

Maintenance and Light Repair I (MLR I)

Primary Career Cluster:	Transportation
Course Contact:	CTE.Standards@tn.gov
Course Code(s):	C20H09
Prerequisite(s):	None
Credit:	1
Grade Level:	9
Elective Focus - Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Transportation courses.
POS Concentrator:	This course satisfies one out of two required courses that meet the Perkins V concentrator definition, when taken in sequence in the approved program of study.
Programs of Study and Sequence:	This is the first course in the <i>Automotive Maintenance and Light Repair</i> program of study.
Aligned Student Organization(s):	SkillsUSA: https://www.skillsusatn.org/
Coordinating Work-Based Learning:	Teachers are encouraged to use embedded WBL activities such as informational interviewing, job shadowing, and career mentoring. For information, visit https://www.tn.gov/content/tn/education/career-and-technical-education/work-based-learning.html .
Promoted Tennessee Student Industry Credentials:	Credentials are aligned with postsecondary and employment opportunities and with the competencies and skills that students acquire through their selected program of study. For a listing of promoted student industry credentials, visit https://www.tn.gov/education/career-and-technical-education/student-industry-certification.html
Teacher Endorsement(s):	506, 508, 770
Required Teacher Certifications/Training:	ASE A-4, ASE A-5, ASE A-6, and ASE A-8 or G1 Industry Certification 2016-17
Teacher Resources:	https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-transportation-distribution-logistics.html Best for All Central: https://bestforall.tnedu.gov/

Course at a Glance

CTE courses provide students with an opportunity to develop specific academic, technical, and 21st century skills necessary to be successful in career and in life. In pursuit of ensuring every student in Tennessee achieves this level of success, we begin with rigorous course standards which feed into intentionally designed programs of study.

Students engage in industry relevant content through general education integration and experiences such as career & technical student organizations (CTSO) and work-based learning (WBL). Through these experiences, students are immersed with industry standard content and technology, solve industry-based problems, meaningfully interact with industry professionals and use/produce industry specific, informational texts.

Using a Career and Technical Student Organization (CTSO) in Your Classroom

CTSOs are a great resource to put classroom learning into real-life experiences for your students through classroom, regional, state, and national competitions, and leadership opportunities. Below are CTSO connections for this course, note this is not an exhaustive list.

- Participate in CTSO Fall Leadership Conference to engage with peers by demonstrating logical thought processes and developing industry specific skills that involve teamwork and project management.
- Participate in contests that highlight job skill demonstration. These include Career Pathways Showcase, Job Interview, Maintenance Light Repair, and Automotive Service Technology.

Using a Work-based Learning (WB) in Your Classroom

Sustained and coordinated activities that relate to the course content are the key to successful work-based learning. Possible activities for this course include the following. This is not an exhaustive list.

- **Standard 3** | Include a safety briefing in a visit to a shop.
- **Standard 4** | Have a technician discuss the tools they use on the job.
- **Standard 5** | Have a service manager discuss how they prepare a vehicle for service.
- **Standard 6** | Have a technician discuss basic service and maintenance.
- **Standard 7** | Visit a shop that allows the students to help change a tire.

Course Description

The *Maintenance and Light Repair I (MLR I)* course prepares students for entry into *Maintenance and Light Repair II*. Students explore career opportunities and requirements of a professional service technician. Content emphasizes beginning transportation service skills and workplace success skills. Students study safety, tools, equipment, shop operations, basic engine fundamentals, and basic technician skills. Upon completing all of the *Maintenance and Light Repair* courses, students may enter automotive service industry as an ASE Certified MLR Technician.

Hours earned in the *Maintenance and Light Repair* courses may be used toward meeting National Automotive Technicians Education Foundation (NATEF) standards and Tennessee Department of Education standards. NATEF requires that 95% of the P-1 tasks, 80% of the P-2 tasks, and 50% of the P-3 tasks will be accomplished. These tasks are notated in these standards.

Program of Study Application

MLR I is the first course in the *Automotive Maintenance and Light Repair* program of study and serves as a foundation of safety skills and knowledge on becoming a professional service technician. For more information on the benefits and requirements of implementing these programs in full, please see the program of study description documents found on the Transportation, Distribution, and Logistics website at <https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-transportation-distribution-logistics.html>.

Course Standards

Standard 1.0

Students will perform safety examinations and maintain safety records.

Learning Expectations and Performance Indicators:

- 1.1 Use and inspect personal protective equipment and demonstrate appropriate related safety procedures.
- 1.2 Inspect, maintain, and employ safe operating procedures with tools and equipment, such as hand and power tools, ladders, scaffolding, and lifting equipment.
- 1.3 Demonstrate continuous awareness of potential hazards to self and others and respond appropriately.
- 1.4 Assume responsibilities under HazCom (Hazard Communication) regulations.
- 1.5 Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies to protect coworkers and bystanders from hazards; report accidents and observed hazards; and comply with emergency response procedures.
- 1.6 Pass with 100% accuracy a written examination relating to safety issues relating specifically to Maintenance and Light Repair.
- 1.7 Pass with 100% accuracy a performance examination relating to safety issues relating specifically to Maintenance and Light Repair.
- 1.8 Maintain a portfolio record of written safety examinations and equipment examination for which the student has passed an operational checkout by the instructor.

