

**Transportation, Distribution & Logistics Career Cluster  
Automobile Service Technology 4  
Course Number: 47.43400**

**Course Description:**

Students in this major will learn the basic skills needed to gain employment as a maintenance and light repair technician. This career major will expose the student to courses in automotive preventative maintenance and servicing and replacing brakes, and steering and suspension components. They will also learn how to do general electrical system diagnosis, learn electrical theory, perform basic tests and then determine necessary action. In addition, they will learn how to evacuate and recharge air-conditioning systems using the proper refrigerant. The hours completed in this major are aligned with ASE/NATEF standards and are an excellent foundation for the entry-level technician. The pre-requisite for this course is Maintenance and Light Repair 3.

**Course Standard 1**

**TDL-AST4-1**

The following standard is included in all CTAE courses adopted for the Career Cluster/Pathways. Teachers should incorporate the elements of this standard into lesson plans during the course. The topics listed for each element of the standard may be addressed in differentiated instruction matching the content of each course. These elements may also be addressed with specific lessons from a variety of resources. This content is not to be treated as a unit or separate body of knowledge but rather integrated into class activities as applications of the concept.

**Standard: Demonstrate employability skills required by business and industry.**

The following elements should be integrated throughout the content of this course.

**1.1 Communicate effectively through writing, speaking, listening, reading, and interpersonal abilities.**

Person-to-Person Etiquette	Telephone and Email Etiquette	Cell Phone and Internet Etiquette	Communicating At Work	Listening
Interacting with Your Boss	Telephone Conversations	Using Blogs	Improving Communication Skills	Reasons, Benefits, and Barriers
Interacting with Subordinates	Barriers to Phone conversations	Using Social Media	Effective Oral Communication	Listening Strategies
Interacting with Co-workers	Making and Returning Calls		Effective Written Communication	Ways We Filter What We Hear
Interacting with Suppliers	Making Cold Calls		Effective Nonverbal Skills	Developing a Listening Attitude
	Handling Conference Calls		Effective Word Use	Show You Are Listening
	Handling Unsolicited Calls		Giving and Receiving Feedback	Asking Questions
				Obtaining Feedback
				Getting Others to Listen

Nonverbal Communication	Written Communication	Speaking	Applications and Effective Résumés
Communicating Nonverbally	Writing Documents	Using Language Carefully	Completing a Job Application
Reading Body Language and mixed Messages	Constructive Criticism in Writing	One-on-One Conversations	Writing a Cover Letter
Matching Verbal and Nonverbal communication		Small Group Communication	Things to Include in a Résumé

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Improving Nonverbal Indicators		Large Group Communication	Selling Yourself in a Résumé
Nonverbal Feedback		Making Speeches	Terms to Use in a Résumé
Showing Confidence Nonverbally		Involving the Audience	Describing Your Job Strengths
Showing Assertiveness		Answering Questions	Organizing Your Résumé
		Visual and Media Aids	Writing an Electronic Résumé
		Errors in Presentation	Dressing Up Your Résumé

### 1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

Teamwork and Problem Solving	Meeting Etiquette
Thinking Creatively	Preparation and Participation in Meetings
Taking Risks	Conducting Two-Person or Large Group Meetings
Building Team Communication	Inviting and Introducing Speakers
	Facilitating Discussions and Closing
	Preparing Visual Aids
	Virtual Meetings

### 1.3 Exhibit critical thinking and problem solving skills to locate, analyze and apply information in career planning and employment situations.

