career Ready Practice:**<br>1, 2, 6, 7, 8, 10<br><br>**CTE Anchor:**<br>Academics: 1.0<br>Communications: 2.1<br>Health and Safety: 6.1, 6.2, 6.3, 6.4, 6.5, |

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| (3 hours) | consumer and environmental protection.<br>6. Discuss the use of the Safety Data Sheet (SDS) as it applies to the automotive industry.<br>7. Discuss the safety items required by the federal, state, and local regulations.<br>8. Describe and demonstrate the standards regarding proper use of protective:<br>a. clothing and gloves in an auto shop<br>b. respiratory gear in an auto shop<br>c. eye gear in an auto shop<br>d. ventilation in an auto shop<br>e. handling, storage, and disposal of chemicals and hazardous materials used in an auto shop<br>9. Pass the safety test with 100%. | 6.6, 6.7<br>Responsibility and Flexibility:<br>7.2, 7.4, 7.7, 7.8<br>Ethics and Legal Responsibilities:<br>8.1, 8.2<br>Technical Knowledge and Skills:<br>10.1, 10.2, 10.4<br>Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C1.1, C1.2, C1.3, C1.4, C1.5, C4.2, C5.2 |
| **C. HIGH VOLTAGE SAFETY**<br><br>Explain the principles involved in high voltage safety precautions with hybrid components.<br><br>(5 hours) | 1. Discuss general high voltage warnings and labels.<br>2. Discuss high voltage cables:<br>a. blue cables<br>b. yellow cables<br>c. orange cables<br>3. Discuss and describe electrical shop potential hazards.<br>4. Discuss and demonstrate high voltage safety equipment:<br>a. gloves<br>b. glove testing<br>c. safety glasses and face shields<br>d. safety cones<br>e. fiber glass pole and hook<br>f. fire extinguishers<br>g. isolating mats<br>h. sheets and clothing<br>5. Discuss and describe procedures for depowering the high voltage system.<br>6. Discuss collision and industry repair issues.<br>7. Discuss and describe first responder procedures.<br>8. Discuss and describe emergency responses:<br>a. fire<br>b. hazardous material issues<br>c. submerged vehicles<br>d. alternative fuel issues | **Career Ready Practice:**<br>1, 2, 6, 7, 8, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Health and Safety:<br>6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7<br>Responsibility and Flexibility:<br>7.2, 7.4, 7.7<br>Ethics and Legal Responsibilities:<br>8.1, 8.2<br>Technical Knowledge and Skills:<br>10.1, 10.2, 10.4<br>Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C1.2, C1.4, C1.5, C4.2 |

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| **D. BASIC AUTOMOTIVE ELECTRICITY**<br><br>Understand, apply, and evaluate the principle of automotive electricity.<br><br>(5 hours) | 1. Define the following:<br>a. Ohm's Law<br>b. electricity<br>c. voltage<br>d. current<br>e. resistance<br>f. watts<br>g. alternating current (AC)<br>h. direct current (DC)<br>i. conductors<br>j. insulators<br>k. magnetism/induction<br>l. electronic diagnostic<br>m. relay circuits<br>2. Identify and describe the features and functions of the following:<br>a. devices used in measuring electricity<br>b. electrical circuits and their components<br>c. electrical systems found in cars<br>d. automotive storage battery<br>e. fuses<br>f. electrical accessories<br>3. Solve Ohm's Law problems.<br>4. Discuss and demonstrate multi-meter training<br>5. Discuss and demonstrate automotive circuits.<br>a. series circuits<br>b. parallel circuits<br>c. series parallel circuits | **Career Ready Practice:**<br>1, 2, 5, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.2, 5.4<br>Technical Knowledge and Skills:<br>10.1, 10.4<br><br>**CTE Pathway:**<br>C2.1, C3.1, C3.2, C3.3, C3.4, C3.5, C3.6 |
| **E. TOOLS AND EQUIPMENT**<br><br>Understand, apply, and evaluate the use, maintenance, and storage techniques for automotive tools and equipment. | 1. Identify and describe the features and functions of the most common<br>a. automotive hand tools<br>b. power tools and equipment<br>2. Describe and demonstrate the following:<br>a. selection of the appropriate hand, power tools, and equipment for each job<br>b. procedures for checking out hand, power tools, and equipment from the tool room<br>c. safe use of the most common hand, power tools and equipment in the auto shop<br>3. Identify and describe the features and functions of the most common high voltage tools and equipment:<br>a. Hybrid Multi meter<br>b. power tools and equipment<br>c. selection of the appropriate insulated hand tools<br>d. Megaohmmeter<br>e. Milliohmmeter/Micro<br>f. Battery chargers/maintainers/conditioners<br>g. Hybrid Engines | **Career Ready Practice:**<br>1, 2, 5, 6, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.2<br>Health and Safety:<br>6.3, 6.4<br>Technical Knowledge and Skills:<br>10.2, 10.4<br>Demonstration and Application:<br>11.1 |

