

# **DMedium/Heavy Diesel Technology | Scope & Sequence**

## **Year 1, Semester 1**

MHD101 Medium/Heavy Truck

(18 Weeks)

### **District Pre-Assessment**

Unit 1 (20 Class Days)

#### **Lab and Classroom Safety, Rules & Employability Skills:**

- Syllabus, Procedures, Rules
- Safety Online Training
- Shop Safety and Orientation
- Certification: SP2 Safety Certification
- OSHA 10 Certification
- CTSO Integration (Leadership Skills): Officer Elections, Officer Training
- Work-based Learning: Guest speaker
- Professional Skills: 6A-C, 8A-I
- Academic Standards: ELA.11-12.W.4, ELA.11-12.W.5, ELA.11-12.RI.10, ELA.11-12.SL.3,5.NF.B.3, 5.NF.B.6, 5.NF.B.7
- Technical Standard: 1.1-1.24

Unit 2 - 20 Days (10 Class Days - 10 lab days)

#### **Diesel Tools and Equipment:**

- Hand Tools
- Power Tools
- Specialty Equipment
- Snap-On Certification
- CTSO Integration (Leadership Skills): SkillsUSA Fall Conference
- Work-Based Learning: guest speaker Snap-On
- Professional Standards: 6A-C, 8A-I
- Academic Standards: ELA 11-12 w8,w9
- Technical Standard 1.17-1.21

Unit 3 - 25 Days (12 Class Days - 13 Lab days)

#### **Steering and Suspension:**

- Tires, Wheels and Hubs
- Front axles and vehicle alignment factors
- Suspension systems
- Steering systems
- Alignment
- Leadership
- Correct imperfections
- CTSO Integration (Leadership Skills): SkillsUSA Fall Leadership Conference Chapter Meeting
- Work-Based Learning: Guest Speaker, Workplace Visit
- Professional Standards: 5.0
- Academic Standards: 5.NF.B.3
- Technical Standard: 10.1-10.15, 11

Unit 4 - 25 Days (12 Class Days - 13 Lab days)

#### **Drivetrain Systems:**

- Manual transmission
- Automatic Transmission
- Driveshaft
- Differentials
- Organizational culture
- CTSO Integration (Leadership Skills): SkillsUSA Fall Leadership Conference, Chapter Meetings
- Work-Based Learning: job shadow
- Professional Standards:7.0
- Academic Standards: ELA 11-12 RI2, RI10, 12-12, SL4
- Technical Standard: 7.1-7.19

## **Year 1, Semester 2**

MHD102 Medium/Heavy Truck

(18 Weeks)

Unit 5 -35 Days (17 Class Days - 18 Lab Days)

#### **Truck Brakes Systems:**

- Hydraulic brake systems
- Air brake systems
- Inspection, troubleshooting and diagnostics
- Air over hydraulics systems
- ABS systems troubleshooting and diagnostics
- Financial Practices
- CTSO Integration (Leadership Skills): SkillsUSA Regional Conference and qualifier
- Work-Based Learning: guest speaker
- Professional Standards: 9.0
- Academic Standards: ELA 11-12 w8,w9
- Technical Standard 8.1-8.18, 9

Unit 6 - 30 Days (20 Class Days - 20 Lab Days)

#### **Welding, Truck Frames and Construction:**

- Truck chassis
- Trailer chassis
- Fifth Wheels
- Inspection and Maintenance
- Welding repair labs
- Certification: ASE t5 steering and suspension
- CTSO Integration (Leadership Skills): SkillsUSA Regional Competition, Chapter Meetings
- Work-Based Learning: Mock Interviews
- Professional Standards: 3.0
- Academic Standards: ELA 11-12 W5,W6
- Technical Standard:12.1-12.5

Unit 7 - 20 Days - (10 Class Days - 10 Lab Days)

**Automotive Service Excellence (ASE):**

- Industry certification study and testing. (ASE,SP/2,CUMMINS)
- Student enterprise projects
- SkillsUSA end of the year banquet
- Certification: ASE- Diesel Brakes, Suspension and Steering exam
- CTSO Integration(Leadership Skills): Chapter Social, SkillsUSA National Conference
- Work-Based Learning: soft skills training
- Professional Skills: ALL
- Academic Standards: review all
- Technical Standard: 1, 7, 8, 9, 10, 11, 12

**Semester Exam (1 week)**

**Year 2, Semester 1**

MHD201 Medium/Heavy Truck  
(18 Weeks)

Unit 8 ( 5 Class Days)

- Syllabus, Procedures, Rules
- Safety online training
- Year 1 Review
- CTSO Integration (Leadership Skills): sp2 certification safety
- Professional Skills:4 A-F

Unit 9 - 45 Days - (22 Class Days - 23 Lab Days)

**Introduction to Diesel/Internal Combustion Engine:**

- Basic Theory of Combustion
- History of Engines
- Operations of Internal Combustion Engines
- Difference between S.I. and C.I. Engines
- Engine Components and Functions
- Deconstruction and Reassembly of Engines
- Timing Systems
- Cooling and Lubricating Systems
- Fuel systems
- Using Precision Measuring Tools
- CTSO Integration (Leadership Skills): Officer training, SkillsUSA Fall Leadership Conference Chapter Meeting
- Professional Standards:4.A-F
- Academic Standards: ELA.11-12.W.2, ELA.11-12.L.6, ELA.11-12.SL.3, ELA.11-12.SL.6
- Work-based Learning: Guest Speaker and Resume Writing
- Technical Standard: 2.3, 2.4, 2.6, 3.1, 3.2.4.1 -

