Regional Occupational Program

Auto Technology 1 A-G 2026-2027

COURSE DESCRIPTION

This course provides instruction and training in automotive repair and maintenance specializing in engine tune-up and repair. Hands-on training experiences will include understanding, diagnosing, and repairing engines, drive train systems, braking, steering/suspension, heating and air conditioning systems, electrical and fuel/emission systems, and other automotive system fundamentals. Experience will be provided in using hand tools, power tools, testing and troubleshooting equipment, as well as using service manuals. Students that achieve competency in this course will obtain entry-level skills necessary for employment as an automotive service person. These skills will provide students with a solid foundation for continued training in this field.

Course Information:

Course Length:	1 Year
Prerequisite:	None
Course Level:	Concentrator
UC:	Yes G - Elective
Articulated:	No
Industry Cert.:	No
Industry Sector:	Transportation
Pathway:	Systems Diagnostics, Service and Repair
CALPADS:	8531

O*Net SOC Codes:

49-3023	Automotive Service Technicians and Mechanics
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists
49-1011	First Line Supervisors of Mechanics, Installers, and Repairers

Legend:

CTE - PS	CTE Pathway Standards
CRP	Career Ready Practices
CTE - AS	CTE Anchor Standards
CCSS	Common Core State Standards
ISTE	International Society for Technology in Education

Includes updates from 25/26 Transportation Advisory

Advisory Minutes

Auto Technology 1

Course Orientation

a. Discuss objectives for this course, including competencies, teacher expectations, classroom policies, and procedures.
b. Identify and discuss the acquisition of transferable skills (communication, collaboration, creativity, and critical thinking) and their importance to being college and career ready and for future personal and professional success.
c. Review objectives, competencies, and course syllabus.
d. Discuss student and teacher expectations including behavior, class rules, appropriate dress, pre-course knowledge, and grading policies, including enrollment and attendance requirements and procedures, and classroom/school safety and disaster procedures.
e. Discuss next steps in course sequence related to the career pathway, the need for reinforcement of basic skills, transferrable skills, and post-secondary and career options.
f. Discuss the Big Six: Career Ready Essentials and the Standards for Career Ready Practice as they relate to this course, all aspects of the industry sector, and being college and career ready.

Big Six: Career Ready Essentials

1. Effective Communication	CTE - PS	CRP	CTE - AS	CCSS	ISTE
a. Demonstrate effective verbal communication and conflict resolution skills. **b. Use the writing process to develop written communication with the appropriate tone, organization, and format for the identified audience.** c. Explain the effect of interpersonal skills on one's ability to communicate effectively and develop relationships. d. Describe the impact of ineffective communication on business relationships. e. Analyze the impact of vocabulary, body language, and tone on verbal communication. f. Demonstrate active listening skills. g. Accurately interpret industry-specific written communication. h. Model responsible and effective use of various communication technologies. i. Identify valid and reliable digital reference and resource materials. j. Gather information from multiple digital sources to compare and contrast, synthesize, and summarize. k. Identify and use appropriate communication and collaboration technologies. l. Utilize technology to problem solve, accomplish tasks, and to produce or publish products.		2 4 11	2 5 10	**LS** 9-10 11-12.6 **WS** 11-12.7 11-12.6	1b,c 2c 3b,c 5c 6b,c,d

2. Collaboration, Creativity, and Critical Thinking	CTE - PS	CRP	CTE - AS	CCSS	ISTE
a. Demonstrate critical thinking skills for a variety of purposes and in different settings. **b. Collaborate to reach consensus on an identical objective through the sharing of knowledge, tasks, and learning.** c. Discuss the importance of the critical thinking process to real-world applications. d. Evaluate the impact of creative thinking on problem solving and innovation in real-world applications.		5 9 10	5	**LS** 9-10 11- 12.6 **SLS** 9-10	1c 3c,d 4a-d 5c,d 6c 7b,c,d

