Prepares Students for College and Careers

▲ Automotive Technology II (g)

COURSE CODES:

▲ROP 67025 ▲WUHSD 8043A4/8045A4 ▲ERUSD 00000 ▲State (CALPADS) 8532

Course Leads to: Post-Secondary Education, Certification, and Employment

Industry Sector: Transportation **Career Pathway:** Systems Diagnostics, Service, and Repair – 221

Classroom Hours: 360 **Course Level:** Capstone

Work Based Learning: 180 (optional)

Textbook/Curriculum: ShopKey Pro, All Data, CDX, NC3

POST-SECONDARY EDUCATION

Articulation with College	Yes
Dual Enrollment with College	No
UC Approved a-g elective credit	Yes (g)

COLLEGE MAJORS

Electrical Engineering Technology
Engineering Technology
Heating, Ventilation, Air-Conditioning, and Refrigeration Technology
Mechanical Engineering
Robotics Technology
Industrial and Product Design

INDUSTRY CERTIFICATIONS

NC3, SP2, MACS, ALLDATA

NEXT STEPS

ROP ASE Certification Course
Rio Hondo Community College

EMPLOYMENT

Related Careers (O*NET)

17-2141.02	Automotive Engineers
49-3023.00	Automotive Service Technicians and Mechanics
49-3023.02	Automotive Specialty Technicians
17-2141.00	Mechanical Engineers
41-2022.00	Parts Salespersons

Prerequisites:
Successful completion of Automotive Technology I at 70% or better is required.

Course Description:
Automotive Technology II builds on the student's knowledge gained in Automotive Technology I and further enhances their entry-level skill training in suspension and steering, electrical/electronic systems, brakes, and engine performance. Learning areas also include engine tune-up, tires, auto cooling, and operation of special electronic testing equipment. Students who complete the additional 2-years of Automotive Academy are eligible to participate in community classroom and may be placed with an Automotive Dealership as an intern.

Integrated throughout the course are standards for Career Ready Practice and Academic Content Standards which include: appropriate technical skills and vocabulary and academic knowledge; communication skills; career planning; applied technology; critical thinking and problem solving; personal health and financial literacy; citizenship, integrity, ethical leadership and effective management; work productively while integrating cultural and global competence; creativity and innovation; reliable research strategies, and environment, social and economic impacts of decisions.

COURSE OUTLINE

I. ORIENTATION

A. Introduce course and facilities
B. Discuss syllabus and major objectives
C. Explain attendance, grading, classroom procedures, code of conduct
D. Complete course safety requirements/test
E. Evening of Excellence Essay

II. HISTORY OF AUTOMOTIVE SERVICES

A. Research and understand various occupations within the Automotive Services industry sector
B. Prepare a resume, demonstrate a professional interview, and explore job search skills
C. Discuss environmentally-sound practices and sustainability within the industry sector

III. SUSPENSION AND STEERING - I

A. Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction
B. Identifies and interprets suspension and steering concern; determines necessary action
C. Researches applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins.
D. Locates and interprets vehicle and major component identification numbers (VIN, vehicle certification labels, calibration decals)
E. Demonstrates SRS (Air Bag) disable and service
F. Removes and replaces steering wheel. Center/time supplemental restraint system (SRS) coil (clock spring)
G. Diagnoses power steering gear (non-rack and pinion) binding, uneven turning effort, looseness, hard steering, noise and fluid leakage concerns; determines necessary action
H. Diagnoses power steering gear (rack and pinion) binding, uneven turning effort, looseness, hard steering, noise and fluid leakage concerns; determines necessary action
I. Inspects steering shaft universal-joint(s), flexible coupling (s), collapsible column, lock cylinder mechanism and steering wheel; performs necessary action
J. Adjusts manual or power non-rack and pinion worm preload and sector lash
K. Removes/replaces manual or power rack and pinion steering gear; inspects mounting bushings and brackets
L. Removes/replaces manual or power rack and pinion steering gear; inner tie rod sockets and bellows
M. Demonstrates power steering fluid type, level check and condition
N. Flushes, fills and bleeds power steering system
O. Inspects and replaces power steering fluid leakage; determines action
P. Removes, inspects, replaces and adjusts power steering pump belt
Q. Removes and reinstalls power steering pump
R. Removes and reinstalls power steering pump pulley; checks pulley and belt alignment
S. Inspects and replaces power steering hoses and fittings
T. Inspects and replaces pitman arm, relay (center link/intermediate) rod, idler arm and mountings, and steering linkage damper
U. Inspects, replaces and adjusts tie rod ends, tie rod sleeves and clamps
V. Demonstrates diagnoses, electronically controlled suspension using scan tool
W. Inspects and tests non-hydraulic electric power assist steering
X. Identifies hybrid vehicle power steering system, electrical circuits, service, and safety precautions
Y. Demonstrates front suspension diagnosis: LASA Suspension and Strut Suspension, noise, body sway and ride height

