Medium/Heavy Diesel Technology | Scope & Sequence

Semester 1, Year 1
MHD101 Medium/Heavy Truck
(18 Weeks)
District Pre-Assessment

Unit 1 (5 Weeks)
Lab and Classroom Safety, Rules & Employability Skills:
- Syllabus, Procedures, Rules
- Safety Online Training
- Hand Tools and Power Tools
- Shop Safety and Orientation
- Certification: SP2 Safety Certification
- CTSO Integration (Leadership Skills): Officer Elections, Officer Training
- Professional Skills: 6A-C, 8A-I
- Work-based Learning: Guest speaker
- Technical Standard: 1.1-1.24, 2.11-2.6

Unit 2 (5 Weeks)
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
- CTSO Integration (Leadership Skills): Officer training, Skills USA Fall Leadership Conference
  Chapter Meeting
- Professional Standards: 4.A-F
- Work-based Learning: Guest Speaker and Resume Writing
- Technical Standard: 2.3, 2.4, 2.6, 3.1, 3.2.A.1, 4.9, 5.4, 5.6

Unit 3 (3 Weeks)
Cooling and Lubrication Systems:
- Principles of cooling and lubrication systems
- Cooling System Function and Components
- Lubrication System Function and Components
- CTSO Integration (Leadership Skills): Chapter meeting, Chapter Social, Community Service Event
- Professional Standards: 2.A-C

Basic Electrical:
- Principles of electricity
- Ohm’s Law
- Conventional and electron theories
- Electrical circuits
- Troubleshooting and Diagnostics
- CTSO Integration (Leadership Skills): Skills USA Region 5, Chapter meeting
- Professional Standards: 8.A-I
- Work-Based Learning: Soft Skills Training, Job shadow

Unit 4 (3 Weeks)
Fuel Systems:
- Principles of fuel delivery systems
- Low and high pressure fuel systems
- Intake and exhaust systems
- Emission systems
- Turbo and induction systems
- CTSO Integration (Leadership Skills): chapter meeting, Fundraising
- Professional Standards: 5.A-E
- Work-based Learning: Soft Skills Training
- Technical Standard: 5.1-5.6, 6.1-6.6

Unit 5 (2 Weeks)
- Principles of electricity
- Ohm’s Law
- Conventional and electron theories
- Electrical circuits
- Troubleshooting and Diagnostics
- CTSO Integration (Leadership Skills): Chapter meeting, Fundraising
- Professional Standards: 8.A-I
- Work-based Learning: Soft Skills Training
- Technical Standard: 13.1-13.11, 17.1-17.4

Semester Exam

Semester 2, Year 1
MHD102 Medium/Heavy Truck II
(14 Weeks)

Unit 5 Continued (4 Weeks)

Basic Electrical:
- Principles of electricity
- Ohm’s Law
- Conventional and electron theories
- Electrical circuits
- Troubleshooting and Diagnostics
- CTSO Integration (Leadership Skills): Skills USA Region 5, Chapter meeting
- Professional Standards: 8.A-I
- Work-Based Learning: Soft Skills Training, Job shadow

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Battery, Starting and Charging Systems:
- Batteries, testing and diagnostics
- Starting & charging system components and functions
- Starting & charging system troubleshooting and diagnostics
- CTSO Integration (Leadership Skills):Skills USA Arizona Conference, Chapter Meeting
- Professional Standards: 1.A-D
- Work-Based Learning: Job Shadow Reflection

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

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

Semester 1, Year 2
MHD201 Medium/Heavy Truck III
(15 Weeks)

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

Unit 2 (1 Week)

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.W2,6,SL.3,SL.6
- Work-Based Learning: Guest Speaker

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 Fall Conference
- Professional Standards: 9.0
- Academic Standards: ELA 11-12 w8,w9
- Work-Based Learning guest speaker
- Technical Standard 8.1-8.18

Unit 4 (5 Weeks)

Drivetrain Systems:
- Manual transmission
- Automatic Transmission
- Driveshaft
- Differentials
- Organizational culture
- CTSO Integration (Leadership Skills): SkillsUSA Fall Leadership Conference, Chapter Meetings
- Professional Standards:7.0
- Academic Standards: ELA 11-12 R12,R110, 12-12, SL4
- Work-Based Learning: job shadow
- Technical Standard: 7.1-7.19

Unit 5 (2 Weeks)

Automotive Service Excellence (ASE) Test Preparation:
- Basic engines review
- Electrical review
- Air Brakes Review
- Certification: ASE- Diesel Engines, Electrical
| Electronic Systems, Air Brakes exam

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- CTSO Integration (Leadership Skills): fund raising
- Professional Skills:
- Academic Standards: ELA 11-12 RI2, RI10, SL4
- Work-Based Learning: Job Shadow and Externship
- Technical Standard: 1.1-17-4 (All)

Semester Exam

Semester 2, Year 2
MHD202 Medium/Heavy Truck IV
(14 Weeks)

Unit 6 (5 Weeks)
Steering and Suspension:
- Tires, Wheels and Hubs
- Tires, Wheels and Hubs
- Front axles and vehicle alignment factors
- Suspension systems
- Steering systems
- Alignment
- Leadership
- Correct imperfections
- CTSO Integration (Leadership Skills): SkillsUSA Regional Conference, Chapter Meeting
- Professional Standards: 5.0
- Academic Standards: 5.NF.B.3
- Work-Based Learning: Guest Speaker, Workplace Visit
- Technical Standard: 10.1-10.15

Unit 7 (2 Weeks)
Truck Frames and Construction:
- Truck chassis
- Trailer chassis
- Fifth Wheels
- Inspection and Maintenance
- Certification: ASE t5 steering and suspension
- CTSO Integration (Leadership Skills): SkillsUSA Regional Competition
- Professional Standards: 3.0
- Academic Standards: ELA11-12 W5, W6
- Work-Based Learning: Mock Interviews
- Technical Standard: 12.1-12.5

Unit 8 (3 Weeks)

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
- Professional Skills:
- Academic Standards: ELA 11-12 W5, W9, J4, L6, RI7, J4
- Work-Based Learning: Soft Skills Training


Unit 9 (1 Week)
Course Review:
- Engines, Brakes, Steering and Suspension, Electrical & Drivetrains
- CTSO Integration (Leadership Skills): chapter meeting, end of year banquet
- Professional Skills: ALL
- Academic Standards: ELA 11-12 sl4, sl6
- Work-Based Learning: Externship
- Technical Standard: 1.1-17-4 (All)

ADE Technical Skills Assessment

Unit 10 (4 Weeks)

Automotive Service Excellence (ASE):
- Welding repair labs
- Industry certification study and testing. (ASE, SP/2, CUMMINS)
- Student enterprise projects
- SkillsUSA end of the year banquet
- Certification: ASE- Diesel, Engines, Electrical | Electronic Systems, Brakes, Suspension & Steering exam
- CTSO Integration (Leadership Skills): SkillsUSA National Conference
- Professional Skills: ALL
- Academic Standards: review all
- Work-Based Learning: soft skills training
- 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)