e. Compile work that demonstrates the process used to (elaborate, refine, analyze) evaluate original ideas and maximize creative efforts. f. Apply divergent and convergent thinking to the development of an original idea or solution. g. Examine real-world limits to adopting ideas. h. Demonstrate creative thinking (preparation, insight, evaluation, elaboration, and communication) to create a new idea or concept. i. Assume shared responsibility for collaborative work, and value the individual contributions made by each team member. j. Evaluate evidence, arguments, claims, and beliefs to identify connections. k. Identify bias, prejudice, propaganda, self-deception, distortion, and misinformation. l. Produce intellectual, informational, or material products that serve an authentic purpose. m. Work effectively and respectfully with those from diverse backgrounds or cultures. n. Demonstrate respect, trust, commitment, and the ability to compromise in collaborative projects.				11-12.1 11-12.1d 11-12.2 **WS** 11-12.7 11-12.6	
3. Leaders and Teams: Roles and Responsibilities	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Determine the individual and team members' roles and responsibilities. **b. Demonstrate leadership skills and qualities (i.e., reliability, negotiation skills, initiative, positive reinforcement, recognition of others' efforts, problem-solving skills, conflict resolution, and delegation).** c. Explain the importance of technical, social, and communication skills to team success. d. Compare and contrast leadership styles and their effectiveness in various situations. e. Organize and delegate responsibilities in a team setting to encourage ideas, perspectives, and contributions from all team members. f. Develop a strong sense of team identity by brainstorming solutions, volunteering, assisting others, practicing respect and courtesy, and taking initiative. g. Examine situations in which a follower becomes the leader. h. Describe twenty-first-century skills required across all occupations. i. Identify and discuss the characteristics of a successful team (i.e., leadership, cooperation, and effective decision-making). j. Leverage social and cultural differences to increase innovation and quality of work.		7 9 10 12	5 7 9	**SLS** 11-12.2 9-10 11-12.1 11-12.1d **WS** 11-12.6	7a,c
4. Legal, Ethical, and Environmental Considerations	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate industry specific ethical and legal practices. **b. Identify eco-friendly industry specific practices and resources.** c. Identify local, state, and federal regulatory agencies, entities, laws, and regulations. d. Identify discrimination based on race, nationality, religion, gender, age, disability, or sexual orientation. e. Summarize the ethical and legal implications of workplace discrimination and harassment.		7 8 9 12	4 8	**WS** 11-12.6 11-12.7 **SLS** 9-10	2a,b 3a,b 5c 6c

f. Explain the concept of corporate citizenship. g. Examine an employer's role in protecting the health and welfare of employees, the community, and the environment. h. Analyze current environmental laws and regulations and their impact on industry. i. Compare and contrast both society's and industry's impact on the environment.				11-12.1 11-12.1d 11-12.2	
5. Personal Growth and Career Planning	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate continued personal development and growth. **b. Develop and manage a personal growth and career plan.** c. Explain the relationship between sound financial habits and financial security. d. Create and manage a personal financial plan. e. Demonstrate initiative in achieving personal and professional goals. f. Apply time management strategies to meet deadlines. g. Demonstrate a growth mindset through flexibility and a positive attitude. h. Select and demonstrate appropriate job-search and retention techniques. i. Demonstrate strategies to prepare for employment. j. Demonstrate interpersonal skills appropriate for the workplace. k. Elaborate on the importance of perseverance to personal and professional success. l. Discover personal career interests, aptitudes, and skills.		3	3	**LS** 9-10 11-12.6 **SLS** 9-10 11-12.1 11-12.1d 11-12.2 **WS** 11-12.6	1a 3a,c 4d 6a,d 7b
6. Workplace Safety and Personal Wellness	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate proper industry specific safe work practices to prevent injury or illness. **b. Assess the potential impact of goal setting on personal and professional success.** c. Describe the role of security and emergency procedures in workplace safety. d. Describe the effect of preventative measures on emergencies in the workplace. e. Identify and describe the causes, prevention, and treatment of common accidents. f. Identify local, state, and federal agencies that regulate workplace safety. g. Explain the role of the California Occupational Safety and Health Administration (Cal-OSHA) and the Environmental Protection Agency (EPA). h. Discuss the basics of system operations. i. Demonstrate the proper use of personal protective equipment (PPE). j. Explain the purpose of and accurately interpret a Safety Data Sheet (SDS). k. Identify hazardous materials and chemicals. l. Demonstrate proper procedures to respond to work-related accidents and injuries. m. Describe how ergonomics, housekeeping, and maintenance are related to accidents and injuries. n. Demonstrate cyber ethics, cyber safety, and cybersecurity. o. Assess the potential impact of preventative physical and mental health measures on workplace safety.		6 12	4 6 9	**LS** 9-10 11-12.6 **WS** 11-12.7 11-12.6 **SLS** 9-10 11-12.1 11-12.1d	1a,d 2a-d 5b

