



Program of Study Guide: **Medium/Heavy and Truck Technician**

Comprehensive guidelines and course standards for the
Medium/Heavy and Truck Technician Pathway

Office of College and Career Pathways

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MARYLAND STATE DEPARTMENT OF EDUCATION

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Purpose

The purpose of this document is to communicate the required Career and Technical Education (CTE) academic standards for the Medium/Heavy Truck and Equipment Program of Study. The academic standards in this document are theoretical and performance based. The standards contain content from multiple state departments of education, industry related resources and have been reviewed and vetted by members of the Maryland business and industry community.

In addition to academic standards, the Maryland State Department of Education (MSDE) has incorporated into this document Labor Market Information (LMI) definitions and explanations for the Program of Study; program aligned Industry Recognized Credentials; and Work-Based Learning resources and requirements by course level.

Standards Sources

The following sources collectively support a progression of standards from foundational to advanced Medium/Heavy Truck and Equipment Technology concepts in a high school context, preparing students for industry-aligned certifications like ASE Entry Level Certifications, OSHA 10/30, and EPA, with the necessary knowledge and skills for career readiness in Medium/Heavy Truck and Equipment maintenance careers.

Here are the key standards sources for Medium/Heavy Truck and Equipment curriculum:

1. Automotive Service Excellence (ASE)

- A. **Description:** ASE is the leading certification organization for automotive professionals, including medium/heavy truck and equipment technicians. Through the ASE Education Foundation, they provide comprehensive program standards, task lists, and accreditation guidelines for automotive education programs.
- B. **Usage:** When teaching Medium/Heavy Truck and Equipment courses, ASE resources serve as the foundation for curriculum development and student assessment. The detailed task lists can be used to create lesson plans that align with industry standards, while practice tests help prepare students for certification. The accreditation guidelines ensure your program meets industry requirements, and the provided instructional materials can be integrated into daily lessons. ASE resources are particularly valuable for developing hands-on lab activities that match real-world scenarios technicians encounter in the field.
- C. **Source:** www.ase.com/educators and www.aseeducationfoundation.org

2. Agricultural Equipment Technician (AET) Standards

- A. **Description:** AET standards are industry-developed benchmarks specifically focused on agricultural machinery maintenance and repair. They cover comprehensive technical knowledge and skills needed for servicing farm equipment, including tractors, combines, and various implements.
- B. **Usage:** AET standards can be integrated to provide specialized focus on agricultural machinery. These standards help create comprehensive lessons on hydraulic systems, power trains, and electronic controls specific to agricultural equipment. They can be used to develop hands-on training modules that simulate real-world repair scenarios, and to create assessment tools that evaluate students' practical skills. The standards also provide guidance for structuring internship programs with equipment dealers, offering students valuable industry experience.
- C. **Source:** Access through state agricultural education department or equipment manufacturers' education programs.

3. Construction Equipment Certification Commission (CECC)

- A. **Description:** CECC focuses on establishing standards and certification programs specifically for construction equipment technicians. They provide comprehensive guidelines for repair and maintenance of various construction equipment types.
- B. **Usage:** CECC standards can guide instruction specific to construction equipment maintenance and repair. These standards help develop lessons focused on heavy equipment systems like hydraulics, powertrains, and electronic controls. They provide a framework for creating safety protocols in the shop environment and designing practical assessments that reflect industry needs. The standards are particularly valuable for structuring hands-on training modules that cover various types of construction equipment, from bulldozers to excavators.

- C. **Source:** Access through local construction industry association or state department of education.

4. Heavy Equipment Maintenance Alliance (HEMA)

- A. **Description:** HEMA is an industry consortium that develops standardized maintenance and repair protocols for heavy equipment. They focus on creating unified standards across different types of equipment and manufacturers.
- B. **Usage:** For Medium/Heavy Truck and Equipment instruction, HEMA standards provide valuable resources for teaching standardized repair procedures across different equipment types. These standards can be used to create comprehensive maintenance checklists for student practice, develop quality control guidelines for shop activities, and incorporate industry best practices into daily lessons. The cross-manufacturer approach helps students understand common systems and components while recognizing manufacturer-specific variations, preparing them for real-world equipment maintenance scenarios.
- C. **Source:** Access through local heavy equipment industry association or equipment dealers.