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| (2 hours) | h. Hybrid CVT/Transaxles<br>i. Hybrid inverters/converters<br>j. High voltage battery packs | **CTE Pathway:**<br>C2.1, C2.2, C2.3, C2.4, C2.5 |
| **F. ENGINE DIAGNOSIS**<br><br>Understand, apply, and evaluate the principles of the internal combustion engine design.<br><br>(2 hours) | 1. Identify and discuss the features and functions of the following:<br>a. major parts of an automobile engine<br>b. different types of cylinder configurations<br>c. valve arrangements<br>i. overhead valve<br>ii. Single overhead cam<br>iii. Double overhead cam<br>2. Define and explain the four-stroke cycle.<br>3. Explain the key differences between Atkinson cycle & Otto cycle engine operation.<br>4. Identify and discuss proper operation of the Exhaust Gas Recirculation (EGR) System.<br>5. Identify and discuss operation of the Exhaust Heat Recirculation (EHR) System.<br>6. Perform engine compression test.<br>7. Define and explain the key differences in the catalyst system.<br>8. Identify and discuss electric water pump operation and perform inverter coolant exchange and bleeding procedures using specialized tools. | **Career Ready Practice:**<br>1, 2, 5, 6, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.2, 5.3, 5.4<br>Health and Safety:<br>6.3, 6.4, 6.5<br>Technical Knowledge and Skills:<br>10.1, 10.2, 10.4<br>Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C2.1, C2.6, C3.1, C3.2, C3.3, C3.4, C3.5, C6.4 |
| **G. TROUBLESHOOTING THE POWERTRAIN**<br><br>Understand, apply, and evaluate the principles and procedures used for Engine Systems. | 1. Identify and discuss internal combustion engine faults.<br>2. Determine if the engine can run.<br>3. Distinguish and determine if drivability problems are engine or hybrid related issues.<br>4. Identify and describe misfire related issues.<br>5. Identify and discuss Atkinson Cycle issues.<br>6. Perform Electric Water pump command, feedback and Current Test. | **Career Ready Practice:**<br>1, 2, 5, 6, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.2, 5.4<br>Health and Safety:<br>6.3, 6.6<br>Technical Knowledge and Skills:<br>10.1, 10.2, 10.4 |

