



CURRICULUM GUIDE





Onsite. Online. On-Demand.

Everything You Need To Know

Garage Gurus® is your portal to the most comprehensive training and technical support available in the automotive aftermarket. It is designed to offer you the tools you need to succeed, delivered in the way that best suits your needs.



12 training centers across the country offering **50+** instructor-led, hands-on workshops



Comprehensive e-learning platform available with **100+** titles to master



State-of-the-art app for iOS and Android provides fast and easy parts lookup on the job



35+ product technology vans offering over **20** unique technical lunch and learn opportunities



Bilingual ASE-certified Master Techs and Technical Specialists available by phone for fast answers to product and diagnostic questions

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ASE Test Prep courses are designed for the working technician looking to gain accreditation with ASE. Getting your ASE certification is an important step in advancing your career as an automotive technician. Garage Gurus ASE Test Prep training can assist you with passing your test the first time. These Test Prep courses offer a convenient and effective venue for helping you become comfortable in learning the necessary test taking tips needed to become ASE certified.

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One of our best venues for complete and thorough technical training. Our daytime training courses provide plenty of time to dive deep into the details of the topic at hand. We provide lunch and adequate time for proper classroom explanation, leaving plenty of time for the most desired format of technical training in the industry – ‘hands-on’. We spend a good portion of time in our state-of-the-art technical facilities applying installation practices and test procedures discussed in the classroom.

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This convenient option for technical training is our most popular. Throughout this venue, we are able to provide comprehensive automotive training when it is most practical for busy shop owners and technicians looking to improve their technical skill sets. This condensed training offering meets the time slot demands for those distracted with the hectic day to day operations of a demanding shop environment. The favorable four-hour offering provides an adequate balance of time in the classroom and in our state-of-the-art training bays.

ONSITE FIELD CLINICS 28

The high levels of quality found in Garage Gurus training is also found beyond the walls of our nationwide Garage Gurus Technical Support Centers. Our field clinics are held throughout the country all year long. Field clinics are local, three-hour presentations given by one of Garage Gurus ASE Certified Master Trainers on selected topics. These clinics are designed for the professional technician and are usually presented during the evening hours to maximize attendance and minimize time away from the shop.

ONLINE COURSES 33

Online training is a convenient addition to the Garage Gurus portfolio of world-class training. Online programs conveniently bring the world-class technical support center right to the student’s computer or tablet. Garage Gurus online training meets the need for up-to-date, relevant training by offering online classes covering industry-specific topics for automotive technicians. Many eLearning courses include CASE Continuing Education Credits (CEU’s). Please check the eLearning website to see the updated course offering.

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The in-class workshop experience allows students to work hand-in-hand with a Garage Gurus HD Master Trainer at one of our conveniently located Technical Support Centers (TSCs).

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ENGINE

ASE.A1.1.WS | ASE A1 Test Prep Engine Repair

Course Length: 4 hours Tuition: \$99.00 U.S

This workshop reviews the needs for passing the A1 Engine Repair ASE test. A Garage Guru overviews general test taking procedures and guidelines. This workshop includes reviewing several ASE sample questions and the logic behind the way they were written. We provide a summary of the description and operation for the following items taken from the task list for the ASE A1 test.

- General Engine Diagnosis
- Cylinder Head and Valve Train Diagnosis and Repair
- Engine Block Diagnosis and Repair
- Lubrication and Cooling Systems Diagnosis and Repair
- Fuel, Electrical, Ignition and Exhaust Systems Diagnosis and Repair

AUTOMATIC TRANSMISSION/TRANSAXLE

ASE.A2.1.WS | ASE A2 Test Prep Automatic Transmission A2 Test Prep - Coming Soon

Course Length: 4 hours Tuition: \$99.00 U.S

This workshop will review the needs for passing the A2 Automatic Transmission/Transaxle ASE Test. A Garage Guru will overview general test taking procedures and guidelines. The workshop will include reviewing several ASE sample questions and the logic behind the way they were written. We will provide a summary of the description and operation for the following items taken from the task list for the ASE A2 test:

- General Transmission/Transaxle Diagnosis
 - Mechanical/Hydraulic Systems
 - Electronic Systems
- In-Vehicle Transmission/Transaxle Maintenance and Repair
- Off-Vehicle Transmission/Transaxle Repair
 - Removal and Installation
 - Disassembly and Assembly
 - Friction and Reaction Units

EVERYTHING YOU NEED TO KNOW.



MANUAL DRIVETRAIN AND AXLES

ASE.A3.1.WS | ASE A3 Test Prep for Manual Drivetrain and Axles A3 Test Prep - Coming Soon

Course Length: 4 hours Tuition: \$99.00 U.S

This workshop will review the needs for passing the A3 Manual Drivetrain and Axles ASE Test. A Garage Guru will overview general test taking procedures and guidelines. The workshop will include reviewing several ASE sample questions and the logic behind the way they were written. We will provide a summary of the description and operation for the following items taken from the task list for the ASE A3 test:

- Clutch Diagnosis and Repair
- Transmission Diagnosis and Repair
- Transaxle Diagnosis and Repair
- Drive Shaft/Half-Shaft and Universal Joint/constant Velocity (CV) Joint Diagnosis and Repair (Front and Rear Wheel Drive)
- Drive Axle Diagnosis and Repair
 - Ring and Pinion gears
 - Differential Case/Carrier Assembly
 - Limited Slip/Locking Differential
 - Axle Shafts and Housing
- Four-Wheel Drive/All Wheel Drive Component Diagnosis and Repair

STEERING AND SUSPENSION

ASE.A4.1.WS | ASE A4 Test Prep for Steering and Suspension

Course Length: 4 hours Tuition: \$99.00 U.S.

This workshop reviews the needs for passing the A4 Steering and Suspension ASE Test. A Garage Guru overviews general test taking procedures and guidelines. The workshop includes reviewing several ASE sample questions and the logic behind the way they were written. We provide a summary of the description and operation for the following items taken from the task list for the ASE A4 test:

- Steering Systems Diagnosis and Repair
 - Steering Columns
 - Steering Units
 - Steering Linkage
 - Electric Assist
- Suspension Systems Diagnosis and Repair
 - Front Suspensions
 - Rear Suspensions
- Related Suspension and Steering Service
- Wheel Alignment Diagnosis, Adjustment, and Repair
- Wheel and Tire Diagnosis and Service

BRAKE

ASE.A5.1.WS | ASE A5 Test Prep for Brakes

Course Length: 4 hours Tuition: \$99.00 U.S.

This workshop reviews the needs for passing the A5 Brakes ASE Test. A Garage Guru overviews general test taking procedures and guidelines. The workshop includes reviewing several ASE sample questions and the logic behind the way they were written. We provide a summary of the description and operation for the following items taken from the task list for the ASE A5 test:

- Hydraulic System Diagnosis and Repair
 - Master Cylinder
 - Lines and Hoses
 - Valves and Switches
 - Bleeding, Flushing and Leak Testing
- Drum Brake Diagnosis and Repair
- Disc Brake Diagnosis and Repair
 - Power Assist Units Diagnosis and Repair
 - Miscellaneous Systems Diagnosis
 - Electronic Brake Control Systems
- Diagnosis and Repair

ELECTRICAL

ASE.A6.1.WS | ASE A6 Test Prep for Electrical and Electronic Systems

Course Length: 4 hours Tuition: \$99.00 U.S.