Course Descriptions

Course Level	Course Information	Description
Core: Course 1	Medium/Heavy Truck Basics SCED: Pending Grades: 9-12 Prerequisite: None Credit: 1	This entry-level course introduces students to the fundamental concepts, systems, and safety protocols of medium/heavy trucks and equipment. Students will explore essential shop practices, employability skills, and basic service procedures for major vehicle systems, including diesel engines, electrical/electronic systems, brakes, and suspension/steering. Emphasis is placed on personal safety, tool use, environmental regulations, and career awareness.
Core: Course 2	Medium/Heavy Truck I SCED: Pending Grades: 10-12 Prerequisite: Medium/Heavy Truck Basics Credit: 1	Students build on foundational skills to perform diagnosis and service of M/H truck electrical/ electronic systems and brake systems in accordance with ASE M/H Truck Test Specifications (Electrical/Electronic Systems, Brakes). Emphasis is placed on electrical theory, circuit diagnosis, battery/starting/charging systems, lighting, cab systems, air brakes, hydraulic brakes, and brake system safety. Students develop skills to prepare for ASE Entry-Level Electrical/Electronic Systems and Brakes certifications.
Core Course 3	Medium/Heavy Truck II SCED: Pending Grades: 11-12 Prerequisite: Medium/Heavy Truck I Credit: 1	Students advance to diagnosis and repair of diesel engines and suspension/steering systems following ASE M/H Truck Test Specifications (Diesel Engines, Suspension & Steering). Instruction covers engine mechanical systems, lubrication, cooling, air induction, exhaust, fuel delivery, and emission control. Students also service steering gears, linkages, power steering systems, and suspension components. Prepares students for ASE Entry-Level Diesel Engines and Suspension/Steering certifications.

Course Level	Course Information	Description
Core Course 4	Medium/Heavy Truck Practicum SCED: Pending Grades: 11-12 Prerequisite: Medium/Heavy Truck II Credit: 1	The Practicum provides students with supervised, real-world application of skills in a medium/heavy truck or equipment service environment. Experiences may include internships, apprenticeships, or school-based enterprise operations. Students integrate academic knowledge, technical skills, and workplace competencies, preparing for ASE Entry-Level M/H Truck Maintenance & Light Repair certification.
Optional Flex: Course 3	Career Connected Learning I SCED: Pending Grades: 11-12 Prerequisite: See Course Description Credits: 1-3	Prerequisites: 1. Alignment to the student's 6-Year Plan 2. Completion of: a. Minimum two sequential courses in a CTE pathway, OR b. Minimum two years of the same world language; OR c. Minimum two sequential courses in a comprehensive arts program; OR d. Inclusion in the IEP/504 transition plan with supporting documentation (as required) 3. Endorsement from an educator, mentor, employer, or career coach 4. No more than one course recovery credit in core subjects is needed by the student. This flexible, work-based learning course introduces students to real-world applications of classroom knowledge and technical skills through on-the-job experiences and reflective practices. Students engage in career exploration, skill development, and professional networking by participating in youth apprenticeships, registered apprenticeships, pre-apprenticeships, internships, capstone projects, or other approved career-connected opportunities. Variable credit (1–3) accommodates the required on-the-job training hours and related instruction. By integrating industry standards, employability skills, and personalized learning goals, Career Connected Learning I equips students to make informed career decisions, develop a professional portfolio, and build a strong foundation for success in postsecondary education, training, or the workforce.

Course Level	Course Information	Description
Optional Flex: Course 4	Career Connected Learning II SCED: Pending Grades: 11-12 Prerequisite: Career Connected Learning I Credits: 1-3	Building on the foundational experiences of Career Connected Learning I, this advanced work-based learning course provides students with deeper on-the-job practice, leadership opportunities, and refined career exploration. Students continue to enhance their technical and professional skills, expanding their industry networks and aligning personal goals with evolving career interests. Variable credit (1–3) remains aligned with the required training hours and related instruction. Through elevated responsibilities and skill application, Career Connected Learning II prepares students to confidently transition into higher-level postsecondary programs, apprenticeships, or the workforce.

Dual Enrollment and Career Connected Learning Experiences Must be Aligned to the CTE Core.

Industry-Recognized Credentials and Career-Connected Learning

The *Blueprint for Maryland's Future* and the High School Level of a Registered Apprenticeship

The Maryland State Department of Education recognizes the high-school level of a Registered Apprenticeship (RA), defined as a State-approved Registered Apprenticeship begun during high school in which students complete at least 144 hours of related technical instruction and 250 hours of paid on-the-job training before graduation, with the remaining required apprenticeship hours completed post-graduation, as the gold standard of Career Connected Learning.