Auto Technology 1 Units of Instruction

7. Safety	CTE - PS	CRP	CTE - AS	CCSS	ISTE
a. Demonstrate the practice of personal and occupational safety and protecting the environment by using materials and processes in accordance with manufacturer and industry standards. **b. Follow proper machine safety techniques and procedures.** c. Explain and demonstrate safety rules for personal and general shop safety including PPEs-eye, ear, feet, and body protection. d. Identify and demonstrate the safe and proper use of common hand tools and power equipment. e. Utilize and define safety-color codes used throughout the transportation industry. f. Apply general safety rules associated with working on various vehicle systems, including hybrid, plug-in hybrid, electric, and other xEV/high-voltage vehicle systems. g. Apply rules and procedures associated with fire safety including procedures for using firefighting devices. h. Demonstrate the safe handling, storage and disposing of flammable liquids, chemicals, and hazardous waste in accordance with Safety Data Sheets (SDS) and the requirements of local, state, and federal regulatory agencies. i. Correctly interpret data found on a hazardous Safety Data Sheet (SDS) and government requirements. j. Describe first aid procedures for an accident involving hazardous materials. k. Demonstrate awareness of the safety aspects of high-voltage circuits and vehicle systems, including high intensity discharge (HID) lamps, ignition systems, and electrified vehicle high-voltage components. l. Explain the proper ventilation procedures for working within the lab/shop area.	C1.0 C1.1 C1.2 C1.4 C1.5 C2.0	1 2 5 6	1 2 5 6	**LS** 9-10 11-12.6 **WS** 11-12.7 **RSTS** 9-10 11-12.4	

8. Tools and Equipment	CTE - PS	CRP	CTE - AS	CCSS	ISTE
a. Demonstrate knowledge and basic skills in the safe handling practices of tools, equipment, and work process standards within the Automotive industry. b. Demonstrate the use of appropriate tools and equipment used to diagnose, service, repair, and maintain systems and components. c. Identify and demonstrate the safe and proper use of common hand tools, power equipment and lifting and hoisting equipment. d. Demonstrate safe and proper use and storage of tools and equipment. e. Identify standard and metric designation. f. Describe and demonstrate the safe and proper use of cleaning equipment. g. Organize and maintain a systematic storage system for hand and power tools. h. Demonstrate proper use of precision measuring tools (i.e., micrometer, dial-indicator, dial-caliper).	C2.0 C2.2 C2.5	1 2 5 6 10	1 2 5 6 11	**LS** 9-10 11-12.6 **WS** 11-12.7 **RSTS** 9-10 11-12.4	

9. Automotive History, Vehicle Design and ASE Careers	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge of the major events in the history of the automobile and its role in the economic, societal, and cultural changes in American culture. **b. Demonstrate knowledge of the ASE certification and career opportunities within the automotive industry.** c. Demonstrate knowledge of automotive history and its impact on current and future automotive design. d. Identify and describe careers within the automotive service industry. e. Describe the type of skills needed to be an automotive technician. f. Describe the reasons for the shortage of good, qualified auto technicians. g. Compare and contrast unibody construction with separate frame/body construction. h. Identify the components of front and rear wheel power drive trains. i. Identify different segments of the automotive industry. j. Describe the kind of work performed by technicians in different automotive specialty areas. k. Describe the ASE certification process for a technician and list the areas of certification. l. Identify and describe the function of major automotive components such as drive train system, brake, steering and suspension systems, electrical systems, computer systems, cooling and lubrication systems, exhaust systems, body/frame construction and safety systems.		1 2 3 5 11	1 2 3 5 11	**LS** 9-10 11-12.6 **SLS** 11-12.2 **WS** 11-12.7	
10. Service Information	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill in typical maintenance procedures and documentation in accordance with the recommendations of the manufacturer. b. Explain and communicate the procedures and practices of various manufacturers regarding service, repair, and maintenance schedules. c. Explain and demonstrate how to properly document maintenance and repair procedures in accordance with the applicable rules, laws, and regulations, e.g. Bureau of Auto Repair (BAR), Occupational Safety and Health Administration, (OSHA), and the California Air Resources Board (ARB). d. Explain and properly demonstrate the use of reference books, computer resources, technical service bulletins, and other documents to accurately diagnose and repair automotive systems. e. Identify applicable vehicle and service information, such as vehicle service history, service precautions, vehicle identification numbers, component identification numbers, and calibration labels.	C4.0 C4.1 C4.2 C4.3	1 2 4 5 11	1 2 4 5 11	**LS** 9-10 11-12.6 **WS** 11-12.6 11-12.7	
11. Math, Measurements, and Measuring Tools	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**