Standard 2.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

Learning Expectations and Performance Indicators:

- 2.1 Cultivate positive leadership skills. Take part in opportunities to practice and demonstrate personal leadership skills. For example, taking advantage of opportunities provided by a career and technical student organization (CTSO), such as SkillsUSA.
- 2.2 Assess situations, apply problem-solving techniques and decision-making skills within the school, community, and workplace.
- 2.3 Participate as a team member in a learning environment.
- 2.4 Respect the opinions, customs, and individual differences of others.
- 2.5 Build personal career development by identifying career interests, strengths, and opportunities.

Standard 3.0

Students will demonstrate shop and personal safety.

Learning Expectations and Performance Indicators:

- 3.1 Identify and demonstrate knowledge of how to utilize marked safety areas and equipment, such as location and use of eye wash stations; types of fire extinguishers and other fire safety equipment; posted evacuation routes; and proper ventilation procedures for working within the lab/shop area.
- 3.2 Comply with the required use of safety glasses, ear protection, gloves, appropriate clothing, and shoes during lab/shop activities; demonstrate knowledge of procedures for securing hair and jewelry for lab/shop activities.
- 3.3 Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits.
- 3.4 Locate and demonstrate knowledge of material safety data sheets (MSDS).

Standard 4.0

Students will identify and properly use, maintain, and store automotive service hand tools, power tools, and shop equipment.

Learning Expectations and Performance Indicators:

- 4.1 Identify tools and their usage in automotive applications.
- 4.2 Identify standard and metric designation.
- 4.3 Demonstrate safe handling and use of appropriate tools.
- 4.4 Demonstrate proper cleaning, storage, and maintenance of tools and equipment.
- 4.5 Demonstrate proper use of precision measuring tools (i.e. micrometer, dial-indicator, dial-caliper).

Standard 5.0

Students will prepare a vehicle for service.

Learning Expectations and Performance Indicators:

- 5.1 Identify information needed and the service requested on a repair order.
- 5.2 Identify purpose and demonstrate proper use of fender covers, mats.
- 5.3 Demonstrate use of the three C's: concern, cause, and correction.
- 5.4 Review vehicle service history.
- 5.5 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.

Standard 6.0

Students will perform basic vehicle engine service and maintenance.

Learning Expectations and Performance Indicators:

- 6.1 Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. (P-1)
- 6.2 Verify operation of the instrument panel engine warning indicators. (P-1)
- 6.3 Inspect engine assembly for fuel, oil, coolant, and other leaks; and determine necessary action. (P-1)
- 6.4 Install engine covers using gaskets, seals, and sealers as required. (P-1)
- 6.5 Remove and replace timing belt; verify correct camshaft timing. (P-1)
- 6.6 Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. (P-1)
- 6.7 Identify hybrid vehicle internal combustion engine service precautions. (P-3)
- 6.8 Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action. (P-1)
- 6.9 Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. (P-1)
- 6.10 Remove, inspect, and replace thermostat and gasket/seal. (P-1)
- 6.11 Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. (P-1)
- 6.12 Perform engine oil and filter change. (P-1)

Standard 7.0

Students will properly inspect and service tires and wheels.

Learning Expectations and Performance Indicators:

- 7.1 Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action.
- 7.2 Rotate tires according to manufacturer's recommendations.
- 7.3 Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).
- 7.4 Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.
- 7.5 Inspect tire and wheel assembly for air loss; perform necessary action.

- 7.6 Repair tire using internal patch.
- 7.7 Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps.
- 7.8 Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system.

Teacher Resources

The following resources are available to assist teachers of this course.

- *Development Guidance: Classroom Activities*, Center on Education and Work, Madison, WI
- *A0 Fundamentals of Transportation Service Technology Course*, AYES Curriculum: A Tenth Grade Course, AYES Corporation, www.ayes.org
- *Introduction to Transportation Service Technology*, Service Series, Curriculum and Instructional Material Center (CIMC), Oklahoma Department of Vocational and Technical Education
- *Module 1 Introduction to Transportation Technology*, Instructional Materials Laboratory (IML), University of Missouri
- *Today's Technician Basic Transportation Service & Systems*, Webster & Owens, Delmar/ITP
- 2008 Automobile Task List, National Automotive Technicians Education Foundation (NATEF), www.natef.org
- General Motors Diagnostic Plan
- Ford Motor Company Diagnostic Plan
- Harley Davidson Institute