This workshop reviews the needs for the A6 Electrical and Electronic Systems ASE Test. A Garage Guru overviews general test taking procedures and guidelines. This workshop includes reviewing several ASE sample questions and the logic behind the way they were written. We provide a summary of the description and operation for the following items taken from the task list for the ASE A6 test:

- General Electrical /Electronic System overview
- Battery and Starting System Diagnosis and Repair
- Charging System Diagnosis and Repair
- Lighting Systems Diagnosis and Repair
- Instrument Cluster and Driver Information Systems Diagnosis and Repair
- Body Electrical Systems Diagnosis and Repair

HVAC

ASE.A7.1.WS | ASE A7 Test Prep for Heating and Air Conditioning A7 Test Prep

Course Length: 4 hours Tuition: \$99.00 U.S.

This workshop reviews the needs for the A7 Heating and Air Conditioning ASE Test. A Garage Guru overviews general test taking procedures and guidelines. This workshop includes reviewing several ASE sample questions and the logic behind the way they were written. We provide a summary of the description and operation for the following items taken from the task list for the ASE A7 test:

- A/C System Service, Diagnosis and Repair
- Refrigeration System Component Diagnosis and Repair
- Compressor and Clutch
- Evaporator, Condenser and Related Components
- Heating and Engine Cooling Systems Diagnosis and Repair
- Operating Systems and Related Controls Diagnosis and Repair
- Electrical
- Vacuum/Mechanical
- Automatic and Semi-Automatic Heating, Ventilating and A/C Systems

DRIVABILITY

ASE.A8.1.WS | ASE A8 Test Prep for Engine Performance

Course Length: 4 hours Tuition: \$99.00 U.S.

This workshop reviews the needs for the A8 Engine Performance ASE Test. A Garage Guru overviews general test taking procedures and guidelines. This workshop includes reviewing several ASE sample questions and the logic behind the way they were written. We provide a summary of the description and operation for the following items taken from the task list for the ASE A8 test:

- General Engine Diagnosis
- Ignition System Diagnosis and Repair
- Fuel, Air Induction and Exhaust System Diagnosis and Repair
- Emission Control Systems Diagnosis and Repair
- Computerized Engine Control Diagnosis

ASE.A9.1.WS | ASE A9 Test Prep for Light Vehicle Diesel Engines A9 Test Prep -

LIGHT VEHICLE DIESEL ENGINES

Coming Soon

Course Length: 4 hours Tuition: \$99.00 U.S

This workshop will review the needs for passing the A9 Light Vehicle Diesel Engines ASE Test. A Garage Guru will overview general test taking procedures and guidelines. The workshop will include reviewing several ASE sample questions and the logic behind the way they were written. We will provide a summary of the description and operation for the following items taken from the task list for the ASE A9 test:

- General Diagnosis
- Cylinder Head and Valvetrain Diagnosis and Repair
- Engine Block Diagnosis and Repair
- Lubrication and Cooling Systems Diagnosis and Repair
- Air Induction and Exhaust Systems Diagnosis and Repair
- Fuel System Diagnosis and Repair

FULL DAY WORKSHOP



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BRAKE

BRK.201.1.WS | Brake Diagnostics and Service

Workshop Length: 2 days (16 hours) *\$299.00 U.S. 1.6 CEUs awarded

This workshop is designed with a combination of classroom and hands-on education to enhance the technician's ability to properly diagnose and service automotive and light truck braking systems. We define the function of brake system components, discussing friction, hydraulic theory operation and bleeding. We overview diagnostic procedures used to diagnose brake pull, brake performance and brake noise complaints.

After completing this workshop, the student will have the knowledge to:

- Interpret the proper friction material per vehicle application
- Apply hydraulic theory and use recommended brake service procedures to reduce diagnostic time and eliminate costly misdiagnosis
- Perform measurements of runout and parallelism of brake rotors
- Discuss hydraulic and friction failures on passenger cars and light trucks
- Discuss components and operation of electronic parking brake systems

BRK.203.1.WS | ABS/Stability Control and Traction Control Diagnostics

Workshop Length: 1 day (8 hours) *\$149.00 U.S. 0.8 CEUs awarded

This workshop is designed with a combination of classroom and hands-on education to enhance the technician's ability to properly diagnose automotive ABS, stability control and traction control systems. We will discuss the operation of the most current ABS/stability control systems utilized by Domestic, Asian and European vehicle manufacturers.

After completing this workshop, the student will have the knowledge to:

- Discuss the function and components of ABS/stability control systems
- Evaluate scan tool data and fault codes
- Recognize the correct test procedures using scan tool data, oscilloscope, DMM and graphing to view and diagnose yaw/lateral force and steering wheel position (SWP) sensors
- Identify base brake system issues that relate to unwanted ABS application and misdiagnosis

EVERYTHING YOU NEED TO KNOW.

**Tuition includes meal and classroom materials*



DRIVABILITY

DRV.601.1.WS | Engine Performance and Drivability

Workshop Length: 2 days (16 hours) *\$299.00 U.S. 1.6 CEUs awarded

This workshop uses a combination of classroom and hands-on education to keep technicians current on changing engine management systems and diagnostic tools for Asian and Domestic vehicles. The most frequently seen emission-based DTC diagnostic routines are reviewed in the classroom and applied in the service bays. The workshop helps technicians become more proficient in interpreting the information the scan tool provides for engine diagnostics. We establish a foundation utilizing strategy-based diagnostics to reduce diagnostic time and prevent Check Engine light comebacks. Learn to interpret scan tool information to gain diagnostic direction to repair today's most seen engine performance concerns.

After completing this workshop, the student will have the knowledge to:

- Evaluate scan tool information on emissions/performance related parameter identification data (PIDs) by using the graphing function of the tool to trend important PID relationships
- Diagnose emission related Check Engine light problems on vehicles using generic and enhanced scan data analysis
- Five diagnostic checks to perform to before catalytic converter replacement
- Interpret important engine performance sensor information and vehicle operating system strategies
- Recognize fuel system monitoring strategies, operation and diagnostic routines
- Test for causes of the popular fuel system lean (P0171/P0174) and fuel system rich (P0172/P0175) DTCs on all makes, models and fuel injection types

DRV.604.1.WS | Diagnosing Variable Valve Timing Systems on Today's Engines

Workshop Length: 1 day (8 hours) *\$149.00 U.S. 0.8 CEUs awarded

This workshop will focus on the different types of variable valve timing (VVT) systems used by vehicle manufacturers today. After multi-valve technology became standard in engine design, VVT became the next step to enhance engine output, increasing engine power and torque output along with reducing emissions. Without VVT technology, engineers previously had to choose the best compromise in valve/cam timing and ended up sacrificing one thing to gain in another area. VVT allows the best of both worlds – increased performance and economy and lower emissions. There are a multitude of DTCs that can set related to VVT faults stemming from oil contamination to inoperative cam actuators and oil control solenoids. We explain the variations of VVT systems used by manufacturers today and look at diagnostic tests that can be performed on this system using the scan tool and other diagnostic equipment to confidently diagnose these systems before the costly and labor-intensive engine teardown for service.