The CTE Committee of the Governor's Workforce Development Board, in alignment with federal apprenticeship standards, requires 144 hours of RTI for all high school RA participants, and the Apprenticeship Maryland Program (AMP) defines the minimum RTI as **one course credit equivalent**. This high-school-level Registered Apprenticeship is the preferred career-connected learning option for students to meet the Blueprint's goal that 45% of public high school graduates complete either the high-school level of a Registered Apprenticeship or another industry-recognized credential.

To the extent practicable, the greatest number of students should achieve this goal through participation in a high-school level Registered Apprenticeship, with schools ensuring these requirements are scheduled, completed, and documented for transcript and reporting purposes.

To the extent practicable, the greatest number of students should achieve this goal through the high-school level of a Registered Apprenticeship.

Career-Connected Learning Resources

Course 1: Career Awareness	Course 2: Career Preparation	Flex Courses: Career-Connected Learning
- Industry Visits - Guest Speakers - Participation in Career and Technical Student Organizations - Postsecondary Visits – Program Specific Site Tours - Mock Interviews	- All of Career Awareness plus the following: - Job Shadow - Employer Mentoring	- Registered Apprenticeship - Internship - School-Based Enterprise - Employer-Directed Capstone

Industry-Recognized Credentials

By the end of Medium/Heavy Truck I: ASE Entry-Level Medium/Heavy Truck: Electrical/Electronic Systems and Brakes

By the end of Medium/Heavy Truck II: ASE Entry-Level Medium/Heavy Truck: Diesel Engines, Suspension and Steering, and Inspection Maintenance and Minor Repair

By the end of Medium/Heavy Truck Practicum: Electrical/Electronic Systems, Brakes, Diesel Engines, Suspension and Steering, and Inspection Maintenance and Minor Repair

TEST SPECIFICATIONS AND TASK LISTS

- Medium/Heavy Truck Series: https://www.ase.com/dist/docs/Truck_Test_Specs.pdf.

Labor Market Information: Definitions and Data

Labor market information (LMI) plays a crucial role in shaping Career and Technical Education (CTE) programs by providing insights into industry demands, employment trends, and skills gaps. This data helps education leaders assess the viability of existing programs and identify opportunities for new offerings. By aligning CTE programs with real-time labor market needs, schools can better prepare students for in-demand careers and ensure that resources are effectively utilized to support pathways that lead to high-quality, sustainable employment.

Standard Occupational Code (SOC) and Aligned Industry:

Indicator	Definition	Pathway Labor Market Data
High Wage¹	Those occupations that have a 25th percentile wage equal to or greater than the most recent MIT Living Wage Index for one adult in the state of Maryland, and/or leads to a position that pays at least the median hourly or annual wage for the DC-VA-MD-WV Metropolitan Statistical Area (MSA). <i>Note: A 25th percentile hourly wage of \$24.74 or greater is required to meet this definition.</i>	Standard Occupational Code: 49-3031: Bus and Truck Mechanics and Diesel Engine Specialists Hourly Wage/Annual Salary: 25 th Percentile: \$28.48/\$59,238 50 th Percentile: \$34.43/\$71,614 75 th Percentile: \$39.28/\$81,702
High Skill	Those occupations located within the DC-VA-MD-WV Metropolitan Statistical Area (MSA) with the following education or training requirements: completion of an apprenticeship program; completion of an industry-recognized certification or credential; associate's degree, bachelor's degree, or higher.	Typical Entry-Level Education: While there are several organized training programs in the region, there is no formal post-secondary training necessary to enter the workforce for students who have completed this program.
In-Demand	Annual growth plus replacement, across all Maryland occupations, is <u>405</u> openings between 2024-2029.	Annual Openings 337

Lightcast Data Updated August 2025

¹ Living Wage Calculator: <https://livingwage.mit.edu/states/24>

Labor Market Information Data Source

Lightcast occupation employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates are also affected by county-level Lightcast earnings by industry. Foundational data for the state of Maryland is collected and reported by the Maryland Department of Labor.