a. Demonstrate knowledge and basic skill in the performance in the use of measurement tools utilized within the automotive industry. b. Accurately measure the length of an object using a ruler. c. Accurately measure common automotive parts using a precision measuring device. d. Identify common fasteners and describe their use. e. Identify the different types of bolts, nuts and washers and describe their appropriate uses. f. Identify bolts by grade, diameter, length, and thread pitch. g. State safety rules relating to measurement. h. Demonstrate how to use a conversion measurement chart.	C2.1 C2.3 C2.4 C2.5 C2.7	1 2 5	1 2 5	**LS** 9-10 11-12.6 **WS** 11-12.7	
12. Lubrication Fundamentals	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge of the major components of an automotive lubrication system and their functions. b. Explain how to maintain, diagnose, service, and repair lubrication systems. c. Perform lubrication maintenance and a general inspection service. d. Discuss regularly scheduled maintenance procedures as outlined in the owner's manual and how they relate to vehicle performance and longevity. e. Complete a work order and maintenance record for given vehicle. f. Visually inspect the lubrication system for leaks and determine repairs needed. g. Select proper lubricants and filters for lubrication service. h. Change engine oil and filter in accordance with the manufacturer's specifications and follow proper disposal procedures. i. Perform a chassis and body lubrication. j. Inspect and service other filters on the engine such as, air, fuel, PCV valve and crankcase vent filters. k. Maintain, diagnose, service, and repair lubrication systems. l. Conduct a general preventative maintenance inspection of hoses, belts, fluid levels, wiper blades, headlights, accessory lights, exhaust and shocks and repair replace or adjust.	C6.2	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	
13. Engine Fundamentals	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge of the major engine components and explain the engine combustion process. b. Describe the principles of the internal combustion engine. c. Identify the visual checks to determine engine condition. d. Identify internal combustion engine parts by name. e. Describe the function of specific engine parts. f. Compare two-stroke and four- stroke engine cycles. g. Describe the operation of a four-stroke engine. h. Identify and describe common symptoms of mechanical problems in an engine.	C3.1 C6.0 C6.1	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	

14. Engine Cooling Fundamentals	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill of heating and cooling systems, including the function, maintenance, diagnosis, and repair. b. Describe the purpose of the cooling system. c. Describe the operation and service of the water pump. d. Explain how to perform cooling system pressure and dye tests; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action. e. Practice safe working strategies when testing, maintaining, or repairing the cooling system. f. List cooling system maintenance procedures. g. Inspect and pressure test a cooling system for proper operation. h. Identify and diagnose basic cooling problems. i. Identify proper service intervals for the cooling system. j. Define the characteristics of coolant and antifreeze. k. Explain the proper techniques to diagnose and repair cooling and lubrication systems.	C3.7 C6.2	1 2 5	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	
15. Fuel Systems Fundamentals	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge of automotive fuel systems and their operating principles. b. Describe fuel system and carburetor operation. c. Identify fuel injection system components. d. Identify the six components of the carburetor. e. Identify and describe types of fuel such as propane, diesel, natural gas, and gasoline. f. Identify and describe common fuel system problems and appropriate repair procedures. g. Identify and describe fuel systems operation. h. Identify and describe fuel systems operation and identify types of fuel. i. Compare the operating principles of a carburetor system to a fuel injection system. j. Demonstrate the use of appropriate diagnostic and maintenance techniques for fuel systems.	C6.4	1 2 5	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	
16. Basic Automotive Electrical Systems	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill of automotive electrical system components, including diagnostic and repair. b. Describe the safety practices that should be followed when working with electrical systems. c. Describe the flow of electricity in a simple circuit including voltage, amperage, and resistance. d. Utilize electrical test instruments to measure voltage, amperage, and resistance. e. Interpret wiring diagrams for a given vehicle and identify the electrical symbols.	C2.3 C3.5 C7.0 C7.1 C7.2	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	