After completing this workshop, the student will have the knowledge to:

- Identify the VVT system types used by manufacturers
- Relate to the scan tool parameters used by various manufacturers to validate camshaft control and operation
- Understand the VVT DTC stored in the Powertrain Control Module (PCM)
- Realize the importance of testing the crankshaft position and camshaft position sensors via a lab scope to validate camshaft to crankshaft correlation
- Perform mechanical engine testing and diagnosis using electronic pressure transducers
- Diagnose engine breathing related faults (both intake and exhaust) using fuel trim and volumetric efficiency testing information via the scan tool
- Utilize new scan tool information and techniques to reduce diagnostic time in the service bay for VVT related faults or symptoms

DRV.605.1.WS | Electronic Engine Diagnostics

Workshop Length: 1 day (8 hours) *\$149.00 U.S. 0.8 CEUs awarded

This workshop will focus on the different types of electronic engine diagnostic procedures used to diagnose today's engines. Both in-cylinder pressure transducers and manifold vacuum transducers used with a digital storage oscilloscope (DSO) can reduce valuable diagnostic and teardown time on today's VVT equipped multi-cam engines.

Engine performance and emissions can be severely impacted by cam timing concerns caused from lack of oil, failed timing chain tensioners and/or stretched timing chains or belts. Volumetric efficiency reductions caused by lack of air flow concerns from restrictions in the intake or exhaust systems can cause Low Power concerns. Air leaks in the induction system cause Check Engine lights and can be difficult to validate and pinpoint. Engine compression issues can be significant in size or very small, almost undetectable at times, leading to misfire DTCs. Relative compression testing can reduce the time it takes to validate a compression issue on an engine. These types of problems can skew the diagnostic information in the scan tool and can make it unreliable or unclear. In this class you learn the benefits of modern diagnostic equipment and learn when and how to use these testing techniques on the vehicle.

After completing this workshop, the student will have the knowledge to:

- Identify what tests to apply to accurately pinpoint the cause of engine performance concerns such as lack of power, run roughs, vacuum leaks and engine misfire
- Perform relative compression tests using both scan tools and lab scopes with a high amp current probe
- Perform mechanical engine testing and diagnosis using electronic pressure transducers
- Perform cranking vacuum tests on the engine using both the scan tool and a lab scope with vacuum transducer to validate air leaks
- Validate engine camshaft to crankshaft correlation accurately using lab scope tests
- Utilize new scan tool information and techniques to reduce diagnostic time in the service bay for VVT related faults or symptoms

ELECTRICAL

ELC.501.1.WS | Automotive Electronics

Workshop Length: 2 days (16 hours) Tuition: *\$299.00 U.S. 1.6 CEUs awarded

This workshop is designed for technicians desiring educational instruction on one of today's hottest subjects. It includes hands-on lab exercises diagnosing electrical circuit faults, voltage drop and current testing. This workshop familiarizes the technician with electricity, electronics and fundamental circuits to become proficient with the diagnostic tools needed to service electrical systems. Students learn skills necessary to develop diagnostic strategies and avoid lengthy troubleshooting. Exercises include the use of diagnostic tools and demonstrations of various types of automotive electrical repairs. Students learn how to quickly identify electrical failures and recommend the proper repair.

After completing this workshop, the student will have the knowledge to:

- Accurately define electrical and electronic components
- Employ the diagnostic tools needed for electrical diagnosis
- Utilize skills to develop diagnostic strategies and avoid lengthy diagnostic times while increasing profitability
- Comprehend electrical schematics and apply knowledge to assist point of failure diagnostics
- Test automotive electronic circuits
- Identify electrical failures and recommend appropriate repair

**Tuition includes meal and classroom materials*

ENGINE AND SEALING

ENG.401.1.WS | Block Reconditioning and Sealing (St. Louis, MO only)

Workshop Length: 4 days (32 hours) Tuition: *\$599.00 U.S. 3.2 CEUs awarded

The workshop is designed with a combination of classroom and hands-on education for automotive repair technicians and machinists involved in engine rebuilding. Disassembly, cleaning, critical measurements and selection of the proper sequence in reconditioning is thoroughly covered. Cylinder boring and honing, surface milling and connecting rod reconditioning are all demonstrated using proven techniques and tools. Assembly preparation is also discussed for engine components.

The technician will leave with the knowledge to make a determination of what machine shop services are required along with selecting the proper replacement parts for performance and service life. Knowledge is gained on OE design changes for proper assembly and sealing of aluminum and cast iron engines.

After completing this workshop, the student will have the knowledge to:

- Apply disassembly and cleaning techniques for efficient service and to prevent costly damage
- Identify the needs for machining, repair or replacement of lower block components through inspection and measurement of all components
- Calculate and determine lower block machining in the areas of line honing, surface mill, cylinder bore/hone and connecting rod reconditioning
- Recognize critical factors for gasket selection and installation
- Analyze failed seals and gaskets to identify required steps and procedures to ensure a quality repair and prevent comebacks
- Identify procedures and materials used in dry and fluid applications

ENG.402.1.WS | Cylinder Head Reconditioning & Sealing (St. Louis, MO only)

Workshop Length: 4 days (32 hours) Tuition: *\$599.00 U.S. 3.2 CEUs awarded

The workshop is designed with a combination of classroom and hands-on education for automotive technicians and machinists involved with cylinder head service and repair. Expand your knowledge of cylinder head reconditioning and sealing characteristics of head gaskets. Analyze components to identify required service and machining procedures. This class includes servicing aluminum and cast iron cylinder heads. Analyze different cleaning methods, milling, pressure testing, straightening, crack detection and repair. Repair techniques such as welding, oven straightening and stitching pins is discussed with hands-on demonstrations and shop activities. Hands-on experience is provided for aluminum and cast iron cylinder head reconditioning with quality parts, tools and equipment.

After completing this workshop, the student will have the knowledge to:

- Identify the correct cleaning procedure for cast iron and aluminum cylinder heads and their components to minimize time and prevent damage utilizing the following cleaning techniques: hot and cold wet cleaning, airless shot blasting, pyrolytic oven, glass beading and ultrasonic cleaning
- Perform critical measurements using various instruments — micrometers (inside diameter [I.D.] and outside diameter [O.D.]), vernier calipers and dial bore gauges
- Identify integrity of cylinder head components through specification measurements
- Perform failure analysis of cylinder head components (head gaskets and surface finish, valves, rocker arms, springs, retainers, guides and seats)
- Categorize cylinder head service steps in preparation for milling, pressure testing, straightening, crack detection and crack repair
- Differentiate techniques to repair cylinder heads in the areas of welding, oven and heat straightening, stitching pins and milling
- Employ various operations using equipment related to cylinder head reconditioning:
 - Surface/Milling machine
 - Crack detection and repair using stitching techniques
 - Guide and seat machine
 - Valve grinders
 - Tig welding
- Apply experience to efficiently assemble cylinder heads

**Tuition includes meal and classroom materials*

ENG.403.1.WS | Diagnosing Modern Engine Sealing Challenges**Workshop Length: 1 day (8 hours) Tuition: *\$149.00 U.S. 0.8 CEUs awarded**

This workshop enhances the skills of the professional under hood technician in the areas of interpreting gasket failure as it relates to modern emission control technologies used today by all manufacturers. A 'sealed' engine is a 'clean' engine today as viewed by the Environmental Protection Agency (EPA). Leaking engine gaskets not only leave spots on the ground, but they can cause a vehicle to have excessive emission levels. Induction leaks, coolant leaks, positive crankcase ventilation (PCV) system problems, crankcase leaks and cylinder head gasket failures are all discussed in this class with the focus placed on the impact these problems have on the On-Board Diagnostics, OBD-II system. Lean DTCs (P0171/0174), Misfire DTCs (P0300), and catalytic converter efficiency DTCs (P0420/P0430) can all be the result of gasket failure concerns. We discuss how to diagnose the symptoms that are the result of these failures using the everyday 'modern' diagnostic equipment in the repair shop.