Problem Solving	Customer Service	The Application Process	Interviewing Skills	Finding the Right Job
Transferable Job Skills	Gaining Trust and Interacting with Customers	Providing Information, Accuracy and Double Checking	Preparing for an Interview	Locating Jobs and Networking
Becoming a Problem Solver	Learning and Giving Customers What They Want	Online Application Process	Questions to Ask in an Interview	Job Shopping Online
Identifying a Problem	Keeping Customers Coming Back	Following Up After Submitting an Application	Things to Include in a Career Portfolio	Job Search Websites
Becoming a Critical Thinker	Seeing the Customer's Point	Effective Résumés:	Traits Employers are Seeking	Participation in Job Fairs
Managing	Selling Yourself and the Company	Matching Your Talents to a Job	Considerations Before Taking a Job	Searching the Classified Ads
	Handling Customer Complaints	When a Résumé Should be Used		Using Employment Agencies
	Strategies for Customer Service			Landing an Internship
				Staying Motivated to Search

### 1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

Workplace Ethics	Personal Characteristics	Employer Expectations	Business Etiquette	Communicating at Work
Demonstrating Good Work Ethic	Demonstrating a Good Attitude	Behaviors Employers Expect	Language and Behavior	Handling Anger
Behaving Appropriately	Gaining and Showing Respect	Objectionable Behaviors	Keeping Information Confidential	Dealing with Difficult Coworkers
Maintaining Honesty	Demonstrating Responsibility	Establishing Credibility	Avoiding Gossip	Dealing with a Difficult Boss

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Playing Fair	Showing Dependability	Demonstrating Your Skills	Appropriate Work Email	Dealing with Difficult Customers
Using Ethical Language	Being Courteous	Building Work Relationships	Cell Phone Etiquette	Dealing with Conflict
Showing Responsibility	Gaining Coworkers' Trust		Appropriate Work Texting	
Reducing Harassment	Persevering		Understanding Copyright	
Respecting Diversity	Handling Criticism		Social Networking	
Making Truthfulness a Habit	Showing Professionalism			
Leaving a Job Ethically				

### 1.5 Apply the appropriate skill sets to be productive in a changing, technological, diverse workplace to be able to work independently and apply team work skills.

Expected Work Traits	Teamwork	Time Management
Demonstrating Responsibility	Teamwork Skills	Managing Time
Dealing with Information Overload	Reasons Companies Use Teams	Putting First Things First
Transferable Job Skills	Decisions Teams Make	Juggling Many Priorities
Managing Change	Team Responsibilities	Overcoming Procrastination
Adopting a New Technology	Problems That Affect Teams	Organizing Workspace and Tasks
	Expressing Yourself on a Team	Staying Organized
	Giving and Receiving Constructive Criticism	Finding More Time
		Managing Projects
		Prioritizing Personal and Work Life

### 1.6 Present a professional image through appearance, behavior and language.

On-the-Job Etiquette	Person-to-Person Etiquette	Communication Etiquette	Presenting Yourself
Using Professional Manners	Meeting Business Acquaintances	Creating a Good Impression	Looking Professional
Introducing People	Meeting People for the First Time	Keeping Phone Calls Professional	Dressing for Success
Appropriate Dress	Showing Politeness	Proper Use of Work Email	Showing a Professional Attitude
Business Meal Functions		Proper Use of Cell Phone	Using Good Posture
Behavior at Work Parties		Proper Use in Texting	Presenting Yourself to Associates
Behavior at Conventions			Accepting Criticism
International Etiquette			Demonstrating Leadership
Cross-Cultural Etiquette			
Working in a Cubicle			

### Support of CTAE Foundation Course Standards and Georgia Standards of Excellence L9-10RST 1-10 and L9-10WHST 1-10:

Georgia Standards of Excellence ELA/Literacy standards have been written specifically for technical subjects and have been adopted as part of the official standards for all CTAE courses.

## Course Standard 2

### TDL-AST4-2

#### Identify and utilize safety procedures and proper tools for shop and personal safety.

The tasks in these standards originate from the NATEF Required Supplemental Tasks.

