Georgia Department of Education

Transportation, Distribution and Logistics Career Cluster
Basic Maintenance and Light Repair
Course Number 47.53110

Course Description:
This course is designed as the foundational course for the Automobile Maintenance and Light Repair pathway. Students in this course will learn the basic skills needed to gain employment as a maintenance and light repair technician. Students will be exposed to courses in automotive preventative maintenance and servicing and replacing brakes, and steering and suspension components. In addition, student will learn how to do general electrical system diagnosis, learn electrical theory, perform basic tests and determine necessary action. In addition, students will learn how to evacuate and recharge air-conditioning systems using the proper refrigerant. The hours completed in this course are aligned with ASE/NATEF standards and are a base for the entry-level technician. The pre-requisite for this course is advisor approval.

Course Standard 1

TDL-BMLR-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.

<table>
<thead>
<tr>
<th>Person-to-Person Etiquette</th>
<th>Telephone and Email Etiquette</th>
<th>Cell Phone and Internet Etiquette</th>
<th>Communicating At Work</th>
<th>Listening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interacting with Your Boss</td>
<td>Telephone Conversations</td>
<td>Using Blogs</td>
<td>Improving Communication Skills</td>
<td>Reasons, Benefits, and Barriers</td>
</tr>
<tr>
<td>Interacting with Subordinates</td>
<td>Barriers to Phone conversations</td>
<td>Using Social Media</td>
<td>Effective Oral Communication</td>
<td>Listening Strategies</td>
</tr>
<tr>
<td>Interacting with Coworkers</td>
<td>Making and Returning Calls</td>
<td>Effective Written Communication</td>
<td>Ways We Filter What We Hear</td>
<td></td>
</tr>
<tr>
<td>Interacting with Suppliers</td>
<td>Making Cold Calls</td>
<td>Effective Nonverbal Skills</td>
<td>Developing a Listening Attitude</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Handling Conference Calls</td>
<td>Effective Word Use</td>
<td>Show You Are Listening</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Handling Unsolicited Calls</td>
<td>Giving and Receiving Feedback</td>
<td>Asking Questions</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Obtaining Feedback</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Getting Others to Listen</td>
<td></td>
</tr>
</tbody>
</table>
1.2 Demonstrate creativity by asking challenging questions and applying innovative procedures and methods.

<table>
<thead>
<tr>
<th>Teamwork and Problem Solving</th>
<th>Meeting Etiquette</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinking Creatively</td>
<td>Preparation and Participation in Meetings</td>
</tr>
<tr>
<td>Taking Risks</td>
<td>Conducting Two-Person or Large Group Meetings</td>
</tr>
<tr>
<td>Building Team Communication</td>
<td>Inviting and Introducing Speakers</td>
</tr>
<tr>
<td></td>
<td>Facilitating Discussions and Closing</td>
</tr>
<tr>
<td></td>
<td>Preparing Visual Aids</td>
</tr>
<tr>
<td></td>
<td>Virtual Meetings</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Problem Solving</th>
<th>Customer Service</th>
<th>The Application Process</th>
<th>Interviewing Skills</th>
<th>Finding the Right Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferable Job Skills</td>
<td>Gaining Trust and Interacting with Customers</td>
<td>Providing Information, Accuracy and Double Checking</td>
<td>Preparing for an Interview</td>
<td>Locating Jobs and Networking</td>
</tr>
<tr>
<td>Becoming a Problem Solver</td>
<td>Learning and Giving Customers What They Want</td>
<td>Online Application Process</td>
<td>Questions to Ask in an Interview</td>
<td>Job Shopping Online</td>
</tr>
<tr>
<td>Identifying a Problem</td>
<td>Keeping Customers Coming Back</td>
<td>Following Up After Submitting an Application</td>
<td>Things to Include in a Career Portfolio</td>
<td>Job Search Websites</td>
</tr>
<tr>
<td>Becoming a Critical Thinker</td>
<td>Seeing the Customer’s Point</td>
<td>Effective Résumés: Traits Employers are Seeking</td>
<td>Participation in Job Fairs</td>
<td></td>
</tr>
<tr>
<td>Managing</td>
<td>Selling Yourself and the Company</td>
<td>Matching Your Talents to a Job</td>
<td>Considerations Before Taking a Job</td>
<td>Searching the Classified Ads</td>
</tr>
<tr>
<td>Handling Customer Complaints</td>
<td>When a Résumé Should be Used</td>
<td></td>
<td>Using Employment Agencies</td>
<td></td>
</tr>
<tr>
<td>Strategies for Customer Service</td>
<td></td>
<td></td>
<td></td>
<td>Staying Motivated to Search</td>
</tr>
</tbody>
</table>
1.4 Model work readiness traits required for success in the workplace including integrity, honesty, accountability, punctuality, time management, and respect for diversity.