After completing this workshop, the student will have the knowledge to:

- Distinguish the impact on the OBD-II system of failed engine gaskets versus a problematic sensor input (cause and effect)
- Diagnose oil consumption related problems due to failed engine gaskets, seals and piston rings
- Apply proper testing techniques that can be used to validate induction system leaks using scan tool data, smoke machines and pressure transducer diagnostic tools
- Employ test methods for diagnosing cylinder leakage due to head gasket failure and lower engine failure
- Identify cooling system concerns leading to gasket failures and vice versa

IGNITION**IGN.301.1.WS | Ignition Failure Diagnostics****Workshop Length: 2 days (16 hours) Tuition: *\$299.00 U.S. 1.6 CEUs awarded**

This workshop is designed for technicians servicing drivability, emission and tune-up repair on today's vehicles using a combination of classroom and hands-on education. Coil on Plug (COP) ignitions of all types are discussed. Enhanced scan tool data used to diagnose P0300 misfire diagnostic trouble codes (DTCs) is covered. Primary and secondary ignition waveform diagnostics are performed hands-on in the service bays using a variety of lab scope test equipment to aid in diagnosis of 'No Code' misfires. Emphasis is placed on techniques to help the technician become more proficient at diagnosing problems such as hard start, no start and intermittent misfire related DTCs using aftermarket scan tools and test equipment for quick and accurate analysis. New industry tools for misfire diagnostics are used in the service bays.

After completing this workshop, the student will have the knowledge to:

- Distinguish different operational strategies used on today's ignition systems ranging from Input triggering to misfire detection
- Diagnose misfire concerns on gasoline engines using enhanced scan tool data interpretation techniques
- Define differences between mechanical, fuel related and ignition misfires using advanced testing techniques
- Apply accurate testing practices for diagnosing Type A and B misfires utilizing scan tools, lab scopes, and current probes
- Identify faults in primary/secondary ignition waveforms
- Identify PCM strategies that prevent catalytic converter damage due to Type A misfires

IGN.302.1.WS | Ignition Systems Diagnostics**Workshop Length: 1 day (8 hours) Tuition: *\$149.00 U.S. 0.8 CEUs awarded**

This workshop is designed with a combination of classroom and hands-on education to enhance the professional level technician's knowledge of modern ignition system diagnostics. P0300 misfire DTC diagnostic strategies are covered using modern scan tools and ignition system testing equipment. Technicians use digital storage oscilloscopes (DSOs), current probes, inductive wands and voltage leads to test modern ignition system components ranging from crankshaft and camshaft position sensors to today's COP (Coil on Plug) assemblies. Today's vehicle operational strategies are reviewed pertaining to OBD II Misfire Monitoring.

After completing this workshop, the student will have the knowledge to:

- Accurately test crankshaft position and camshaft position sensors
- Distinguish the difference between testing procedures for conventional ignition coils and 'smart coil' assemblies
- Interpret ignition component waveforms captured from a DSO (Digital Storage Oscilloscope)
- Recognize different manufacturers' operational strategy during misfire conditions
- Understand fuel trim corrections during ignition misfire conditions
- Identify PCM strategies that prevent catalytic converter damage due to Type A misfires

**Tuition includes meal and classroom materials*

STEERING AND SUSPENSION

SS.101.1.WS | Steering and Suspension Service

Workshop Length: 2 days (16 hours) *\$299.00 U.S. 1.6 CEUs awarded

This workshop combines classroom and hands-on activities to enhance the diagnostic and service skills of the professional undercar technician in the areas of suspension and ride control diagnosis, steering system diagnosis and wheel alignment. Special emphasis is given to the effects of worn suspension system components on handling, ride quality, tire life and the symptoms to expect if a part has failed. The relationships between component integrity, alignment geometry, vehicle handling and tire wear is stressed. Customer communication skills are presented to help the student explain the value of the suggested repair to the vehicle owner.

After completing this workshop, the student will have the knowledge to:

- Perform accurate vehicle inspections on suspension and steering systems
- Identify the components and operating characteristics of suspension and steering systems on current passenger cars and light trucks
- Apply time-tested service techniques, tool usage and problem-solving parts to ensure accurate steering and suspension repairs in the minimum amount of time
- Utilize the latest alignment equipment to adjust chassis components for optimum tire life, steering, stopping and stability

SS.102.2.WS | Advanced Steering and Suspension Diagnostics

Workshop Length: 1 day (8 hours) *\$149.00 U.S. 0.8 CEUs awarded

This workshop enhances the skills of the professional undercar technician in the area of steering systems on both hydraulic and electronic assist units. Steering systems have evolved from hydraulic pump assisted steering gears to modern EPS (electric power steering) designs that can provide various level of assist. Each system's component operation is discussed and the strategies of operation are outlined. Information on steering angle sensor recalibration and sensor testing on both hydraulic and electrical assist steering units are reviewed. We also discuss electronic and mechanical suspension ranging from variable valve ride control systems to modern magnetorheological damper systems. Operation and diagnostic tips for air, nitrogen and hydraulic suspension systems are included in this workshop. Numerous diagnostic strategies are reviewed related to owner concerns of accelerated tire wear and inadequate steering, stopping and stability that may be caused by a suspension component failure.

After completing this workshop, the student will have the knowledge to:

- Define the operation of various electronically assisted steering systems (column drive, rack motor drive, belt drive)
- Overview variable ratio system operation from various manufacturers
- Diagnose hydraulic steering assist concerns and causes of noise and intermittent assist
- Utilize scan tools and other methods to service the system and recalibrate sensors after repairs and wheel alignment
- Identify the components and operation of late model ride control systems and related service procedures
- Utilize scan tools for diagnosis and bi-directional testing on both electronic steering and suspension controls

SS.104.1.WS | Advanced Alignment Diagnostics

Workshop Length: 1 day (8 hours) *\$149.00 U.S. 0.8 CEUs awarded

This workshop enhances the skills of the professional undercar technician in the area of advanced and standard wheel alignment. It covers suspension and steering diagnosis due to bent parts from accidents and road hazards, vehicle modifications, tire/wheel resizing and height issues. A thorough understanding of camber, caster, toe, steering axis inclination (SAI), included angle, scrub radius and toe out on turns will assist the alignment technician in utilizing the aligner as a diagnostic tool. Related electronic systems are also covered in this course. Vehicle component inspection and customer communication skills are necessary traits for any successful alignment tech and the importance of these skills are stressed in this class.

After completing this workshop, the student will have the knowledge to:

- Utilize the alignment machine as a diagnostic tool for the alignment and repair of vehicles involved in road hazard incidents and vehicle collisions
- Identify root causes for uneven or erratic tire wear and handling problems. Effectively communicate the results to the vehicle owner.
- Identify how vehicle modifications and tire/wheel changes affect alignment and dynamic operation
- Analyze related electronic systems that interact with the chassis system in need of recalibration or adjustment after the alignment procedure

**Tuition includes meal and classroom materials*

HALF DAY WORKSHOPS



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BRAKE

BRK.206.1.WS | Advanced Brake System Service Tips and Techniques

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

The workshop is designed with a combination of classroom and hands-on education to enhance the technician's ability to properly diagnose automotive and light truck braking systems. In this class we discuss how to pinpoint the causes of brake pulls, brake vibrations and brake noise complaints. Proper service procedures are reviewed and installation tips are covered to prevent comebacks. The causes of uneven brake pad wear are also identified. We use live vehicles in the shop to help illustrate some of these points.