IV. SUSPENSION AND STEERING – II

A. Demonstrates front strut suspension diagnosis: Strut Suspension, noise, body sway and ride height
B. Demonstrates lower and upper control arm service
C. Demonstrates strut rod bushing removal and replacement
D. Demonstrates remove, inspect and/or replace ball joint, upper or lower service
E. Demonstrates steering knuckle assembly removal and replacement
F. Demonstrates inspect, replace coil spring replacement (L.A.S.A.)

G. Demonstrates torsion bar suspension service
H. Demonstrates stabilizer bar bushing and link removal and replacement
I. Removes, inspects and installs strut cartridge, coil spring, insulators or bearing (front)
J. Demonstrates knowledge of lubrication
K. Demonstrates vehicle service diagnostics
L. Demonstrates SRS (Air Bag) disable and service
M. Removes and replaces steering wheel. Center/time supplemental restraint system (SRS) coil (clock spring)
N. Demonstrates knowledge of steering column and related mechanism inspection
O. Demonstrates power steering and rack and pinion service and diagnosis
P. Demonstrates power steering fluid level check and inspection and hoses inspection and replacement
Q. Demonstrates power steering pump pressure check and service
R. Demonstrates steering component removal and replacement
S. Demonstrates rack and pinion tie rod end removal and replacement
T. Demonstrates knowledge of variable assist steering systems using scan tool
U. Inspects and tests non-hydraulic electric power assist steering
V. Identifies hybrid vehicle power steering electrical circuits, service and safety precautions
W. Demonstrates front suspension diagnosis: LASA Suspension and Strut Suspension
X. Demonstrates lower and upper control arm service
Y. Demonstrates strut rod bushing removal and replacement
Z. Demonstrates ball joint service: LASA Suspension

V. SUSPENSION AND STEERING – III

A. Diagnoses tire wear patterns; determines necessary action
B. Inspects tires; checks and adjusts air pressure
C. Diagnoses wheel/tire vibration, shimmy and noise; determines necessary action
D. Rotates tires according to manufacturer's recommendations
E. Measures wheel, tire, axle, and hub runout; determines necessary action
F. Diagnoses tire pull (lead) problem; determines necessary action
G. Balances wheel and tire assembly (static and dynamic)
H. Dismounts, inspects and remounts tire and wheel
I. Dismounts, inspects and remounts tire on wheel equipped with tire pressure sensor
J. Reinstalls wheel: Torque lug nuts
K. Inspects tire and wheel assembly for air loss; performs necessary action
L. Repairs tire using internal patch
M. Inspects, diagnoses and calibrates tire pressure monitoring system
N. Demonstrates proficiency in using oxy-acetylene torch to heat and cut metal

VI. ELECTRICAL/ ELECTRONIC SYSTEMS – I

A. Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and erosion
B. Identifies and interprets electrical/electronic system concern; determines necessary action
C. Researches applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins
D. Locates and interprets vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals)
E. Diagnoses electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law)
F. Uses wiring diagrams during diagnoses of electrical circuit problems
G. Demonstrates the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems
H. Checks electrical circuits with a test light; determines necessary action