<table>
<thead>
<tr>
<th>Workplace Ethics</th>
<th>Personal Characteristics</th>
<th>Employer Expectations</th>
<th>Business Etiquette</th>
<th>Communicating at Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrating Good Work Ethic</td>
<td>Demonstrating a Good Attitude</td>
<td>Behaviors Employers Expect</td>
<td>Language and Behavior</td>
<td>Handling Anger</td>
</tr>
<tr>
<td>Behaving Appropriately</td>
<td>Gaining and Showing Respect</td>
<td>Objectionable Behaviors</td>
<td>Keeping Information Confidential</td>
<td>Dealing with Difficult Coworkers</td>
</tr>
<tr>
<td>Maintaining Honesty</td>
<td>Demonstrating Responsibility</td>
<td>Establishing Credibility</td>
<td>Avoiding Gossip</td>
<td>Dealing with a Difficult Boss</td>
</tr>
<tr>
<td>Playing Fair</td>
<td>Showing Dependability</td>
<td>Demonstrating Your Skills</td>
<td>Appropriate Work Email</td>
<td>Dealing with Difficult Customers</td>
</tr>
<tr>
<td>Using Ethical Language</td>
<td>Being Courteous</td>
<td>Building Work Relationships</td>
<td>Cell Phone Etiquette</td>
<td>Dealing with Conflict</td>
</tr>
<tr>
<td>Showing Responsibility</td>
<td>Gaining Coworkers’ Trust</td>
<td></td>
<td>Appropriate Work Texting</td>
<td></td>
</tr>
<tr>
<td>Reducing Harassment</td>
<td>Persevering</td>
<td></td>
<td>Understanding Copyright</td>
<td></td>
</tr>
<tr>
<td>Respecting Diversity</td>
<td>Handling Criticism</td>
<td></td>
<td>Social Networking</td>
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</tr>
<tr>
<td>Making Truthfulness a Habit</td>
<td>Showing Professionalism</td>
<td></td>
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<tr>
<td>Leaving a Job Ethically</td>
<td></td>
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</tbody>
</table>

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.

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

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

<table>
<thead>
<tr>
<th>On-the-Job Etiquette</th>
<th>Person-to-Person Etiquette</th>
<th>Communication Etiquette</th>
<th>Presenting Yourself</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Professional Manners</td>
<td>Meeting Business Acquaintances</td>
<td>Creating a Good Impression</td>
<td>Looking Professional</td>
</tr>
<tr>
<td>Introducing People</td>
<td>Meeting People for the First Time</td>
<td>Keeping Phone Calls Professional</td>
<td>Dressing for Success</td>
</tr>
<tr>
<td>Appropriate Dress</td>
<td>Showing Politeness</td>
<td>Proper Use of Work Email</td>
<td>Showing a Professional Attitude</td>
</tr>
<tr>
<td>Business Meal Functions</td>
<td>Proper Use of Cell Phone</td>
<td>Using Good Posture</td>
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</tr>
<tr>
<td>Behavior at Work Parties</td>
<td>Proper Use in Texting</td>
<td>Presenting Yourself to Associates</td>
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</tr>
<tr>
<td>Behavior at Conventions</td>
<td>Accepting Criticism</td>
<td>Demonstrating Leadership</td>
<td></td>
</tr>
<tr>
<td>International Etiquette</td>
<td></td>
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<tr>
<td>Cross-Cultural Etiquette</td>
<td></td>
<td></td>
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<tr>
<td>Working in a Cubicle</td>
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</tbody>
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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. Additional Georgia Standards of Excellence ELA/Literacy standards for Speaking and Listening are listed in the foundational course standards below.

Course Standard 2

TDL-BMLR-2
Identify and utilize safety procedures and proper tools.

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).

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence
ELACC9-10SL1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

Course Standard 3

TDL-BMLR-3
Identify and utilize proper tools and equipment.

3.1 Identify tools and their usage in automotive applications.
3.2 Identify standard and metric designations.
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 (e.g. micrometer, dial-indicator, and dial-caliper).

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**Course Standard 4**

**TDL-BMLR-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 and 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.).