Methodology for High Wage Calculations

To combine labor market data across multiple Standard Occupational Classifications (SOCs), a weighted average approach was used to ensure accurate representation of the marketplace. Median wages for each SOC were weighted based on their respective employment levels, reflecting the relative demand for each occupation. This method ensures that occupations with higher employment contribute proportionately to the overall wage calculation. Additionally, job openings from all relevant SOCs were summed to determine the total projected demand. For example, if Mechanical Engineers account for 67% of total employment and Electrical Engineers for 33%, their respective wages are weighted accordingly, and job openings are aggregated to provide a comprehensive view of labor market opportunities. This approach delivers a balanced and accurate representation of both wages and employment demand for the program.

Methodology for In-Demand Calculations

The baseline for annual job openings, taking into account new positions and replacement positions, was determined by taking the average of all annual job openings between 2024 and 2029 across all 797 career sectors at the 5-digit SOC code level. For the 2024-2029 period, average job openings (growth + replacement) is 405.

Course Standards: Medium/Heavy Truck Basics

1. GENERAL REQUIREMENTS. This course is recommended for students in Grades 9-12.

2. INTRODUCTION

- A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
- B. The Supply Chain & Transportation Career Cluster encompasses the transfer, coordination, and management of goods from production to consumption, ensuring efficient movement across various modes of transportation including air, ground, and water, as well as maintenance of the respective transport modes. This Cluster integrates logistics and distribution networks to facilitate the seamless flow of materials and products, playing a crucial role in global commerce.
- C. The Medium/Heavy Truck Technician Program of Study is a comprehensive four-course sequence that prepares students for careers in diesel technology and heavy equipment maintenance. Throughout the program, students perform essential tasks such as testing electrical circuits, servicing brake systems, conducting engine diagnostics, and aligning steering components. The curriculum aligns with ASE Education Foundation standards, preparing students for ASE Entry-Level certification in Medium/Heavy Truck as well as other industry credentials such as EPA Section 609 MVAC certification. Graduates are prepared for entry-level positions as diesel technicians, fleet maintenance technicians, or heavy equipment service technicians.
- D. Medium/Heavy Truck Basics introduces students to the fundamental concepts, systems, and safety protocols of medium/heavy trucks and equipment. Students will explore essential shop practices, employability skills, and basic service procedures for major vehicle systems, including diesel engines, electrical/electronic systems, brakes, and suspension/steering. Emphasis is placed on personal safety, tool use, environmental regulations, and career awareness. The Medium/Heavy Truck provides foundational knowledge that supports ASE Entry-Level certification preparation in M/H Truck Electrical/Electronic Systems and Inspection, Maintenance & Minor Repair.
- E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.
- F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.

3. KNOWLEDGE AND SKILLS

- A. The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:**
- 1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work.
 - 2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn.
 - 3. Employ effective reading, writing, and technical documentation skills.

4. Solve problems using critical thinking techniques and structured troubleshooting methodologies.
5. Demonstrate leadership skills and collaborate effectively as a team member.
6. Implement safety procedures, including proper handling of hardware and following OSHA guidelines.
7. Exhibit an understanding of legal and ethical responsibilities in the Medium/Heavy Truck and Equipment field, following applicable laws and best practices for safety.
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting.

B. The student demonstrates appropriate personal and communication skills. The student is expected to:

1. Demonstrate respectful interaction with peers, instructors, and customers.
2. Apply active listening techniques to gather information accurately.
3. Prepare written documentation that is clear, concise, and professional.
4. Deliver verbal explanations of technical work to both technical and non-technical audiences.

C. The student demonstrates academic skills related to the requirements of maintaining and repairing medium/heavy trucks. The student is expected to:

1. Apply mathematical calculations to measurement, torque, and basic circuit analysis.
2. Interpret tables, charts, and technical diagrams.
3. Read and follow technical service bulletins and manufacturer procedures.

D. The student understands the technical knowledge and skills of automotive systems related to medium/heavy trucks. The student is expected to:

1. Identify the major systems of a medium/heavy truck and describe their functions.
2. Explain the interaction between powertrain, brake, steering, and suspension systems.
3. Describe the role of preventive maintenance in vehicle reliability and safety.