COURSE OUTLINE

I. Measures source voltage and performs voltage drop tests in electrical/electronic circuits using a voltmeter, determines necessary action
J. Measures current flow in electrical/electronic circuits and components using an ammeter; determines necessary action
K. Checks continuity and measure resistance in electrical/electronic circuits and components using an ohmmeter; determines necessary action
L. Checks electrical circuits using fused jumper wires; determines necessary action
M. Locates shorts, grounds, opens and resistance problems electrical/electronic circuits; determines necessary action
N. Measures and diagnoses the cause (s) of excessive key-off battery drain (parasitic draw); determines necessary action
O. Knowledge of inspection, testing and repair of fusible links, circuit breakers, fuses: determines needed repair
P. Demonstrates inspection and test of connectors, relays, solenoids devices and wires of electrical circuit, performs necessary repairs
Q. Demonstrates remove and replace terminal end from connectors
R. Demonstrates repair of connectors and terminal ends
S. Repairs wiring harness (including CAN/BUS systems)
T. Performs solder repair of electrical wiring
U. Identifies location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures
V. Performs battery state-of-charge test, determines needed action
W. Performs battery capacity test (or conductance test); confirms proper battery capacity for vehicle application; determines necessary action
X. Demonstrates, maintains or restores electronic memory functions
Y. Inspects and cleans battery cables, connectors, clamps & hold downs, repair as needed
Z. Knowledge of boost starting and jump starting a vehicle

VII. ELECTRICAL/ ELECTRONIC SYSTEMS – II

A. Identifies high voltage circuits of electric or hybrid electric vehicle and related safety precautions
B. Identifies electronic modules, security systems and/or radios that require re-initialization or code entry following battery disconnect
C. Identifies hybrid vehicle auxiliary (12v) battery service, repair and test procedures
D. Performs starter current draw test, determines necessary action
E. Demonstrates ability to test the starter circuit breakers and remove and replace starters
F. Demonstrates remove and install starter in vehicle
G. Inspects and tests switches, connectors and wires of starter control circuits; performs necessary action
H. Differentiates between electrical and/or engine mechanical problems that cause a slow-crank or
I. no-crank condition
J. Performs charging system output test; determines necessary action
K. Diagnoses charging system for the cause of undercharge, no-charge, and overcharging conditions
L. Inspects, adjusts or replaces generator (alternator) drive belts, pulleys and tensioners; checks pulley and belt alignment
M. Demonstrates ability to remove and reinstall alternator
N. Performs charging circuit voltage drop tests; determines necessary action
O. Demonstrates the cause of brighter than normal, intermittent, dim or no light operation; determines necessary action
P. Demonstrates inspection, diagnosis and test turn signal and hazard light circuit operation
Q. Identifies system voltage and safety precautions associated with high intensity discharge headlights
R. Inspects and tests sensors, connectors and wires of electronic (digital) instruments circuits; determines necessary action
S. Demonstrates inspect & test gauges and sending units for cause of intermittent, high, low or no gauge readings; determines necessary action

T. Demonstrates ability to inspect and test connectors, wires and printed circuit boards of gauge circuits
U. Diagnoses the cause of incorrect operation of warning devices and other driver information systems; determines necessary action
V. Inspects and tests sensors, connectors and wires of electronic (digital) instruments circuits; determines necessary action
W. Demonstrates ability to diagnose problems in the horn system
X. Diagnoses incorrect wiper operation; diagnoses wiper control and park problems; performs necessary action
Y. Diagnoses incorrect washer operation; performs necessary action