f. Explain how to construct a simple DC circuit and test for power and continuity. g. Identify charging and starting system components and summarize their operation. h. Perform basic charging and starting system tests. i. Start a vehicle using jumper cables or an auxiliary power supply. j. Demonstrate the necessary skills to perform battery capacity testing. k. Clean and service a battery including the case, cables, connections, and check electrolytes. l. Identify and describe conventional ignition system components. m. Identify and describe electronic ignition system components. n. Compare the operating principles of a distributor system to an electronic ignition system. o. Describe horn and turn signal circuit operation. p. Discuss the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits.					
17. Tires and Wheels	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill in tire structure, sizing, maintenance, and repair of tires and wheels. b. Identify types and classes of tires. c. Demonstrate the skills needed to rotate tires in accordance with the manufacturer's recommendations. d. Explain how to remove and install a wheel assembly to manufacturer's specifications. e. Describe how to inspect tires for proper inflation and abnormal wear. f. Demonstrate how to balance tires to industry standards. g. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. h. Describe the necessary action by identifying tire condition, wear patterns, correct size, and application (load and speed ratings) and air pressure.	C8.5	1 2 5	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	
18. Braking Systems	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill of automotive braking systems, their components, functionality, maintenance, diagnosis, and repair. b. Describe and identify brake system components. c. Evaluate and diagnose basic brake systems. d. Compare hydraulic, drum, and disc brake systems. e. Describe the principles of friction, hydraulic circuits, and braking system operation. f. Diagnose common brake problems and identify appropriate service procedures. g. Evaluate and diagnose parking brake operation and parking brake indicator light system operation. h. Explain procedures for dismantling and cleaning brake system parts, including protection from hazards associated with asbestos brake pads and shoes.	C8.3	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	

i. Analyze and diagnose brake system problems. j. Explain the procedures for dismantling and cleaning a brake system and its parts. k. Explain how an overhaul for a disc-type brake system and drum-type brake system. l. Demonstrate proper procedures to remove, bench bleed and replace a master cylinder. m. Explain how to check and repair/replace damaged brake lines. n. Describe how to bleed the brake system. o. Describe the operation of anti-lock brake systems and how to repair problems in anti-lock brake systems. p. Describe procedures for performing a road test to check brake system operation, including an anti-lock brake system (ABS) and related safety system operation.					
19. Short Block Engine Diagnosis and Repair	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skills in short and long block components, functionality, and assemblage. b. Explain the construction of different types of cylinder blocks. c. Identify piston, piston ring, crankshaft, oil pump, camshaft, connecting rod, and describe their purposes in a short block. d. Demonstrate how to measure all components to .001 of an inch in a short block using a micrometer. e. Explain how to diagnose engine noises and vibrations. f. Determine needed replacement parts when performing a lower engine rebuilding job. g. Demonstrate and explain how to assemble a short block unit.	C2.5 C3.1 C6.0	1 2 5	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	
20. Drive Train Systems	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill of drive train systems, components, functionality, diagnosis, and repair. b. Explain how to perform a basic driveline diagnostic check. c. Evaluate, diagnose, and replace universal joints. d. Identify differential problems and appropriate repair services. e. Demonstrate how to correctly measure differential backlash using a dial indicator. f. Evaluate and diagnose constant-velocity (CV) joint noise and vibration problems. g. Describe how to remove and replace a CV-axle assembly. h. Diagnose and repair axles, axle bearings and seals. i. Demonstrate and evaluate how to remove, repair, and reassemble a clutch assembly including the flywheel, pressure plate, disc, and release assembly. j. Explain how to adjust clutch linkage for free travel. k. Demonstrate skills to correctly perform a basic automatic transmission service.	C8.0 C8.6	1 2 5 11	1 2 5 11		