After completing this workshop, the student will have the knowledge to:

- Pinpoint noise problems
- Diagnose brake pull concerns
- Properly service automotive brake systems
- Understand 'uneven' brake pad wear
- Locate the source of brake vibration concerns

BRK.207.1.WS | ABS Wheel Speed Sensor Testing

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop enhances the technician's ability to diagnose common ABS/Stability Control system faults that can illuminate a variety of warning lamps in the dash. Wheel speed sensor DTCs are one of the most frequently retrieved trouble codes from the ABS module. We define a variety of tests used to diagnose both Analog and Digital wheel speed sensors. These methods are demonstrated 'hands-on' in the shop.

After completing this workshop, the student will have the knowledge to:

- Connect a lab scope to various types of wheel speed sensors and validate powers and grounds
- Analyze faults found in wheel speed sensor waveforms
- Set up and use the scan tool capture function to chase 'intermittent' Wheel Speed sensor DTCs or false ABS activation concerns
- Differentiate circuit or component failures found when diagnosing wheel speed sensor DTCs

EVERYTHING YOU NEED TO KNOW.

**Tuition includes meal and classroom materials*



BRK.208.1.WS | Electronic Brake Control (EBC) Systems on Hybrid and Non-Hybrid Vehicles

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop is designed for classroom education to enhance the technician’s ability when performing base brake service on vehicles with Electronic Brake Control (EBC). These systems are found on many luxury and hybrid vehicles. We discuss the operation of the brake system components involved and how apply pressure is generated. In addition, ABS/stability control system operation found on EBC systems are reviewed.

After completing this workshop, the student will have the knowledge to:

- Discuss the function and components of EBC system
- Evaluate scan tool data and fault codes through Case Studies
- Identify procedures to prepare the vehicle for base brake service
- Discuss brake service issues that relate to base brake service and misdiagnosis

DRIVABILITY

DRV.606.1.WS | Engine Performance Diagnostic Strategies

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop uses a combination of classroom and hands-on education to keep technicians current on changing Engine Management Systems and diagnostic tools for Asian and Domestic vehicles. The most frequently seen emission based DTC (Diagnostic Trouble Codes) diagnostic routines are reviewed in the classroom and applied in the service bays. The workshop helps technicians become more proficient in interpreting the information the scan tool provides for engine performance diagnostics. We establish a foundation utilizing “strategy based diagnostics” to reduce diagnostic time and prevent Check Engine Light comebacks. We discuss how to interpret Scan Tool information to gain diagnostic direction to repair today’s most seen Engine Performance concerns.

After completing this workshop, the student will have the knowledge to:

- Review OBD II monitor strategy pertaining to the testing of emission related sensors
- Evaluate Scan Tool information on emissions/performance related PIDs (Parameter Identification Data) by using the Graphing function of the Scan Tool to ‘trend’ important PID relationships
- Diagnose emission related Check Engine light problems on vehicles using generic and enhanced Scan Data analysis
- Five diagnostic checks to perform to before catalytic converter replacement
- Interpret important Engine Performance sensor information and vehicle operating system strategies
- Recognize Fuel System monitoring strategies, operation and diagnostic routines

DRV.607.1.WS | Gasoline Direct Injection

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

The demand for more efficient, smarter and environmentally cleaner liquid-fueled spark ignition (SI) engines is a primary focus of today’s vehicle manufacturers. GDI SI (Spark Ignited) engines have overcome many limitations and are now becoming commonplace. This workshop provides a comprehensive overview of GDI engines. Various engine operating modes (start-up injection, late injection, operating mode transition) are explored. An explanation of mixture preparation leading to the combustion process is outlined. An emphasis on operational strategies for both homogenous and stratified charge fuel control is reviewed. Issues related to the direct injection of gasoline into the combustion chamber are highlighted. Fuel injection system requirements for optimal spray characteristics are discussed. Emission of pollutants, fuel economy and effects of some key design and operating parameters are also covered.

After completing this workshop, the student will have the knowledge to:

- Describe the operating characteristics behind GDI engine operation
- Analyze the important criteria leading up to maximum performance in GDI engines such as proper operation of the Fuel Delivery system
- Explain injector spray and atomization requirements for successful GDI operation
- Utilize service tools and techniques to properly disassemble and reassemble GDI fuel systems
- Analyze important scan tool data parameters in verifying proper GDI engine performance
- Interpret scope waveforms captured from fuel injectors and other fuel system components
- Understand effects of key engine design and operating conditions on performance, combustion, and emission within GDI engines

DRV.608.1.WS | Understanding CAN Networks

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop helps technicians understand, identify and diagnose CAN (Controller Area Network) communication networks. We review network fundamentals to help the technician understand the need, strategy and protocol of CAN. To aid in diagnostics, various types of network topology are explored and explained. To help pinpoint CAN failures, several electrical circuit integrity test methods are outlined to validate root cause of CAN communication failures. Application of the diagnostic strategies are demonstrated in our state-of-the-art service bays using modern diagnostic equipment.

After completing this workshop, the student will have the knowledge to:

- Identify Network type and topology
- Utilize the proper tools and test procedures when diagnosing network fault
- Diagnose ‘U’ code failures on CAN networks
- Test for ‘No Communication’ failures on CAN networks

**Tuition includes meal and classroom materials*



DRV.609.1.WS | Air:Fuel System Management & Volumetric Efficiency Testing

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop concentrates on the most common Drivability problems encountered on Asian and Domestic vehicles. Low power complaints and Engine Misfires are one of the highest causes of Check Engine Light illumination. Technicians explore how to test the function of various Engine Management Systems to validate root causes for many types of Engine Performance related problems. System diagnostics are performed in our state-of-the art service bays. Explore the industry's newest aftermarket test equipment and procedures available for fast, efficient vehicle repair.

After completing this workshop, the student will have the knowledge to:

- Apply conclusive, in-bay tests to Speed Density and Mass Air Flow equipped vehicles to verify Fuel System control and to gain diagnostic direction for drivability complaints
- Examine causes of Misfire and Air:Fuel related DTC's using popular test equipment and scan tools
- Utilize NEW scan tool information and techniques to reduce diagnostic time in the service bay for Engine Performance concerns
- Diagnose engine breathing related faults (both Intake and Exhaust) using Fuel Trim and Volumetric Efficiency testing

DRV.610.1.WS | O2 and Wide Range Air:Fuel Sensor Diagnostics

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop concentrates on the most common drivability problems encountered on Asian and Domestic vehicles related to fuel control and Exhaust Sensor (O2 and A:F sensor) faults. Many manufacturers today have made the switch to using Wide Range Air:Fuel sensors over traditional O2 sensors to increase fuel economy and reduce vehicle emissions. The application of various diagnostic tests for both types of sensors are demonstrated in the service bays using both scan tools and lab scopes. Technicians observe how to test the function of the engine management system and Feedback Control Loop to validate root causes for many types of Engine Performance related problems. System diagnosis is performed in our state-of-the-art service bays. Explore the industry's newest aftermarket test equipment and procedures available for fast, efficient vehicle repair.