E. The student applies the technical knowledge and skills of inspection, maintenance, and minor repair (ASE IMMR). The student is expected to:

1. Locate and interpret manufacturer preventive maintenance schedules. (ASE IMMR A1)
2. Perform visual inspections for wear, leaks, and damage on all major systems. (ASE IMMR A2)
3. Check and record fluid levels and conditions (engine oil, coolant, DEF, fuel). (ASE T2 D1, IMMR A2)
4. Inspect tires for wear, tread depth, and inflation pressure. (ASE IMMR C1–C3)
5. Inspect and clean battery terminals; secure battery mounting. (ASE T6 B3, B8)
6. Perform safe jump-starting procedures. (ASE T6 B5)

F. The student applies the technical knowledge and skills of basic electrical/electronic systems. The student is expected to:

1. Identify series and parallel circuits. (ASE T6 A2)
2. Use a digital multimeter (DMM) to measure voltage, resistance, and continuity. (ASE T6 A3)
3. Inspect basic lighting system components; replace bulbs and fuses. (ASE T6 E1–E4)

G. The student applies the technical knowledge and skills of safety and environmental practices. The student is expected to:

1. Follow OSHA regulations for shop operations. (General Safety)
2. Identify hazards and demonstrate mitigation strategies. (General Safety)
3. Handle and dispose of hazardous materials per EPA/state rules. (General Safety)

H. The student applies the technical knowledge and skills of tools, equipment, and technology. The student is expected to:

1. Identify hand, power, and shop tools and their uses. (ASE IMMR A6)
2. Demonstrate safe lifting and support of vehicles. (ASE IMMR A6)
3. Maintain tools and shop equipment in serviceable condition. (ASE IMMR A6)

Course Standards: Medium/Heavy Truck I

1. **GENERAL REQUIREMENTS.** This course is recommended for students in Grades 10-12.
2. **INTRODUCTION**
 - A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
 - B. The Supply Chain & Transportation Career Cluster encompasses the transfer, coordination, and management of goods from production to consumption, ensuring efficient movement across various modes of transportation including air, ground, and water, as well as maintenance of the respective transport modes. This Cluster integrates logistics and distribution networks to facilitate the seamless flow of materials and products, playing a crucial role in global commerce, economic development, and community health.
 - C. The Medium/Heavy Truck and Equipment Technician Program of Study is a comprehensive four-course sequence that prepares students for careers in diesel technology and heavy equipment maintenance. Throughout the program, students perform essential tasks such as testing electrical circuits, servicing brake systems, conducting engine diagnostics, and aligning steering components. The curriculum aligns with ASE Education Foundation standards, preparing students for ASE Entry-Level certification in Medium/Heavy Truck as well as other industry credentials such as EPA Section 609 MVAC certification. Graduates are prepared for entry-level positions as diesel technicians, fleet maintenance technicians, or heavy equipment service technicians.
 - D. In Medium/Heavy Truck I, Students build on foundational skills to perform diagnosis and service of M/H truck electrical/ electronic systems and brake systems in accordance with ASE M/H Truck Test Specifications (Electrical/Electronic Systems, Brakes). Emphasis is placed on electrical theory, circuit diagnosis, battery/starting/charging systems, lighting, cab systems, air brakes, hydraulic brakes, and brake system safety. Students develop skills to prepare for ASE Entry-Level Electrical/Electronic Systems and Brakes certifications.
 - E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.
 - F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.
3. **KNOWLEDGE AND SKILLS**
 - A. **The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:**
 1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work.
 2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn.
 3. Employ effective reading, writing, and technical documentation skills.

4. Solve problems using critical thinking techniques and structured troubleshooting methodologies.
5. Demonstrate leadership skills and collaborate effectively as a team member.
6. Implement safety procedures, including proper handling of hardware and following OSHA guidelines.
7. Exhibit an understanding of legal and ethical responsibilities in the Medium/Heavy Truck and Equipment field, following applicable laws and best practices for safety.
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting.

B. The student demonstrates appropriate personal and communication skills. The student is expected to:

1. Demonstrate respectful interaction with peers, instructors, and customers.
2. Apply active listening techniques to gather information accurately.
3. Prepare written documentation that is clear, concise, and professional.
4. Deliver verbal explanations of technical work to both technical and non-technical audiences.

C. The student demonstrates academic skills related to the requirements of maintaining and repairing medium/heavy trucks. The student is expected to:

1. Apply mathematical calculations to measurement, torque, and basic circuit analysis.
2. Interpret tables, charts, and technical diagrams.
3. Read and follow technical service bulletins and manufacturer procedures.

D. The student understands the technical knowledge and skills of automotive systems related to medium/heavy trucks. The student is expected to:

1. Identify the major systems of a medium/heavy truck and describe their functions.
2. Explain the interaction between powertrain, brake, steering, and suspension systems.
3. Describe the role of preventive maintenance in vehicle reliability and safety.