l. Compare the operation of a conventional transmission to the operation of an electronic transmission, including precautions to be followed in the routine service of an electronic transmission. m. Demonstrate how to perform a service on a transmission that includes changing fluid and filters. n. Visually evaluate a transmission, check for leaks and examining the condition of fluid. o. Explain how to remove and replace a transaxle. p. Identify and explain common transaxle and drive axle problems.					
21. Suspension Systems, Steering and Wheel Alignment	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill of automotive suspension systems, the components, and functions of steering/suspension and wheel alignment. b. Compare and contrast the various types of suspension systems, including conventional, strut and electronic. c. Evaluate suspension components and determine repairs. d. Describe the function of each suspension system component. e. Diagnose and describe how to service steering system components. f. Explain the procedures used to prepare a vehicle for a two and four-wheel alignment, including manufacturer-required sensor checks. g. Describe wheel alignment angle. h. Diagnose wheel alignment related problems. i. Perform a two and four-wheel alignment using computer operated wheel alignment equipment. j. Perform diagnosis and service procedures on a MacPherson Strut suspension system. k. Perform diagnosis and service procedures on a conventional suspension system. l. Diagnose and service rack and pinion steering. m. Explain the diagnosis and service of gearbox type power steering systems.	C8.4 C8.6	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	
22. Heating and Air Conditioning	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skill of heating and cooling systems, including components, functionality, maintenance, diagnosis, and repair. b. Identify safety precautions and refrigerant handling requirements, including Section 609 certification awareness, when working on heating and air conditioning systems. c. Describe the basic operation and function of air conditioning and heater system components. d. Diagnose common heating and air conditioning problems and determine if repairs are needed. e. Diagnose automatic temperature control problems on a heater/air conditioning system. f. Describe the basic operation and function of air conditioning system components.	C3.2 C7.5	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	

g. Explain how to replace major air conditioning and heating components. h. Test the operation of the air conditioning system and measure the system operating pressures. i. Describe the general procedures for evacuating and charging an air conditioning system using approved refrigerant-handling equipment and manufacturer procedures. j. Check the system for leaks, determine necessary repairs, and follow refrigerant handling requirements.					
23. Safety Systems, Security, and Navigation Systems	**CTE - PS**	**CRP**	**CTE - AS**	**CCSS**	**ISTE**
a. Demonstrate knowledge and basic skills in the operation, functionality, diagnosis, and repair of automotive safety, security, and navigation systems. b. Explain how to inspect and service seat belts. c. Summarize the operation of restraint system sensors, inflator modules, and electronic control modules. d. Describe safety procedures for air bag diagnosis, repair, and replacement. e. Describe testing and repair procedures for passive restraint systems. f. Disable and enable supplemental restraint systems according to manufacturer's specifications. g. Explain how to safely service and replace air bags and their sensors. h. Describe how to service an air bag controller. i. Explain the operation of vehicle security systems. j. Explain the operation of vehicle navigation, camera, and ADAS systems. k. Describe how to install a security system. l. Diagnose and repair security system problems. m. Describe the basic operation of advanced driver assistance systems (ADAS) and explain the importance of following manufacturer procedures for inspection, service, and required recalibration/relearn procedures after repairs or adjustments.	C3.7	1 2 5 11	1 2 5 11	**LS** 9-10 11-12.6 **WS** 11-12.7	