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| (2 hours) | | Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C2.1, C2.2, C2.3, C2.6, C3.1, C3.4, C3.5, C3.6, C3.7, C5.6, C6.3 |
| **H. BATTERY CONSTRUCTION**<br><br>Understand, apply, and evaluate the principles and procedures used for Hybrid High Voltage battery systems.<br><br>(8 hours) | 1. Identify and discuss low voltage batteries such as the:<br>a. Absorbed Glass Matt (AGM) batteries<br>2. Discuss and determine low voltage battery faults and Secondary Symptoms.<br>3. Describe and demonstrate charging of AGM batteries and jump starting procedures.<br>4. Discuss and describe High Voltage (HV) battery construction.<br>5. Discuss and demonstrate HV battery health checks.<br>6. Identify HV battery Bus Bars and determine possible faults.<br>7. Discuss and demonstrate use of battery chargers and reconditioners.<br>8. Discuss and demonstrate removal of HV Service Disconnect Plugs and Devices.<br>9. Discuss and demonstrate enabling/disabling of HV components.<br>10. Identify and diagnose HV battery module failures.<br>11. Perform removal and installation of HV battery. | **Career Ready Practice:**<br>1, 2, 5, 6, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.2, 5.3<br>Health and Safety:<br>6.4, 6.5, 6.6<br>Technical Knowledge and Skills:<br>10.1, 10.2, 10.4<br>Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C1.2, C2.2, C3.4, C3.7, C5.5, C7.2, C7.3 |
| **I. HYBRID DRIVE SYSTEMS**<br><br>Understand, apply, and evaluate the principles and procedures of Hybrid Components. | 1. Review the features and functions of the Inverter/Converter system.<br>2. Identify and describe the following:<br>a. conductive charging<br>b. flywheel energy/power storage<br>c. Boost converters<br>d. AC current sensors<br>e. assist hybrid<br>f. full hybrid<br>g. mild hybrid<br>h. regenerative braking<br>i. parallel hybrid<br>j. series hybrid<br>k. electrolysis | **Career Ready Practice:**<br>1, 2, 5, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.2, 5.4 |

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| (7 hours) | L. series-parallel hybrid<br>3. Identify and describe the following types of power devices:<br>a. Constant Variable Transmission (CVT)/transaxles<br>b. Motor Generator ( MG 1)<br>c. Motor Generator ( MG 2)<br>d. Resolvers<br>e. Planetary Gear Set<br>4. Describe the differences between low voltage and HV voltage in terms of:<br>a. major components<br>b. diagnostics<br>c. operation of accessories<br>d. advantage and disadvantages | Technical Knowledge and Skills:<br>10.1, 10.2, 10.4<br>Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C2.2, C2.4, C6.1, C6.3, C6.4, C7.3, C7.4, C7.5, C7.6, C7.7, C8.6 |
| **J. SUPPORTING SYSTEMS**<br><br>Understand, apply, and evaluate the principles and procedures of heating, ventilation and air conditioning (HVAC) and power systems.<br><br>(3 hours) | 1. Discuss Air Conditioning (AC) system overview of the:<br>a. operation of accessories<br>b. advantages and disadvantages<br>c. major considerations when servicing an HV<br>d. air conditioning dyes and oils<br>2. Describe the differences between electric and mechanical compressors of the:<br>a. major components<br>b. power system<br>c. operation of accessories<br>d. advantage and disadvantages<br>e. major considerations when servicing AC systems<br>f. perform AC Service<br>3. Describe the differences between power and electric steering of the:<br>a. major components<br>b. power-steering system<br>c. operation of accessories<br>d. advantage and disadvantages<br>e. major considerations when servicing/Fault Diagnosis | **Career Ready Practice:**<br>1, 2, 5, 6, 10<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.1<br>Problem Solving and Critical Thinking:<br>5.1, 5.4<br>Health and Safety:<br>6.4, 6.6<br>Technical Knowledge and Skills:<br>10.1, 10.2, 10.4<br>Demonstration and Application:<br>11.1<br><br>**CTE Pathway:**<br>C2.2, C2.4, C3.2, C7.1, C7.5, C7.7, C8.4 |
| **K. EMPLOYABILITY SKILLS & RESUME PREPARATION**<br><br>Understand, apply, and evaluate the employability skills required in auto repair and maintenance. | 1. Understand employer requirements for soft skills such as:<br>a. punctuality and attendance<br>b. time management<br>c. flexibility and adaptability<br>d. interpersonal skills<br>e. work ethic<br>f. communication and collaboration<br>g. teamwork | **Career Ready Practice:**<br>1, 2, 3, 4, 5, 7, 8, 9<br><br>**CTE Anchor:**<br>Academics:<br>1.0<br>Communications:<br>2.2, 2.3, 2.4, 2.5 |