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

**Course Standard 5**

**TDL-BMLR-5**

Demonstrate general engine service techniques.

- 5.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
- 5.2 Verify operation of the instrument panel engine warning indicators.
- 5.3 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action.
- 5.4 Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.
- 5.5 Inspect, and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air, as required.
- 5.6 Perform engine oil and filter change.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

**ELACC9-10SL4:** Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

**Course Standard 6**

**TDL-BMLR-6**

Perform general automatic transmission and manual transaxle and differential service.

- 6.1 Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins.
- 6.2 Check fluid level in a transmission or a transaxle equipped with a dip-stick.
- 6.3 Check fluid level in a transmission or a transaxle not equipped with a dip-stick.
- 6.4 Check transmission fluid condition; check for leaks.
- 6.5 Inspect for leakage at external seals, gaskets, and bushings.
- 6.6 Drain and refill manual transmission/transaxle and final drive unit.
- 6.7 Check and adjust clutch master cylinder fluid level.
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6.8 Check hydraulic clutch for system leaks.
6.9 Clean and inspect differential housing; check for leaks; inspect housing vent.
6.10 Check and adjust differential housing fluid level.
6.11 Drain and refill differential housing.
6.12 Check for leaks at drive assembly seals; check vents; check lube level.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

ELACC9-10SL2: Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

Course Standard 7

TDL-BMLR-7

Prepare vehicle for general suspension and steering systems service.

7.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
7.2 Determine proper power steering fluid type; inspect fluid level and condition.
7.3 Inspect for power steering fluid leakage; determine necessary action.
7.4 Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action.
7.5 Rotate tires according to manufacturer’s recommendations.
7.6 Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
7.7 Remove and properly re-install tire pressure monitoring system.
7.8 Inspect, dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
7.9 Inspect tire and wheel assembly for air loss; perform necessary action. Explain patch/plug system.
7.10 Repair tire using internal patch.
7.11 Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

ELACC9-10SL1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

ELACC9-10SL4: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Course Standard 8

TDL-BMLR-8

Perform hydraulic brake system service and repairs.

8.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
8.2 Select, handle, store, and fill brake fluids to proper level.
8.3 Install wheel and torque lug nuts.
8.4 Check parking brake cables and components for wear, binding and corrosion; clean, lubricate, adjust or replace, as needed.
8.5 Check operation of brake stop light system.
Course Standard 9

TDL-BMLR-9

Perform general electrical systems service.

9.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
9.2 Perform battery state-of-charge test; determine necessary action.
9.3 Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.
9.4 Maintain or restore electronic memory functions.
9.5 Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.
9.6 Perform slow/fast battery charge according to manufacturer’s recommendations.
9.7 Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.
9.8 Identify high-voltage circuits of electric or hybrid electric vehicle.
9.9 Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace, as needed.
9.10 Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators.
9.11 Verify windshield wiper and washer operation; replace wiper blades.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

ELACC9-10SL4: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Course Standard 10

TDL-BMLR-10

Demonstrate knowledge of A/C systems.

10.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
10.2 Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.

Course Standard 11

TDL-BMLR-11

Analyze engine performance.

11.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.
11.2 Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action.
11.3 Replace fuel filter(s).
11.4 Inspect, service, or replace air filters, filter housings, and intake ductwork.
11.5 Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

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ELACC9-10SL4: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Course Standard 12

TDL-BMLR-12
Develop an understanding of automotive careers, describing the principal fields of specializations and identifying associated career opportunities.

12.1 Identify education requirements for automotive occupations and locations where programs of study are available.
12.2 Match automotive job titles with qualifications and responsibilities.
12.3 Participate in activities related to career interests.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

ELACC9-10SL1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

ELACC9-10SL4: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Course Standard 13

TDL-BMLR-13
Examine how related student organizations are integral parts of career and technology education courses through leadership development, school and community service projects, and competitive events.

13.1 Explain the purpose, mission, objectives, motto, colors, official dress and other distinguishing characteristics of SkillsUSA.
13.2 Explain how participation in SkillsUSA can promote lifelong responsibility for community service, professional growth and development.
13.3 Explore the impact and opportunities SkillsUSA can develop to bring business and industry together with education in a positive working relationship through innovative leadership and career development programs.
13.4 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.

Support of CTAE Foundation Course Standards and Georgia Standards of Excellence

ELACC9-10SL1: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others’ ideas and expressing their own clearly and persuasively.

ELACC9-10SL4: Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.