After completing this online course, the student will have the knowledge to:

- Review OBD II monitor strategy pertaining to the testing of Air:Fuel and emission related sensors
- Verify Air:Fuel (Lambda) sensor operation on car and test using proper techniques
- Validate O2 sensor performance
- Five diagnostic checks to perform to before catalytic converter replacement
- Test O2 and A:F Sensor heater circuit related DTCs
- Efficiently diagnose O2 Sensor Performance, Lack of Switching, Slow Response, Circuit High and Circuit LOW DTCs in a timely manner
- Examine causes of Misfire and Fuel related DTCs using popular test equipment and O2 sensor scan data

ELECTRICAL

ELC.503.1.WS | Hands-On Electrical Diagnostics

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop is designed for technicians who have a basic understanding of electrical theory and are ready to put it to use. A large portion of this class is spent in our state-of-the-art shop working on vehicles with common, everyday automotive electrical test equipment. Technicians walk through a quick procedure to check battery, starting and charging systems, utilizing a DMM to assist in accurate diagnosis. Common sensor inputs and outputs are explored with emphasis on diagnostic procedures and on-car testing. Input testing includes diagnosing three wire analog sensors, variable reluctance sensors and digital sensors. Output testing includes, pulse width modulated solenoids and DC motors.

After completing this workshop, the student will have the knowledge to:

- Diagnose common battery, starting, and charging issues using DMM
- Understand and diagnose common 3 wire analog and digital sensors
- Measure and test Duty Cycle outputs for diagnostics
- Use amperage draw to diagnose DC Motor failures

ENGINE

ENG.404.1.WS | Engine Misfire Analysis

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop is designed for the drivability technician. Emphasis is placed on streamlining the process during the diagnostic of an engine misfire. We review scan tool data captured from various types of engine misfire complaints and connect-the-dots to locating the root cause. Several diagnostic tips and strategies are highlighted to help improve anyone's diagnostic methods. The infamous P0300 DTC (random cylinder misfire code) will no longer elude you after completing this workshop.

After completing this workshop, the student will have the knowledge to:

- Understand and apply tests using in-cylinder pressure transducers, vacuum transducers, and current probes for Misfire diagnosis
- Interpret valuable scan tool PIDs to aid in diagnosing a Misfire concern
- Identify PCM strategies that prevent catalytic converter damage due to Type A misfires
- Differentiate between Fuel, Ignition, and Mechanical Misfires using the scan tool and a lab scope

**Tuition includes meal and classroom materials*

IGNITION

IGN.303.1.WS | Analyzing Today's Ignition Systems

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop discusses diagnostic shortcuts and test methods that streamline the time spent pinpointing failures within the Ignition system. Modern COP Ignition system operation is reviewed in the classroom and tested in the service bays. Primary and Secondary Ignition waveforms are captured and reviewed in the service bays using the latest automotive diagnostic equipment.

After completing this workshop, the student will have the knowledge to:

- Interpret enhanced scan tool data helpful in the diagnosing a P0300 (random cylinder misfire) DTC
- Diagnose 'hard start' and 'no start' conditions
- Pinpoint causes of 'intermittent' Misfire
- Analyze Ignition waveforms captured with a lab scope

IGN.304.1.WS | Understanding Fuel Trims

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop is designed to enhance the technician's ability to diagnose engine performance related problems through using Fuel Trim correction information provided from the scan tool data stream. It is often said that Total Fuel Trim correction learned by the vehicle PCM (Powertrain Control Module) is the technician's window into the vehicle's fuel injection system. Several cause and effect relationships are defined with emphasis placed on faulty sensor inputs, engine breathing problems (intake and exhaust restriction), Misfire and cylinder sealing (compression) issues. This workshop includes several in-bay demonstrations in our state-of-the-art service bays.

After completing this workshop, the student will have the knowledge to:

- Diagnose the common Fuel Trim diagnostic trouble codes (DTC's, P0171, P0174, P0172, P0175)
- Use Fuel Trim scan tool data to diagnose a variety of engine performance concerns
- Identify faulty sensor inputs that can affect fuel control through using fuel trim information
- Define LEAN and RICH engine running conditions and their causes

IGN.305.1.WS | How to Use Your Lab Scope

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

In this workshop we present how to set up and operate a lab scope for the purpose of testing automotive sensors and components of various types. We cover set up procedures, voltage and time base settings, and waveform capturing techniques. Waveform analysis is discussed on many different captures to differentiate 'good' and 'bad.' Several on-car demonstrations take place in our state-of-the-art service bays during this workshop.

After completing this workshop, the student will have the knowledge to:

- Set up and capture automotive waveforms using a lab scope
- Configure lab scope settings for optimized viewing of waveforms
- Properly connect a lab scope to various solenoids, actuators, speed and position sensors, and DC motors found under hood and undercar

STEERING AND SUSPENSION

SS.105.1.WS | Diagnosing Modern Chassis Systems

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop is designed to focus on the high volume repair opportunities found in the undercar sector of the automotive industry. The important relationships between component integrity, alignment geometry, vehicle handling and tire wear are defined. We discuss proper inspection procedures for all suspension and steering system types. Hands-on shop demonstrations in our state-of-the-art service bays are performed during this workshop.

After completing this workshop, the student will have the knowledge to:

- Properly perform steering and suspension inspection procedures
- Relate worn chassis components to tire life, steering, stopping and stability
- Identify various types of vehicle steering systems and their operations (hydraulic and electric)
- Inspect, properly diagnose and replace wheel hub bearings of all types

SS.106.1.WS | Calibrating Steering Angle Sensors

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop combines classroom and hands-on activities to enhance the learning experience. The workshop starts with a description and operation segment on Steering Angle Sensors (SAS). We discuss the integration of these components within modern day safety systems included on today's vehicles. Theory and operation of these safety systems are reviewed and the special service procedures highlighted. Alignments are performed in the service bays while demonstrating SAS recalibration procedures.

After completing this workshop, the student will have the knowledge to:

- Understand the function of the Steering Angle Sensor (SAS) within various vehicle safety systems
- Locate and interpret SAS information within the scan tool datastream
- Perform SAS recalibration using an aftermarket scan tool
- Perform SAS recalibrations using the Hunter CodeLink tool

**Tuition includes meal and classroom materials*

SS.107.1.WS | Electronic Suspension Diagnostics

Workshop Length: 4 hours Tuition: *\$99.00 U.S. 0.4 CEUs awarded

This workshop enhances the skills of the professional undercar technician in the areas of operation and diagnosis on electronically controlled suspension systems. We discuss techniques and procedures to replace, set up and calibrate suspension components, such as height sensors and electronic shocks and air springs, on vehicles with ECS (Electronically Controlled Suspension). Vehicle diagnostic strategies revolving around ride quality and handling issues are the focus. Air and Nitrogen suspension operation is discussed. Proven diagnostic strategies that address Service Suspension lights and vehicle stability concerns are discussed.

After completing this workshop, the student will have the knowledge to:

- Apply diagnostic tests to vehicles with ECS (Electronically Controlled Suspensions)
- Validate performance of suspension components on ECS equipped vehicles
- Understand scan tool data that identifies inputs and outputs on electronically controlled suspension equipped vehicles
- Identify different types of failed components on ECS (Electronically Controlled Suspension) equipped vehicles

SW.701.2.WS | Service Writer – Brakes

Workshop Length: 4 hours *\$99.00 U.S. 0.4 CEUs awarded

This workshop enhances the skills of the service professional working as the interface between the customer and the business. Effective customer communication and selling skills are highlighted throughout this workshop. Emphasis is placed on practicing the 4C model (concern, cause, correction and consequence). Attendees are trained on how to professionally interact with their customers. Several role play exercises take place throughout the workshop so attendees can practice and hone their skills. This workshop focuses on a light technical overview of a vehicle’s brake system’s components.