VIII. ELECTRICAL/ ELECTRONIC SYSTEMS – III

A. Demonstrates diagnosis of incorrect operation of motor-driven accessory circuits; determines necessary action
B. Demonstrates ability to diagnose incorrect operation of heated glass, mirror or seat operation; determines necessary action
C. Demonstrates ability to diagnose incorrect operation of electric door lock; determines necessary action
D. Demonstrates ability to diagnose incorrect operation of cruise control system
E. Demonstrates ability to diagnose supplemental restraint system (SRS) concerns; determines necessary action
F. Demonstrates ability to disarm and arm bag system
G. Demonstrates ability to diagnose problems in radio
H. Demonstrates ability to remove and reinstall door panel
I. Demonstrates ability to check for module communication errors using scan tool
J. Demonstrates ability to diagnose cause of false, intermittent or no operation of anti-theft system

IX. BRAKES - I

A. Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction
B. Identifies and interprets electrical/electronic system concerns; determines necessary action
C. Researches applicable vehicle and service information such as electrical/electronic system operation, vehicle service history, service precautions and technical service bulletins
D. Locates and interprets vehicle and major component identification numbers (VIN, vehicle certification labels and calibration decals)
E. Diagnoses pressure concerns in the brake system using hydraulic principles (Pascal's Law)
F. Measures brake pedal height; determines necessary action
G. Demonstrates inspection of mastery cylinder for internal and external leaks and proper operation: determines needed repairs
H. Removes, bench bleeds, and reinstalls master cylinder
I. Inspects brake lines, flexible hoses and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and support; determines necessary action
J. Demonstrates, fabricates and/or installs brake lines (flare): replaces hoses, fittings, and supports
K. Selects, handles, stores and fills brake fluids to proper level
L. Inspects, tests and/or replaces metering (hold-off), proportioning (balance), pressure differential and combination valves
M. Inspects, tests and adjusts height (load) sensing proportioning valve
N. Inspects, tests and/or replaces components of brake warning light system
O. Bleeds (manual, pressure, vacuum or surge) brake system
P. Diagnoses poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determines necessary action
Q. Demonstrates, removes, cleans, inspects and measures brake drums; determines needed action
R. Knowledge of brake drum service/refinishing
S. Demonstrates, removes, cleans and inspects brake shoes, springs, pins, clips, levers, adjusters, and other related brake hardware and backing support plates. Lubricates and reassembles hardware

T. Demonstrates removal, inspection and installation of wheel cylinder service
U. Pre-adjusts brake shoes and parking brake before installing brake drums or drum/hub assemblies and wheel bearings
V. Installs wheels, torque lug nuts, and makes final checks and adjustments
W. Diagnoses poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determines necessary action
X. Demonstrates removal of caliper, cleans and inspects caliper for leaks and damage to caliper housing; determines necessary action
Y. Cleans and inspects caliper mounting and slides for wear and damage; determines necessary action

X. BRAKES - II

A. Reassembles, lubricates and reinstalls caliper, pads and related hardware; seat pads and inspects for leaks
B. Cleans, inspects and measures rotor with a dial indicator and a micrometer; follows manufacturer's recommendations in determining need to machine or replace
C. Removes and installs rotor
D. Refinishes rotor on vehicle
E. Refinishes rotor off vehicle
F. Adjusts calipers equipped with an integrated parking brake
G. Installs wheels, torque lug nuts and makes final checks and adjustments
H. Demonstrates and tests pedal-free travel with and without engine running, checks power assist operation
I. Checks vacuum supply to vacuum-type booster
J. Inspects the vacuum-type power booster unit for vacuum leaks; inspects the check valve for proper operation; determines necessary action
K. Inspects and tests hydraulically-assisted power brake system for leaks and proper operation; determines necessary action
L. Measures and adjusts master cylinder pushrod length
M. Diagnoses wheel bearing noises, wheel shimmy, and vibration concerns; determines necessary action
N. Demonstrates, removes, cleans, inspects, repacks and installs wheel bearings and replaces seals, installs hub and adjusts wheel bearing
O. Checks parking brake cables and components for wear, rusting, binding and corrosion; cleans, lubricates or replaces as needed
P. Checks parking brake operation; determines necessary action
Q. Checks operation of parking brake indicator light system
R. Checks operation of brake stop light system; determines necessary action
S. Demonstrates replacing wheel bearing and race
T. Demonstrates knowledge of wheel stud repair and replacement
U. Demonstrates knowledge of sealed wheel bearing assembly service
V. Identifies and inspects antilock brake system (ABS) components; determines necessary action
W. Diagnoses poor stopping, wheel lock-up, abnormal pedal feel or pulsation, and noise concerns caused by the antilock brake system (ABS); determines necessary action
X. Diagnoses antilock brake system (ABS) electronic control (s) and components using self-diagnosis and/or recommended test equipment; determines necessary action
Y. Knowledge of anti-lock brake system depressurize/bleed
Z. Demonstrates bleed the anti-lock brake systems (ABS) front and rear hydraulic circuits