A-G Approved Key Assignments	
1.	Research and present on an assigned topic regarding safety in the transportation industry. *Unit(s) 7*
2.	Pass a written and demonstration-based shop safety test with a 90% or better. *Unit(s) 7*
3.	Make a video tutorial for assigned tools. The tutorial should demonstrate proper use, safety precautions, maintenance, and storage practices. Organization and cleanliness of shop areas will be assessed regularly. *Unit(s) 8*
4.	Research the automotive industry for an assigned decade and create a presentation that includes makes and models of cars, detail the newest technologies and innovations (e.g., drive train system, brake, steering and suspension systems, electrical systems, computer systems, cooling and lubrication systems, exhaust systems, body/frame construction and safety systems) and the impact of transportation on the economy, society, and American cultural. *Unit(s) 9*
5.	Research careers in the automotive industry and complete a graphic organizer to compare and contrast at least two different careers. *Unit(s) 9*
6.	Research maintenance schedules for an assigned make, model, and year of a car and create a table that is. *Unit(s) 10*
7.	Accurately use a ruler and a precision measuring device. Select the proper types of bolts, nuts, and washers for a given task. *Unit(s) 11*
8.	Write a work order and perform scheduled maintenance of an automotive lubrication system and conduct a general preventative maintenance inspection (hoses, belts, fluid levels, wiper blades, headlights, accessory lights, exhaust, shocks) and take appropriate action as needed. When work is completed, the student will accurately update the vehicle's maintenance record. *Unit(s) 12*
9.	Successfully complete a visual check to determine the condition of an engine. Identify, correctly name, and describe the function of all internal combustion engine parts. *Unit(s) 13*
10.	Write a work order for the scheduled maintenance of a heating and cooling system. Conduct a general preventative maintenance inspection (system pressure and dye tests, check coolant condition and level, inspect and test radiator, pressure cap, coolant recovery tank, and heater core) to determine and perform necessary action. When work is completed, students will accurately update the vehicles maintenance record. *Unit(s) 14*
11.	Write a two-page paper comparing the operating principles of a carburetor system to a fuel injection system. U*nit(s) 15*
12.	Demonstrate safety practices to be followed diagnosing and repairing electric systems. Accurately use electrical test instruments to measure voltage, amperage, and resistance. Clean and service a battery including the case, cables, connections, and check electrolytes. *Unit(s) 16*
13.	Successfully perform maintenance and repair of tires and wheels. *Unit(s) 17*
14.	Pass a braking system test identifying and describing components, functionality, maintenance, diagnosis, and repair. *Unit(s) 18*
15.	Create a steps list detailing how to assemble a short block. Students will then be tasked with assembling a short block unit using their list as a guide. *Unit(s) 19*
16.	Successfully demonstrate each of the following *Unit(s) 20*: • Evaluate, diagnose, and replace universal joints. • Diagnose and repair axles, axle bearings, and seals. • Remove, repair, and reassemble a clutch assembly including the flywheel, pressure plate, disc, and release assembly. • Basic automatic transmission service.
17.	Successfully perform a two and four-wheel alignment using computer operated wheel alignment equipment. *Unit(s) 21*
18.	Demonstrate maintenance, diagnosis, and repair of heating and cooling systems. *Unit(s) 22*
19.	Research the history of automotive safety and identify major advances in restraint systems, airbags, sensors, cameras, etc. Write a 2-3 page paper exploring the impact of the advances on the fatality rates of automotive accidents and the importance of maintenance to these systems. *Unit(s) 23*

Standards Alignment

The curricula have been aligned with the CTE Model Curriculum Standards released in 2013. Each industry sector was updated to meet the increased rigor and relevancy requirements of the Common Core State Standards. The curriculum also includes the new Standards for Career Ready Practices.

Standards for Career Ready Practice

1. *Apply appropriate technical skills and academic knowledge.*
2. *Communicate clearly, effectively, and with reason.*
3. *Develop an education and career plan aligned with personal goals.*
4. *Apply technology to enhance productivity.*
5. *Utilize critical thinking to make sense of problems and persevere in solving them.*
6. *Practice personal health and understand financial literacy.*
7. *Act as a responsible citizen in the workplace and the community.*
8. *Model integrity, ethical leadership, and effective management.*
9. *Work productively in teams while integrating cultural and global competence.*
10. *Demonstrate creativity and innovation.*
11. *Employ valid and reliable research strategies.*
12. *Understand the environmental, social, and economic impacts of decisions.*

CTE Anchor Standards—Common Core English Language Arts Alignment

Anchor Standard 2: Communications

Language Standard: Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the (career and college) readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. LS 9-10, 11-12.6

Anchor Standard 3: Career Planning and Management

Speaking and Listening Standard: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SLS 11-12.2

Anchor Standard 4: Technology

Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments and information.

Anchor Standard 5: Problem Solving and Critical Thinking

Writing Standard: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow, or broaden the inquiry when appropriate, and synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WS 11-12.7

Anchor Standard 6: Health and Safety

Reading Standards for Science and Technical Subjects: Determine the meaning of symbols, key words, and other domain-specific words and phrases as they are used in a specific scientific or technical context. RSTS 9-10, 11-12.4

Anchor Standard 7: Responsibility and Flexibility

Speaking and Listening Standard: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others' ideas and expressing their own clearly and persuasively. SLS 9-10, 11-12.1

Anchor Standard 8: Ethics and Legal Responsibilities

Speaking and Listening Standard: Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the work. SLS 11-2.1d

Anchor Standard 9: Leadership and Teamwork

Speaking and Listening Standard: Work with peers to promote civil, democratic discussions and decision making; set clear goals and deadlines; and establish individual roles as needed. SLS 11-12.1b

Anchor Standard 10: Technical Knowledge and Skills

Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. WS 11-12.6

Anchor Standard 11: Demonstration and Application

Demonstrate and apply the knowledge and skills contained in the industry-sector anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and the career technical student organization. Note: no alignment evident for this standard. WS 11-12.6

Transportation

C. Systems Diagnostics, Service, and Repair Pathway

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.