After completing this workshop, the student will have the knowledge to:

- Professionally communicate the corrective action necessary for servicing a vehicle’s braking system
- Interact professionally with the customer
- Communicate the benefits of a premium brake service to the customer

SERVICE WRITER TRAINING

SW.701.1.WS | Service Writer – Steering and Suspension

Workshop Length: 4 hours *\$99.00 U.S. 0.4 CEUs awarded

This workshop enhances the skills of the service professional working as the interface between the customer and the business. Effective customer communication and selling skills are highlighted throughout this workshop. Emphasis is placed on practicing the 4C model (concern, cause, correction and consequence). Attendees are trained on how to professionally interact with their customers. Several role play exercises take place throughout the workshop so attendees can practice and hone their skills. This workshop focuses on a light technical overview of a vehicle’s steering and suspension system.

After completing this workshop, the student will have the knowledge to:

- Professionally communicate the corrective action necessary for servicing a vehicle’s steering and suspension system
- Interact professionally with the customer
- Communicate the benefits of replacing steering and suspension components with premium parts to the customer

**Tuition includes meal and classroom materials*



ONSITE FIELD CLINICS



The high levels of quality found in Garage Gurus training is also found beyond the walls of our nationwide Garage Gurus Technical Support Centers. Our field clinics are held throughout the country all year long. Field clinics are local, three-hour presentations given by one of Garage Gurus ASE Certified Master Trainers on selected topics. These clinics are designed for the professional technician and are usually presented during the evening hours to maximize attendance and minimize time away from the shop.

WHAT'S INCLUDED

- Each clinic is designed to be approximately three hours of instruction with 30 minutes for dinner preceding the seminar.
- Twenty-five clinic kits are provided for each clinic.

FIELD CLINIC FEES

- Call your Federal-Mogul Motorparts representative for pricing.
- The clinic sponsor is responsible for location and meals.

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BRAKE

BRK.2021.1.FC | Brake System Technology

**Clinic Length: Approx. 3 hours Minimum of 25 attendees*

This clinic is designed to enhance the technician's ability to perform proper brake service procedures on today's vehicles utilizing Electronic Brake Control (EBC) systems. We discuss several Active Safety Systems and the operational strategies used on many new vehicles. Included in this technical seminar is an overview of stability control operation and the modern advancements within this safety technology. Newly mandated braking controls and the impact on vehicle braking performance are reviewed. Special service procedures on the base brake system are outlined. Brake by wire and automatic stop system control inputs and outputs are discussed. Yaw, lateral, accelerometer, wheel speed, active brake booster and brake pressure sensor testing procedures are outlined.

After completing this seminar, the student will have the knowledge to:

- Properly service today's automotive brake systems
- Diagnose Brake and Stability Control System warning lights
- Discuss base brake service issues that relate to braking performance issues
- Properly inspect, test and calibrate components within the electronic controlled brake system
- Evaluate scan tool data and fault codes through vehicle Case Study examples

BRK.2031.1.FC | Active Vehicle Safety

**Clinic Length: Approx. 3 hours Minimum of 25 attendees*

This seminar provides the professional technician with a perspective on how to properly service today's braking and steering systems on vehicles equipped with ADAS (Advanced Driver Assist Systems). The foundation of these systems is based on the ABS/VSC (anti-lock brakes and Vehicle Stability Control) system. We will briefly discuss system operation of the ABS/VSC systems to set the ground work for deeper discussions on ADAS. Diagnostic procedures on ABS/VSC system components will be explored. Electric Power steering systems will be introduced and their contribution to the ADAS systems will be explained. Proper service and calibration procedures will be presented for Steering Angle Sensors, accelerometers and YAW sensors. Several Active Safety systems and their operational strategies will be outlined. In addition, safety system alignment resets will be discussed for Adaptive Cruise Control, Forward Collision Warning and Lane Departure Warning.

After completing this seminar, the student will have the knowledge to:

- Understand ABS/VSC operational strategies
- Properly inspect, test and calibrate components within the electronic brake and vehicle stability systems
- Evaluate scan tool data and fault codes
- Discuss several active safety systems on current production vehicles
- Understand the function and calibration needs of related sensors within several vehicle safety systems

EVERYTHING YOU NEED TO KNOW.

**Call your sales representative for pricing*



DRIVABILITY

DRV.6021.1.FC | Engine Performance Diagnostic Strategies

***Clinic Length: Approx. 3 hours Minimum of 25 attendees**

This clinic is designed to keep technicians current on changing Engine Management Systems and diagnostic procedures for Asian and Domestic vehicles. The focus is on helping the technician become more proficient in interpreting the information the scan tool provides for engine performance diagnostics. We establish a foundation utilizing “strategy based diagnostics” to reduce diagnostic time and prevent emission related Check Engine light comebacks. We discuss utilizing scan tool information to gain diagnostic direction to repair today’s most seen Engine Performance concerns. Putting all the pieces together during an engine diagnostic is a lot like reading a road map; the key to success is finding the shortest path to the destination without getting lost.

After completing this seminar, the student will have the knowledge to:

- Apply a logical flow of diagnosing Check Engine light concerns through understanding what the scan tool data is saying
- Utilize the graphing function of the scan tool to ‘trend’ important scan tool PID (Parameter Identification Data) relationships
- Diagnose emission related Check Engine light problems on vehicles through using generic and enhanced scan data analysis
- Five diagnostic checks to perform to before catalytic converter replacement
- Interpret important engine performance sensor information and vehicle operating system strategies

DRV.6041.1.FC | Diagnosing Variable Valve Timing

***Clinic Length: Approx. 3 hours Minimum of 25 attendees**

This clinic will focus on the different types of variable valve timing (VVT) systems used by vehicle manufacturers today. After multi-valve technology became standard in engine design, VVT became the next step to enhance engine output, increasing engine power and torque output along with reducing emissions. Without VVT technology, engineers previously had to choose the best compromise in valve/cam timing and ended up sacrificing one thing to gain in another area. VVT allows the best of both worlds – increased performance and economy and lower emissions. There are a multitude of Diagnostic Trouble Codes (DTCs) that can set related to VVT faults stemming from oil contamination to inoperative cam actuators and oil control solenoids. We explain the variations of VVT systems used by manufacturers today and look at diagnostic tests that can be performed on this system using the scan tool and other diagnostic equipment to confidently diagnose these systems before the costly and labor-intensive engine teardown for service.

After completing this clinic, the student will have the knowledge to:

- Identify the VVT system types used by manufacturers
- Understand the VVT DTC stored in the Powertrain Control Module (PCM)
- Relate to the scan tool parameters used by various manufacturers to validate camshaft control and operation
- Realize the importance of lab scope testing to validate camshaft to crankshaft correlation
- Perform mechanical engine tests with a variety of test equipment to avoid timely engine teardowns for diagnostic purposes
- Utilize new scan tool information and techniques to reduce diagnostic time in the service bay for VVT related faults or symptoms

DRV.6081.1.FC | CAN Networks

***Clinic Length: Approx. 3 hours Minimum of 25 attendees**

Since many newer vehicles can have 30 or more onboard computers, this clinic helps technicians understand, identify and diagnose CAN (Controller Area Network) vehicle communication networks. We review network fundamentals to help the technician understand the need, strategy and protocol of CAN. To aid in diagnostics, various types of network topologies are reviewed and explained. To help pinpoint CAN failures, several electrical circuit integrity test methods are outlined to validate root cause of CAN communication failures. Application of the diagnostic strategies are highlighted through vehicle Case Studies shown throughout this seminar.