E. The student applies the technical knowledge and skills of general electrical/electronic diagnosis (ASE T6-A). The student is expected to:

1. Research service information, wiring diagrams, and TSBs. (ASE T6 A1, A5)
2. Analyze series, parallel, and series-parallel circuits using Ohm's Law. (ASE T6 A2)
3. Measure voltage, voltage drop, current, continuity, and resistance. (ASE T6 A3)
4. Identify and repair opens, shorts, and high resistance faults. (ASE T6 A4)

F. The student applies the technical knowledge and skills of battery systems (ASE T6-B). The student is expected to:

1. Verify correct battery capacity for application. (ASE T6 B2)
2. Perform state-of-charge and load tests. (ASE T6 B4)
3. Inspect, clean, and service cables, connectors, and battery boxes. (ASE T6 B3–B9)

G. The student applies the technical knowledge and skills of starting systems (ASE T6-C). The student is expected to:

1. Test starter cranking voltage and current draw. (ASE T6 C2, C5)
2. Inspect starter control circuit components. (ASE T6 C3)
3. Diagnose no-crank and slow-crank conditions. (ASE T6 C4)

H. The student applies the technical knowledge and skills of charging systems (ASE T6-D).**The student is expected to:**

1. Test alternator output and AC ripple. (ASE T6 D5)
2. Perform voltage drop tests in charging circuits. (ASE T6 D6)
3. Inspect and service drive belts, pulleys, and tensioners. (ASE T6 D3)

I. The student applies the technical knowledge and skills of lighting systems (ASE T6-E). The student is expected to:

1. Diagnose dim, intermittent, or non-functioning lights. (ASE T6 E1)
2. Test and aim headlights. (ASE T6 E2)
3. Inspect tractor-to-trailer lighting connections. (ASE T6 E4)

J. The student applies the technical knowledge and skills of cab and chassis electrical systems (ASE T6-G). The student is expected to:

1. Verify operation of wipers, horns, and mirrors. (ASE T6 G1)
2. Diagnose comfort/convenience systems such as power windows and locks. (ASE T6 G3)

K. The student applies the technical knowledge and skills of brake systems (ASE T4). The student is expected to:

1. Identify and inspect air brake components: compressor, governor, dryer, tanks, valves. (ASE T4 A2)
2. Test for leaks, build-up time, and low-pressure warning. (ASE T4 A2-2)
3. Inspect and adjust slack adjusters; measure drum/rotor wear. (ASE T4 A3)
4. Inspect hydraulic brake components; bleed and flush systems. (ASE T4 B2-B3)
5. Diagnose ABS, ATC, and ESC system faults. (ASE T4 C1-C6)
6. Inspect, adjust, and replace parking brake components, including mechanical linkages and spring brakes. (ASE T4 A4)
7. Inspect, service, and replace foundation brake components such as brake shoes, drums, pads, rotors, calipers, and hardware. (ASE T4 A3, T4 B2)

Course Standards: Medium/Heavy Truck II

1. **GENERAL REQUIREMENTS.** This course is recommended for students in Grades 11-12.

2. **INTRODUCTION**

- A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
- B. The Supply Chain & Transportation Career Cluster encompasses the transfer, coordination, and management of goods from production to consumption, ensuring efficient movement across various modes of transportation including air, ground, and water, as well as maintenance of the respective transport modes. This Cluster integrates logistics and distribution networks to facilitate the seamless flow of materials and products, playing a crucial role in global commerce, economic development, and community health.
- C. The Medium/Heavy Truck and Equipment Technician Program of Study is a comprehensive four-course sequence that prepares students for careers in diesel technology and heavy equipment maintenance. Throughout the program, students perform essential tasks such as testing electrical circuits, servicing brake systems, conducting engine diagnostics, and aligning steering components. The curriculum aligns with ASE Education Foundation standards, preparing students for ASE Entry-Level certification in Medium/Heavy Truck as well as other industry credentials such as EPA Section 609 MVAC certification. Graduates are prepared for entry-level positions as diesel technicians, fleet maintenance technicians, or heavy equipment service technicians.
- D. In Medium/Heavy Truck II, students advance to diagnosis and repair of diesel engines and suspension/steering systems following ASE M/H Truck Test Specifications (Diesel Engines, Suspension & Steering). Instruction covers engine mechanical systems, lubrication, cooling, air induction, exhaust, fuel delivery, and emission control. Students also service steering gears, linkages, power steering systems, and suspension components. Prepares students for ASE Entry-Level Diesel Engines and Suspension/Steering certifications.
- E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.
- F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.