4.9, 5.4, 5.6, 6.1-6.6

Unit 10 - 25 Days ( 5 class Days - 5 Lab Days)

**Principles of Electrical:**

- Principles of electricity
- Ohm's Law
- Conventional and electron theories
- Electrical circuits
- Troubleshooting and Diagnostics
- CTSO Integration (Leadership Skills): SkillsUSA Region 5, Chapter meeting
- Batteries, testing and diagnostics
- Starting & charging system components and functions
- Starting & charging system troubleshooting and diagnostics
- CTSO Integration (Leadership Skills): SkillsUSA Arizona Fall Leadership Conference, Chapter Meeting
- Professional Standards: 1.A-D
- Academic Standards: ELA.11-12.W.5, ELA.11-12.W.6
- Work-Based Learning: Job Shadow Reflection
- Technical Standard: 14.1-14.6, 15.1-15.3,

16.1-16.5

Unit 14 - 15 Days (7 Class Days - 8 Lab Days)

**Electronic Control Units Networking:**

- Electronics
- Obd2 systems & Hd-Obd
- Cummins Insite software & Q.S.O.L. Labs
- Snap on scan tool training
- C.A.N.
- Retrieving and diagnostics of troubleshooting codes
- CTSO Integration (Leadership Skills): SkillsUSA Fall Leadership Conference, Chapter Meetings, Fundraising
- Academic Standards: ELA 11-12 w5,w9,l4,l6,ri7,l4
- Work-Based Learning: Soft Skills Training

**Year 2, Semester 2**

MHD202 Medium/Heavy Truck  
(18 Weeks)

Unit 14 - 15 Days ( 5 Class Days - 10 Lab Days)

**(Continued) Electronic Control Units Networking:**

- Electronics
- Obd2 systems & Hd-Obd
- Cummins Insite software & Q.S.O.L. Labs
- Snap on scan tool training
- C.A.N.
- Retrieving and diagnostics of troubleshooting codes
- CTSO Integration (Leadership Skills): SkillsUSA State Conference
- Academic Standards: ELA 11-12 w5,w9,l4,l6,ri7,l4

- Work-Based Learning: Soft Skills Training

Unit 15 -15 Days (5 Class Days - 10 Lab Days)

**HVAC and Refrigeration Systems:**

- Principles of Cooling
- Air conditioning systems
- Troubleshooting and diagnostics on Air Conditioning Systems
- Trailer Refrigeration System
- CTSO Integration (Leadership Skills) Soft Skills Training
- Professional Skills: How To Execute A Planned Event
- Academic Standards: ELA.11-12.SL.4, ELA.11-12.SL.6
- Work-Based Learning: student externship
- Technical Standard: 4.1-4.9

Unit 16 - 10 Day (5 Class Days - 5 Lab Days)

**Hydraulics:**

- Principles of hydraulics
- Hydraulics systems and components
- Application of hydraulics
- CTSO Integration (Leadership Skills):officer training
- Professional Skills:4a-f
- Academic Standards: ELA.11-12.W2,I6,SL.3,SL.6
- Work-Based Learning: Guest Speaker
- Technical Standard: 9.1-9.13

Unit 16 - 20 Days (10 Class Days - 10 Lab Days)

**Preventive Maintenance:**

- D.O.T. Inspections
- A,B, T- Level Inspections
- Diagnostic code retrieving, troubleshooting and diagnostics
- CTSO Integration (Leadership Skills): Chapter meetings
- Professional Skills: planning a year end banquet
- Academic Standards: ELA.11-12.RI.10, ELA.11-12.W.4
- Work-Based Learning Soft Skills Training
- Technical Standard: 13.1-13.11, 14.1-14.6

Unit 17 - 15 Class Days

**Automotive Service Excellence (ASE) Test Preparation:**

- Basic engines review
- Electrical review
- Air Brakes Review
- Certification: ASE- Diesel Engines and Electrical Electronic Systems exam
- CTSO Integration (Leadership Skills): fund raising, SkillsUSA State Conference.
- Professional Skills:
- Academic Standards: ELA 11-12 RI2,RI10,SL4
- Work-Based Learning: Job Shadow and Externship
- Technical Standard: 2,3, 4, 5, 6, 13, 14, 15, 16, 17

Unit 18 - 15 Class Days

**Course Review:**

- Engines, Brakes, Steering and Suspension, Electrical & Drivetrains
- **ADE Technical Skills Assessment**
- CTSO Integration (Leadership Skills): chapter meeting, end of program banquet, SkillsUSA National Conference
- Professional Skills: ALL
- Academic Standards: ELA 11-12 sl4,sl6
- Work-Based Learning: Externship
- Technical Standard: 1.1-17-4 (All)

Arizona Department of Education (ADE)  
Automotive Service Excellence (ASE)  
Common AZCCR Math Standards (CAMS)  
English Language Arts Standards (ELAS)