

# Medium/Heavy Diesel Technology | Scope & Sequence

## Year 1, Semester 1

MHD101 Medium/Heavy Truck

(18 Weeks)

### District Pre-Assessment

#### Unit 1 (20 Days: 10 Class/10 Lab)

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

- Syllabus, Procedures, Rules
- Safety Online Training
- Shop Safety and Orientation
- Certification: SP2 Safety 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: 1.1-1.22

#### Unit 2 (10 Days: 5 Class/5 Lab)

#### 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 (30 Days: 10 Class/20 Lab)

#### 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

## ASE Steering and Suspension Certification

#### Unit 4 (30 Days: 10 Class/20 Lab)

#### 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: 7.1-7.17

## Year 1, Semester 2

MHD102 Medium/Heavy Truck

(18 Weeks)

#### Unit 5 -45 Days (14 Class/31 Lab)

#### 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 8.1-8.17, 9

## ASE Truck Brake Certification

#### Unit 6 - 45 Days (15 Class/30 Lab)

#### Truck Frames and Construction:

- Truck chassis
- Trailer chassis
- Fifth Wheels
- Inspection and Maintenance
- 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: 12.1-12.4

#### Semester Exam

## **Year 2, Semester 1**

MHD201 Medium/Heavy Truck  
(18 Weeks)

### Unit 7 - 7 Days (5 Class/2 Lab)

#### **Lab and Classroom Safety, Rules, and Overview**

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

### Unit 8 - 50 Days (20 Class/30 Lab)

#### **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, 6.1-6.5

#### **ASE Diesel Engines Certification**

### Unit 9 - 14 Days (7 Class/7 Lab)

#### **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 10 - 19 Days (6 Class/13 Lab)

#### **Electronic Control Units Networking:**

- Electronics
- Obd2 systems & Hd-Obd
- Cummins Insite software & Q.S.O.L. Labs
- 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

#### **ASE Electrical and Electronic Systems Certification**

## **Year 2, Semester 2**

MHD202 Medium/Heavy Truck  
(18 Weeks)

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

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

- Electronics
- Obd2 systems & Hd-Obd
- Cummins Insite software & Q.S.O.L. Labs
- 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 11 - 15 Days (5 Class/10 Lab)

#### **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

## **ASE HVAC EPA 609 Certification**

### Unit 12 - 35 Days (10 Class/25 Lab)

#### **Hydraulics and Welding:**

- Principles of hydraulics
- Hydraulics systems and components
- Application of hydraulics
- Welding Project
- Oxy-Fuel Welding
- Arc Welding
- Mig Welding
- 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: 9.1-9.1

### Unit 13 - 20 Days (6 Class/14 Lab)

#### **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

#### **ASE Preventive Maintenance Certification**

### Unit 14 - 5 Days(5 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)