3. **KNOWLEDGE AND SKILLS**

- A. The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:**
 - 1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work.
 - 2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn.
 - 3. Employ effective reading, writing, and technical documentation skills.

4. Solve problems using critical thinking techniques and structured troubleshooting methodologies.
5. Demonstrate leadership skills and collaborate effectively as a team member.
6. Implement safety procedures, including proper handling of hardware and following OSHA guidelines.
7. Exhibit an understanding of legal and ethical responsibilities in the Medium/Heavy Truck and Equipment field, following applicable laws and best practices for safety.
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting.

B. The student demonstrates appropriate personal and communication skills. The student is expected to:

1. Demonstrate respectful interaction with peers, instructors, and customers.
2. Apply active listening techniques to gather information accurately.
3. Prepare written documentation that is clear, concise, and professional.
4. Deliver verbal explanations of technical work to both technical and non-technical audiences.

C. The student demonstrates academic skills related to the requirements of maintaining and repairing medium/heavy trucks. The student is expected to:

1. Apply mathematical calculations to measurement, torque, and basic circuit analysis.
2. Interpret tables, charts, and technical diagrams.
3. Read and follow technical service bulletins and manufacturer procedures.

D. The student understands the technical knowledge and skills of automotive systems related to medium/heavy trucks. The student is expected to:

1. Identify the major systems of a medium/heavy truck and describe their functions.
2. Explain the interaction between powertrain, brake, steering, and suspension systems.
3. Describe the role of preventive maintenance in vehicle reliability and safety.

E. The student applies the technical knowledge and skills of diesel engine general diagnosis (ASE T2-A). The student is expected to:

1. Diagnose start/no-start, rough idle, low power, and shutdown conditions. (ASE T2 A7–A8)
2. Identify engine component configurations and types. (ASE T2 A6)

F. The student applies the technical knowledge and skills of cylinder head and valve train service (ASE T2-B). The student is expected to:

1. Inspect cylinder heads for cracks, damage, and warpage. (ASE T2 B2)
2. Adjust valve clearances and injector settings. (ASE T2 B6)

G. The student applies the technical knowledge and skills of engine block service (ASE T2-C). The student is expected to:

1. Inspect crankshaft, pistons, liners, and bearings. (ASE T2 C12–C17)
2. Check clearances and reinstall components to spec. (ASE T2 C13)

H. The student applies the technical knowledge and skills of lubrication and cooling systems (ASE T2-D/E). The student is expected to:

1. Test oil pressure; service oil pump and filters. (ASE T2 D1–D7)
2. Inspect coolant type, level, and condition; pressure test system. (ASE T2 E1–E7)

I. The student applies the technical knowledge and skills of air induction, exhaust, and engine brakes (ASE T2-F). The student is expected to:

1. Inspect turbocharger operation and piping systems. (ASE T2 F1–F2)
2. Diagnose and service EGR systems. (ASE T2 F6)

J. The student applies the technical knowledge and skills of fuel systems (ASE T2-G). The student is expected to:

1. Inspect fuel tanks, lines, and filters. (ASE T2 G2–G4)
2. Prime and bleed the system. (ASE T2 G4)

K. The student applies the technical knowledge and skills of suspension and steering (ASE T5). The student is expected to:

1. Inspect and service suspension components: springs, bushings, airbags, torque arms. (ASE T5 A3)
2. Diagnose steering gear and linkage issues. (ASE T5 B1)
3. Check and adjust wheel alignment. (ASE T5 C)
4. Diagnose and service electronic steering and suspension control systems, including sensors, actuators, and control modules. (ASE T5 C2)