- 2.1 Identify general shop safety rules and procedures.
- 2.2 Utilize safe procedures for handling of tools and equipment.
- 2.3 Identify and use proper placement of floor jacks and jack stands.
- 2.4 Identify and use proper procedures for safe lift operation.
- 2.5 Utilize proper ventilation procedures for working within the lab/shop area.
- 2.6 Identify marked safety areas.
- 2.7 Identify the location and the types of fire extinguishers and other fire safety equipment, demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment.
- 2.8 Identify the location and use of eye wash stations.
- 2.9 Identify the location of the posted evacuation routes.
- 2.10 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities.
- 2.11 Identify and wear appropriate clothing for lab/shop activities.
- 2.12 Secure hair and jewelry for lab/shop activities.
- 2.13 Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
- 2.14 Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, injection systems, etc.).
- 2.15 Locate and demonstrate knowledge of material safety data sheets (MSDS).

## Course Standard 3

### TDL-AST-3

#### Identify and utilize proper tools and equipment.

- 3.1 Identify tools and their usage in automotive applications.
- 3.2 Identify standard and metric designation.
- 3.3 Demonstrate safe handling and use of appropriate tools.
- 3.4 Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
- 3.5 Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).

## Course Standard 4

### TDL-AST-4

#### Identify and utilize vehicle service information.

- 4.1 Identify information needed and the service requested on a repair order.
- 4.2 Identify purpose and demonstrate proper use of fender covers, mats.
- 4.3 Demonstrate use of the three C's (concern, cause, and correction).
- 4.4 Review vehicle service history.
- 4.5 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.
- 4.6 Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover, etc.).

## Course Standard 5

### TDL-AST-5

**Demonstrate and explain general engine service techniques relating to general engine diagnosis, removal and reinstallation, and lubrication and cooling system diagnosis and repair.**

#### Engine Repair

General: engine diagnosis, removal and reinstallation (R&R)

5.1 Inspect, remove and replace engine mounts (P-2).

Lubrication and cooling systems diagnosis and repair

5.2 Identify causes of engine overheating (P-1).

5.3 Inspect, remove, and replace water pump (P-2).

5.4 Remove and replace radiator (P-2).

5.5 Inspect and test fan(s) (electrical or mechanical), fan clutch, fan shroud, and air dams (P-1).

5.6 Perform oil pressure tests; determine necessary action (P-1).

5.7 Inspect auxiliary coolers; determine necessary action (P-3).

5.8 Inspect, test, and replace oil temperature and pressure switches and sensors (P-2).

## Course Standard 6

### TDL-AST-6

**Perform general automatic transmission and manual transaxle and differential service.**

#### Automatic transmission and transaxle

General: transmission and transaxle diagnosis

6.1 Diagnose fluid loss and condition concerns; determine necessary action (P-1).

In-vehicle transmission/transaxle maintenance and repair

6.2 Inspect, test, adjust, repair, or replace electrical/electronic components and circuits including computers, solenoids, sensors, relays, terminals, connectors, switches, and harnesses (P-1).

Off-vehicle transmission and transaxle repair

6.3 Inspect, leak test, and flush or replace transmission/transaxle oil cooler, lines, and fittings (P-1).

#### MANUAL DRIVE TRAIN AND AXLES

General: drive train diagnosis

6.4 Identify and interpret drive train concerns; determine necessary action (P-1).

6.5 Check fluid condition; check for leaks; determine necessary action (P-1).

Clutch diagnosis and repair

6.6 Inspect clutch pedal linkage, cables, automatic adjuster mechanisms, brackets, bushings, pivots, and springs; perform necessary action (P-1).

6.7 Bleed clutch hydraulic system (P-1).

6.8 Inspect flywheel and ring gear for wear and cracks; determine necessary action (P-1).

## Course Standard 7

### TDL-AST-7

**Prepare vehicle for general suspension and steering systems service, including wheel alignment diagnosis, adjustment and repair.**

#### SUSPENSION AND STEERING

Suspension systems diagnosis and repair

7.1 Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action (P-1).

7.2 Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action (P-1).

Wheel alignment diagnosis, adjustment, and repair

7.3 Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action (P-1).