XI. BRAKES - III

A. Removes and installs antilock brake system (ABS) electrical/electronic and hydraulic components
B. Tests, diagnoses and services ABS speed sensors, toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground and frequency data)
C. Diagnoses antilock brake system (ABS) braking concerns caused by vehicle modifications (tire size, curb height, final drive ration, etc.)
D. Identifies traction control/vehicle stability control system components

COURSE OUTLINE

XII. ENGINE PERFORMANCE – I

A. Completes work order to include customer information, vehicle identifying information, customer concern, related service history, cause and correction
B. Identifies and interprets engine performance concern; determines necessary action
C. Researches applicable vehicle and service information, such as engine management system operation, vehicle history, service precaution and technical service bulletins
D. Locates and interprets vehicle and major component identification numbers (VIN)
E. Inspects engine assembly for fuel, oil, coolant and other leaks; determines necessary action
F. Diagnoses abnormal engine noise or vibration concerns; determines necessary action
G. Diagnoses abnormal exhaust color, odor and sound; determines necessary action
H. Performs engine absolute (vacuum/boost) manifold pressure test; determines needed repairs
I. Performs cylinder power balance test; determines needed repairs
J. Performs cylinder cranking compression test; determines needed repairs
K. Performs engine running compression test; determines needed repairs
L. Performs cylinder leakage test; determines needed repairs
M. Demonstrates ability to diagnose engine mechanical, electrical, fuel and ignition concerns with oscilloscope and/or engine diagnostic equipment; determines needed repairs
N. Demonstrates ability to prepare 4 or 5 gas analyzer; inspects and prepares vehicle for test and obtain exhaust readings; interprets readings; determines needed repairs
O. Verifies engine operating temperature; determines needed repairs
P. Performs cooling system pressure test; checks coolant condition; inspects and tests radiator, cap recovery tank and hoses; determines needed repairs
Q. Demonstrates ability to verify correct crankshaft timing
R. Demonstrates ability to retrieve and correct OBD I diagnostic trouble codes; clear codes when applicable
S. Demonstrates ability to retrieve and record OBD II diagnostic trouble codes; clear codes when applicable
T. Diagnoses emissions and drivability concerns resulting from malfunctions in the computerized engine controls with stored diagnostic codes
U. Diagnoses emissions and drivability concerns resulting from malfunctions in the computerized engine controls with no stored diagnostic codes; determines needed repair
V. Demonstrates ability to check for module communication (including CAN/BUS systems) errors using scan tool
W. Demonstrates ability to inspect and test computerized engine control system sensors, powertrain control (PCM), actuators, and circuits using a graphing multimeter (GMM) digital storage oscilloscope (DSO); determines needed repairs
X. Demonstrates ability to obtain and interpret scan data
Y. Demonstrates ability to access and use service information to perform step-by-step diagnosis
Z. Diagnoses emission and drivability problems resulting from malfunctions of interrelated systems (cruise control, security, suspension, traction, A/C, transmissions, non-OBM-installed accessories, or similar systems) determines needed repair