Course Standards: Medium/Heavy Truck Practicum

1. **GENERAL REQUIREMENTS.** This course is recommended for students in Grades 11-12.
2. **INTRODUCTION**
 - A. Career and Technical Education (CTE) instruction provides content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current or emerging professions.
 - B. The Supply Chain & Transportation Career Cluster encompasses the transfer, coordination, and management of goods from production to consumption, ensuring efficient movement across various modes of transportation including air, ground, and water, as well as maintenance of the respective transport modes. This Cluster integrates logistics and distribution networks to facilitate the seamless flow of materials and products, playing a crucial role in global commerce, economic development, and community health.
 - C. The Medium/Heavy Truck and Equipment Technician Program of Study is a comprehensive four-course sequence that prepares students for careers in diesel technology and heavy equipment maintenance. Throughout the program, students perform essential tasks such as testing electrical circuits, servicing brake systems, conducting engine diagnostics, and aligning steering components. The curriculum aligns with ASE Education Foundation standards, preparing students for ASE Entry-Level certification in Medium/Heavy Truck as well as other industry credentials such as EPA Section 609 MVAC certification. Graduates are prepared for entry-level positions as diesel technicians, fleet maintenance technicians, or heavy equipment service technicians.
 - D. The Medium/Heavy Truck Practicum provides students with supervised, real-world application of skills in a medium/heavy truck or equipment service environment. Experiences may include internships, apprenticeships, or school-based enterprise operations. Students integrate academic knowledge, technical skills, and workplace competencies, preparing for ASE Entry-Level M/H Truck Maintenance & Light Repair certification.
 - E. Students will participate in at least two Career-Connected Education and Work-Based Learning experiences in this course, which might include informational interviews or job shadowing relevant to the program of study.
 - F. Students are encouraged to participate in extended learning experiences through aligned Career and Technical Student Organizations (CTSOs). CTSOs are a cocurricular requirement in the Carl D. Perkins Act, and alignment to CTSO activities is an expectation for CTE programs in the state of Maryland.
3. **KNOWLEDGE AND SKILLS**
 - A. **The student demonstrates the necessary skills for career development, maintenance of employability, and successful completion of course outcomes. The student is expected to:**
 1. Identify and demonstrate positive work behaviors that enhance employability and job advancement, such as regular attendance, promptness, proper attire, maintenance of a clean and safe work environment, and pride in work.
 2. Demonstrate positive personal qualities such as flexibility, open-mindedness, initiative, active listening, and a willingness to learn.
 3. Employ effective reading, writing, and technical documentation skills.
 4. Solve problems using critical thinking techniques and structured troubleshooting methodologies.

5. Demonstrate leadership skills and collaborate effectively as a team member.
6. Implement safety procedures, including proper handling of hardware and following OSHA guidelines.
7. Exhibit an understanding of legal and ethical responsibilities in the Medium/Heavy Truck and Equipment field, following applicable laws and best practices for safety.
8. Demonstrate time-management skills and the ability to prioritize tasks in a technical setting.

B. The student demonstrates appropriate personal and communication skills. The student is expected to:

1. Demonstrate respectful interaction with peers, instructors, and customers.
2. Apply active listening techniques to gather information accurately.
3. Prepare written documentation that is clear, concise, and professional.
4. Deliver verbal explanations of technical work to both technical and non-technical audiences.

C. The student demonstrates academic skills related to the requirements of maintaining and repairing medium/heavy trucks. The student is expected to:

1. Apply mathematical calculations to measurement, torque, and basic circuit analysis.
2. Interpret tables, charts, and technical diagrams.
3. Read and follow technical service bulletins and manufacturer procedures.

D. The student understands the technical knowledge and skills of automotive systems related to medium/heavy trucks. The student is expected to:

1. Identify the major systems of a medium/heavy truck and describe their functions.
2. Explain the interaction between powertrain, brake, steering, and suspension systems.
3. Describe the role of preventive maintenance in vehicle reliability and safety.

E. The student applies integrated technical skills across ASE M/H Truck content areas. The student is expected to:

1. Perform full-system preventive maintenance inspections. (ASE IMMR A2–A3)
2. Diagnose and repair faults in diesel engines, electrical systems, brakes, and suspension/steering. (ASE T2–T6–T4–T5)
3. Diagnose and repair combined system faults where multiple vehicle systems interact, such as electrical issues causing engine performance concerns or brake system faults affecting suspension operation. (ASE IMMR A5, T2 A7, T4 C1, T5 B1, T6 A4)

F. The student applies industry-standard diagnostic and repair procedures. The student is expected to:

1. Use scan tools and diagnostic software to retrieve/clear codes. (ASE IMMR A5)
2. Verify repairs through testing and inspection. (ASE IMMR A4)

G. The student applies workplace readiness skills in a real or simulated environment. The student is expected to:

1. Document repairs in standard work order format. (IMMR A4)
2. Communicate findings and recommendations to customers and supervisors. (ASE IMMR A4)
3. Follow shop workflow procedures for efficiency. (ASE IMMR A4)