| COMPETENCY AREAS AND STATEMENTS | MINIMAL COMPETENCIES | STANDARDS |
|---|---|---|
| (1 hour) | h. critical thinking and problem solving<br>i. leadership and responsibility<br>j. ethical behavior<br>k. cultural and diversity differences<br>2. Create/revise a resume and cover letter.<br>3. Review the role of online job searching platforms and career websites.<br>4. Complete and/or review an on-line job application.<br>5. Understand interview skills to get the job:<br>a. do's and don'ts for job interviews<br>b. how to dress for the job<br>6. Create sample follow-up letters.<br>7. Understand the importance of the continuous upgrading of job skills as it relates to:<br>a. certification, licensure, and/or renewal<br>b. professional organizations/events<br>c. industry associations and/or organized labor | Career Planning and Management:<br>3.2, 3.3, 3.4, 3.6, 3.8<br>Technology:<br>4.1, 4.3<br>Problem Solving & Critical Thinking:<br>5.1<br>Responsibility and Flexibility:<br>7.2, 7.3, 7.4, 7.7<br>Ethics and Legal Responsibilities:<br>8.4<br>Leadership and Teamwork:<br>9.2, 9.3, 9.4, 9.6<br>Demonstration and Application:<br>11.5<br><br>**CTE Pathway:**<br>C5.1, C5.2, C5.5 |

## *SUGGESTED INSTRUCTIONAL MATERIALS and OTHER RESOURCES*

**TEXTBOOKS**

Duffy, James E. Modern Automotive Technology, 10th Edition. Goodheart-Willcox Publishing, 2022.

Halderman, James. Hybrid and Alternative Fuel Vehicles, 4th Edition. Pearson Publishing, 2016

Erjavec, Jack. Hybrid, Electric & Fuel-Cell Vehicles, 3rd Edition. Delmar Cengage, 2022.

Denton, Tom. Electric & Hybrid Vehicles, 1st Edition. Routledge, 2016.

Denton, Tom. Alternative Fuel Vehicles, 1st Edition. Routledge, 2018.

Ehsani, Mehrdad. Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, 3rd Edition. CRC Press, 2019.

Husain, Iqbal. Electric & Hybrid Vehicles: Theory & Design Fundamentals, 3rd Edition. CRC Press, 2021.

**RESOURCES**

Employer Advisory Board members

California Career Technical Education Model Curriculum Standards
https://www.cde.ca.gov/ci/ct/sf/documents/transportation.pdf

Automotive Service Excellence (ASE) Education Foundation 101 Blue Seal Dr. SE, Suite 101, Leesburg, VA 20175. Phone (703) 669-6650 Fax (703) 669-6125. https://www.aseeducationfoundation.org/

SkillsUSA P.O. Box 3000, Leesburg, VA 20177-0300. Phone: (703) 777-8810. Fax: (703) 777-8999. www. skillsusa.org

www.freeonlineautorepair.com/automotive_fuel_system.html

www.fueleconomy.gov

**COMPETENCY CHECKLIST**

## *TEACHING STRATEGIES and EVALUATION*

**METHODS AND PROCEDURES**

A. Lecture and discussion

B. Multimedia presentations

C. Visual aids

D. Projects

E. Individualized instruction

**EVALUATION**

SECTION A – Introduction – Pass all assignments with a minimum score of 80% or higher.

SECTION B – Safety - General – Pass all assignments and exams with a minimum score of 100% accuracy.

SECTION C – High Voltage Safety – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION D – Basic Automotive Electricity – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION E – Tools and Equipment – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION F – Engine Diagnosis – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION G – Troubleshooting the Powertrain – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION H – Battery Construction – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION I – Hybrid Drive Systems – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION J – Supporting Systems – Pass all assignments and exams with a minimum score of 80% or higher.

SECTION K – Employment Skills & Resume Preparation – Pass all assignments and exams with a minimum score of 80% or higher.

## *Standards for Career Ready Practice*

1. **Apply appropriate technical skills and academic knowledge.**
   Career-ready individuals readily access and use the knowledge and skills acquired through experience and education. They make connections between abstract concepts with real-world applications and recognize the value of academic preparation for solving problems, communicating with others, calculating measures, and performing other work-related practices.