XIII. ENGINE PERFORMANCE – II

A. Demonstrates ability to perform active test of actuators using scan tool; determines needed repairs
B. Diagnoses ignition system related problems: no starting, hard starting, engine misfire, poor drivability, spark knock, power loss, engine misfire, power loss, poor mileage and emissions problems on vehicles w/electronic ignition systems
C. Diagnoses ignition systems related problems such as no start, hard start and misfire. Determines necessary action
D. Demonstrates ability to inspect and test ignition primary circuit wiring and solid state components; determines needed repairs
E. Demonstrates ability to inspect, test and service distributor
F. Demonstrates ability to inspect/test ignition secondary wiring and components; determines needed repairs
G. Demonstrates ability to inspect, test ignition coil; determines needed repairs
H. Demonstrates ability to check and adjust ignition timing and advance/retard

COURSE OUTLINE

I. Demonstrates ability to inspect and test ignition pick-up sensor or triggering devices; determines needed repairs
J. Diagnoses ignition system related problems such as no starting, hard starting
K. Checks fuel for contaminants and quality; determines necessary action
L. Demonstrates ability to test fuel pumps and pump control systems for pressure, regulation and volume; determines needed repairs
M. Demonstrates ability to replace fuel filters
N. Demonstrates ability to inspect and test cold enrichment system and components
O. Inspects throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air
P. Inspects and tests fuel injectors
Q. Inspects the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s) and heat shield(s); performs necessary action
R. Performs exhaust system back-pressure test; determines necessary action
S. Demonstrates ability to test the operation of turbocharger/supercharger systems; determines needed repairs
T. Diagnoses oil leaks, emissions and drivability problems resulting from malfunctions in the positive crankcase ventilation (PVC) system; determines necessary action
U. Inspects, tests and services positive crankcase ventilation (PVC) filter/breather cap, valve, tubes. Orifices, and hoses; performs necessary action
V. Diagnoses emissions and drivability problems caused by malfunctions in the exhaust gas recirculation (EGR) system; determines necessary action
W. Inspects, tests, services and replaces components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; performs necessary action
X. Inspects and tests electrical/electronic sensors, controls and wiring of exhaust gas recirculation (EGR) systems; performs necessary action
Y. Diagnoses emissions and drivability problems resulting from malfunctions in the secondary air injection and catalytic converter systems; performs necessary action
Z. Inspects and tests mechanical components of secondary air injection systems; performs necessary action

XIV. ENGINE PERFORMANCE – III

A. Inspects and tests electrical/electronically-operated components and circuits of air injection systems; performs necessary action
B. Inspects and tests catalytic converter performance
C. Diagnoses emissions and drivability problems resulting from malfunctions in the evaporative emissions control system; determines necessary action
D. Inspects and tests components and hoses of evaporated emissions control system; determines necessary action
E. Interprets evaporative emission related diagnostic trouble codes (DTCs); determines necessary action
F. Knowledge of adjusting valves on engine with mechanical or hydraulic lifters
G. Demonstrates ability to remove, replace and verify camshaft timing and belt
H. Demonstrates ability to remove and replace thermostat
I. Demonstrates ability to inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams and fan control devices; determines needed repairs
J. Demonstrates ability to perform common fastener and thread repairs to include: removal of broken belt, restore internal and external threads, and repair internal threads with thread insert
K. Demonstrates ability to perform oil and filter change
L. Identifies hybrid vehicle internal combustion engine service precautions

ESSENTIAL STANDARDS AND KEY ASSIGNMENTS
INDUSTRY SECTOR: Transportation

ESSENTIAL PATHWAY STANDARD – C2.0

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

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARD – C4.0

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

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARDS – C6.0

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

KEY ASSIGNMENT

ESSENTIAL PATHWAY STANDARDS – C7.0

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

KEY ASSIGNMENT

ESSENTIAL PATHWAY 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.

KEY ASSIGNMENT

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, social, 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.

CTE ANCHOR STANDARDS—Common Core English Language Arts Alignment

1: Academics
Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the industry sector alignment matrix for identification of standards. Note: alignment listed within each sector 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. WS 11-12.6 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 11-12.1d 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.