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- 7.4 Prepare vehicle for wheel alignment on alignment machine; perform four-wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel (P-1).
- 7.5 Check toe-out-on-turns (turning radius); determine necessary action (P-2).
- 7.6 Check SAI (steering axis inclination) and included angle; determine necessary action (P-2).
- 7.7 Check rear wheel thrust angle; determine necessary action (P-1).
- 7.8 Check for front wheel setback; determine necessary action (P-2).

### Wheels and tires diagnosis and repair

- 7.9 Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action (P-2).
- 7.10 Measure wheel, tire, axle flange, and hub runout; determine necessary action (P-2).
- 7.11 Diagnose tire pull problems; determine necessary action (P-2).

## Course Standard 8

### **TDL-AST-8**

#### **Perform hydraulic brake system service and repairs.**

##### Brakes

#### General: brake systems diagnosis

- 8.1 Identify and interpret brake system concerns; determine necessary action (P-1).

#### Hydraulic system diagnosis and repair

- 8.2 Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law) (P-1).
- 8.3 Remove, bench bleed, and reinstall master cylinder (P-1).
- 8.4 Diagnose poor stopping, pulling or dragging concerns caused by malfunctions in the hydraulic system; determine necessary action (P-3).
- 8.5 Replace brake lines, hoses, fittings, and supports (P-2).
- 8.6 Fabricate brake lines using proper material and flaring procedures (double flare and ISO types) (P-2).
- 8.7 Inspect, test, and/or replace components of brake warning light system (P-3).

## Course Standard 9

### **TDL-AST-9**

#### **Perform general electrical systems service and diagnose and repair the charging system, horn and wiper/washer, and automobile accessories.**

##### Electrical/Electronic Systems

#### General: electrical system diagnosis

- 9.1 Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems (P-1).
- 9.2 Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action (P-1).
- 9.3 Repair wiring harness (P-3).

#### Charging system diagnosis and repair

- 9.4 Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions (P-1).

#### Horn and wiper/washer diagnosis and repair

- 9.5 Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action (P-1).
- 9.6 Diagnose (troubleshoot) windshield washer problems; perform necessary action (P-2).

#### Accessories diagnosis and repair

- 9.7 Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action (P-2).

## Course Standard 10

### TDL-AST-10

**Analyze engine performance to diagnose and repair issues related to the engine, ignition system, and fuel, air induction, and exhaust systems.**

Engine Performance

#### General: engine diagnosis

- 10.1 Identify and interpret engine performance concerns; determine necessary action (P-1).
- 10.2 Diagnose abnormal engine noises or vibration concerns; determine necessary action (P-3).
- 10.3 Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; determine necessary action (P-2).
- 10.4 Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action (P-2).
- 10.5 Verify correct camshaft timing (P-1).

#### Ignition system diagnosis and repair

- 10.6 Inspect and test crankshaft and camshaft position sensor(s); perform necessary action (P-1).

#### Fuel, air induction, and exhaust systems diagnosis and repair

- 10.7 Check fuel for contaminants; determine necessary action (P-2).
- 10.8 Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action (P-1).
- 10.9 Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air (P-2).
- 10.10 Verify idle control operation (P-1).

## Course Standard 11

### TDL-AST4-11

**Examine how SkillsUSA is a co-curricular part of career and technical education through leadership development, school and community service projects, and competitive events.**

- 11.1 Explain the purpose, mission, objectives, motto, colors, official dress and other distinguishing characteristics of SkillsUSA.
- 11.2 Explain how participation in SkillsUSA can promote lifelong responsibility for community service, professional growth and development.
- 11.3 Explore the impact and opportunities that SkillsUSA can develop to bring business and industry together with education in a positive working relationship through innovative leadership and career development programs.
- 11.4 Explore the local, state, and national opportunities available to students through participation in SkillsUSA, including but not limited to conferences, competitions, community service, philanthropy, and other SkillsUSA activities.