C1.1 Know and understand common environmental conservation practices and their applications.

C1.2 Practice the safe handling and storage of chemicals and hazardous wastes in accordance with Material Safety Data Sheets (MSDS) and the requirements of local, state, and federal regulatory agencies.

C1.4 Use appropriate personal protective equipment and safety practices.

C1.5 Evaluate the advantages and disadvantages of existing, new, and emerging systems and the effects of those systems on the environment.

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

C2.1 Recognize the importance of calibration processes, systems, and techniques using various measurement and testing devices.

C2.3 Use tools, equipment, and machines to safely measure, test, diagnose, and analyze components and systems (e.g., electrical, and electronic circuits, alternating- and direct-current applications, fluid/hydraulic and air/pneumatic systems).

C2.5 Use measurement scales, devices, and systems, such as dial indicators and micrometers, to design, fabricate, diagnose, maintain, and repair vehicles and components following recommended industry standards.

C3.1 Describe the operating principles of internal and/or external combustion engines.

C3.2 Describe the function and principles of air-conditioning and heating systems.

C3.5 Practice the basic principles of electricity, electronics and electrical power generation, and distribution systems.

C3.7 Perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and malfunctions.

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

C4.1 Communicate the procedures and practices of various manufacturers regarding service, repair, and maintenance schedules.

C4.2 Demonstrate how to properly document maintenance and repair procedures in accordance with applicable rules, laws, and regulations (e.g., Bureau of Auto Repair [BAR], Occupational Safety and Health Administration [OSHA], and the California Air Resources Board [ARB]).

C4.3 Use reference books, technical service bulletins, and other documents and materials related to the service industry available in print and through electronic retrieval systems to accurately diagnose and repair systems, equipment, and vehicles.

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

C6.1 Perform general engine maintenance, diagnosis, service, and repair in accordance with portable national industry standards, such as the National Automotive Technicians Education Foundation and the Equipment and Engine Training Council.

C6.2 Maintain, diagnose, service, and repair lubrication and cooling systems.

C6.4 Maintain, diagnose, service, and repair ignition, electronic, and computerized engine controls, and fuel management systems.

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

C7.1 Practice maintenance, diagnosis, and repair of electrical systems.

C7.2 Maintain, diagnose, repair, and service batteries.

C7.5 Diagnose, service, and repair heating and air-conditioning systems and components.

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.

C8.2 Describe the function and operation of automatic and manual transmissions and transaxles.

C8.3 Diagnose, service, and repair disc brakes, drum brakes, antilock brakes, and other brake systems as developed.

C8.4 Diagnose, service, and repair steering and suspension systems.

C8.5 Interpret tire and rim sizing to select appropriate wheels and tires for vehicles.

C8.6 Maintain, diagnose, service, and repair under-vehicle systems and malfunctions.

ISTE Standards for Students

1. Empowered Learner- Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.

a) Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.

b) Students build networks and customize their learning environments in ways that support the learning process.

c) Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways

d) Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

2. Digital Citizen- Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.

a) Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.

b) Students engage in positive, safe, legal, and ethical behavior when using technology, including social interactions online or when using networked devices.

c) Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.

d) Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.

3.Knowledge Constructor- Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

a) Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

b) Students evaluate the accuracy, perspective, credibility and relevance of information, media, data, or other resources.

c) Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

d) Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.

4. Innovative Designer- Students use a variety of technologies within a design process to identify and solve problems creating new, useful, or imaginative solutions.

a) Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems.

b) Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

c) Students develop, test, and refine prototypes as part of a cyclical design process.

d) Students exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.

5. Computational Thinker- Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

a) Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.

b) Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.

c) Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

d) Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

6. Creative Communicator- Students communicate clearly and express themselves creatively for a variety of purposes using platforms, tools, styles, formats, and digital media appropriate for their goals.

a) Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

b) Students create original works or responsibly repurpose or remix digital resources into new creations.

c) Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.

d) Students publish or present content that customizes the message and medium for their intended audiences.

7. Global Collaborator- Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.

a) Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.

b) Students use collaborative technologies to work with others, including peers, experts, or community members, to examine issues and problems from multiple viewpoints.

c) Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.

d) Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.