2. **Communicate clearly, effectively, and with reason.**
   Career-ready individuals communicate thoughts, ideas, and action plans with clarity, using written, verbal, electronic, and/or visual methods. They are skilled at interacting with others: they are active listeners who speak clearly and with purpose, and they are comfortable with terminology that is common to workplace environments. Career-ready individuals consider the audience for their communication and prepare accordingly to ensure the desired outcome.

3. **Develop an education and career plan aligned with personal goals.**
   Career-ready individuals take personal ownership of their educational and career goals and manage their individual plan to attain these goals. They recognize the value of each step in the educational and experiential process, and they understand that nearly all career paths require ongoing education and experience to adapt to practices, procedures, and expectations of an ever-changing work environment. They seek counselors, mentors, and other experts to assist in the planning and execution of education and career plans.

4. **Apply technology to enhance productivity.**
   Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring and using new technology. They understand the inherent risks—personal and organizational—of technology applications, and they take actions to prevent or mitigate these risks.

5. **Utilize critical thinking to make sense of problems and persevere in solving them**
   Career-ready individuals recognize problems in the workplace, understand the nature of the problems, and devise effective plans to solve the problems. They thoughtfully investigate the root cause of a problem prior to introducing solutions. They carefully consider options to solve a problem and, once agreed upon, follow through to ensure the problem is resolved.

6. **Practice personal health and understand financial literacy.**
   Career-ready individuals understand the relationship between personal health and workplace performance. They contribute to their personal well-being through a healthy diet, regular exercise, and mental health activities. Career-ready individuals also understand that financial literacy leads to a secure future that enables career success.

7. **Act as a responsible citizen in the workplace and the community.**
   Career-ready individuals understand the obligations and responsibilities of being a member of a community and demonstrate this understanding every day through their interactions with others. They are aware of the impacts of their decisions on others and the environment around them, and they think about the short-term and long-term consequences of their actions. They are reliable and consistent in going beyond minimum expectations and in participating in activities that serve the greater good.

8. **Model integrity, ethical leadership, and effective management.**
Career-ready individuals consistently act in ways that align with personal and community-held ideals and principles. They employ ethical behaviors and actions that positively influence others. They have a clear understanding of integrity and act on this understanding in every decision. They use a variety of means to positively impact the direction and actions of a team or organization, and they recognize the short-term and long-term effects that management's actions and attitudes can have on productivity, morale, and organizational culture.

9. **Work productively in teams while integrating cultural and global competence.**
Career-ready individuals contribute positively to every team, as both team leaders and team members. To avoid barriers to productive and positive interaction, they apply an awareness of cultural differences. They interact effectively and sensitively with all members of the team and find ways to increase the engagement and contribution of other members.

10. **Demonstrate creativity and innovation.**
Career-ready individuals recommend ideas that solve problems in new and different ways and contribute to the improvement of the organization. They consider unconventional ideas and suggestions by others as solutions to issues, tasks, or problems. They discern which ideas and suggestions may have the greatest value. They seek new methods, practices, and ideas from a variety of sources and apply those ideas to their own workplace practices.

11. **Employ valid and reliable research strategies.**
Career-ready individuals employ research practices to plan and carry out investigations, create solutions, and keep abreast of the most current findings related to workplace environments and practices. They use a reliable research process to search for new information and confirm the validity of sources when considering the use and adoption of external information or practices.

12. **Understand the environmental, societal, and economic impacts of decisions.**
Career-ready individuals understand the interrelated nature of their actions and regularly make decisions that positively impact other people, organizations, the workplace, and the environment. They are aware of and utilize new technologies, understandings, procedures, and materials and adhere to regulations affecting the nature of their work. They are cognizant of impacts on the social condition, environment, workplace, and profitability of the organization.

## Statement for Civil Rights

All educational and vocational opportunities are offered without regard to race, color, national origin, gender, or physical disability.