After completing this clinic, the student will have the knowledge to:

- Identify Network type and topology
- Utilize the proper tools and test procedures when diagnosing network fault
- Diagnose ‘U’ code failures on CAN networks
- Test for ‘No Communication’ faults on CAN networks

IGNITION

IGN.3021.1.FC | How to Use Your Lab Scope for Diagnostics

***Clinic Length: Approx. 3 hours Minimum of 25 attendees**

In this clinic, we will present how to set up and operate a lab scope for the purpose of testing automotive sensors and components of various types. As the saying goes, “A picture is worth a thousand words.” We cover set up procedures, voltage and time base settings, and waveform capturing techniques. Waveforms captured from many different component types are reviewed to differentiate ‘good’ and ‘bad’ waveforms. A color clinic book is provided showcasing popular aftermarket lab scope waveforms for take home reference.

After completing this clinic, the student will have the knowledge to:

- Set up and capture automotive waveforms using a lab scope
- Configure lab scope settings for optimized viewing of waveforms
- Properly connect a lab scope to various solenoids, actuators, speed and position sensors and DC motors found under hood and undercar
- Identify when going for the lab scope is necessary
- Utilize multiple channels of the lab scope to aid in diagnostic situations

**Call your sales representative for pricing*

IGN.3031.1.FC | Modern Ignition System Testing

**Clinic Length: Approx. 3 hours Minimum of 25 attendees*

This clinic is designed to enhance the professional level technician's knowledge of modern ignition system diagnostics. P0300 misfire DTC diagnostic strategies are covered using modern scan tools and ignition system test equipment. Information covered reviews digital storage oscilloscopes (DSOs) patterns captured using current probes, inductive wands and voltage test leads to validate modern ignition system components ranging from crankshaft and camshaft position sensors to today's COP (Coil on Plug) assemblies. Misfire information obtained from the scan tool is explained and reviewed through Case Study vehicles. PCM (Powertrain Control Module) operational strategies are defined pertaining to OBD II Misfire Monitoring standards.

After completing this clinic, the student will have the knowledge to:

- Recognize different manufacturers' operational strategy during misfire conditions
- Identify PCM strategies that prevent catalytic converter damage due to Type A misfires
- Accurately test crankshaft position and camshaft position sensors
- Distinguish the difference in testing procedures for conventional ignition coils versus 'smart coil' assemblies
- Interpret various ignition component waveforms captured from a DSO (Digital Storage Oscilloscope)
- Understand fuel trim corrections during misfire conditions to isolate system faults

STEERING AND SUSPENSION

SS.1021.1.FC | Diagnosing Steering and Suspension Systems from A to Z

**Clinic Length: Approx. 3 hours Minimum of 25 attendees*

This clinic enhances the skills of the professional undercar technician in the areas of mechanical and electronic steering and suspension systems. We discuss proper component inspection procedures on today's popular suspension and steering systems. Vehicle diagnostic strategies revolving around ride quality and handling issues are a focus with an emphasis on electronic shocks and air springs used on vehicles with ECS (Electronically Controlled Suspension). A description, operation and diagnostic segment on electric steer vehicles is included. Integration of these components within modern day safety systems result in special wheel alignment procedures after 'hard part' replacement. We discuss how to perform this service the 'right way' to restore proper vehicle handling and control. Calibrating various steering and suspension components after replacement is highlighted.

After completing this clinic, the student will have the knowledge to:

- Relate worn chassis components to accelerated tire wear and inadequate steering, stopping and stability
- Define the operation of electronically assisted steering systems (column drive, rack motor drive, belt drive)
- Validate performance of steering and suspension components on ECS equipped vehicles
- Understand the function and calibration needs of the Steering Angle Sensor (SAS) within various vehicle safety systems
- Recognize scan tool functional tests, data stream interpretation and output controls to complete electronic steering and suspension service procedures

**Call your sales representative for pricing*

ONLINE COURSES



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BRAKE

Fundamentals of Automotive Brake Systems
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Brake System Diagnostics
Brake Friction Wear Analysis
ABS Systems
Brake Assist Systems
Brake System Bleeding
Brake Rotor and Drum Machining
Stability Control Systems
Accident Avoidance Systems

ENGINE AND SEALING

Ford 6.0L Powerstroke Head Gasket – Diagnosis
Ford 6.0L Powerstroke Head Gasket – Teardown
Ford 6.0L Powerstroke Head Gasket – Inspection and Analysis
Ford 6.0L Powerstroke Head Gasket – Machining
Ford 6.0L Powerstroke Head Gasket – Reassembly

IGNITION

Modern Ignition Systems – Ignition Coil Operation And Control (Primary and Secondary)
Modern Ignition Systems – Inputs and Outputs
Modern Ignition Systems – Misfire Monitoring
Modern Ignition Systems – Basic Testing
Modern Ignition Systems – Advanced Testing
Modern Ignition Systems – Reading Spark Plugs

STEERING AND SUSPENSION

Ride Control Service in Four Steps
Vehicle Dynamics
Effects of Worn Shocks/Struts
Bearing Plate Tech Tips
How to Measure Ride Height
Commercial Vehicle Opportunity
Quick-Strut Installation
Mastering the Opportunity (English)
Steering and Suspension Overview
Suspension Basics
Steering Basics
Alignment Basics Part I
Alignment Basics Part II: Equipment
Tire Mounting
Tire Balancing
Tire Balancing (Road Force)
Tire Pressure Monitoring Systems

DRIVABILITY**5 Basic Emissions Control Diagnostic Checks****Emission Control - Determining the Right Replacement Catalytic Converter****Diagnosis of DTC's****Fuel System Service****Engine Management Systems****Turbocharging Induction****Automotive Fuels****Emissions****Understanding Strategy Based Diagnostics****ASE TEST PREP****ASE Technician Test Preparation A1 Engine Repair****ASE Technician Test Preparation A2 Automatic Transmissions and Transaxles****ASE Technician Test Preparation A3 Manual Drive Trains and Axles****ASE Technician Test Preparation A4 Suspension and Steering****ASE Technician Test Preparation A5 Brakes****ASE Technician Test Preparation A6 Electricity and Electronics****ASE Technician Test Preparation A7 Heating and Air Conditioning****ASE Technician Test Preparation A8 Engine Performance****ASE Technician Test Preparation A9 Light Vehicle Diesel Engines****ASE Technician Test Preparation C1 Service Consultant****ASE Technician Test Preparation G1 Automotive Maintenance and Light Repair****ASE Technician Test Preparation L1 Advanced Engine Performance****ASE Technician Test Preparation P2 Parts Specialist****ASE Technician Test Preparation X1 Exhaust Systems****ELECTRICAL****Electrical Theory****Electrical Components****Electrical Sensors****Electromagnetism****Automotive Meters****Introduction to Electrical Testing****Hybrid Safety Overview****Hybrid Fundamentals****Battery, Starting, and Charging Testing****HVAC****Cooling System Operation****HVAC System Service****Introduction to HVAC****Air Conditioning Fundamentals****Cooling System Filling and Air Bleeding****Cooling System Service**

SERVICE OPERATIONS

Basic Shop Safety
Managing Employees
Closing the Sale and Delivery
Expanding Your Customer Base
Introduction to Financial Management
Introduction to Business Analysis
Managing Customer Objections
Service Facilities
Verbal and Non-Verbal Communication
Training Employees
Preparing for Successful Service
Marketing and Advertising
Increasing Service Bay Sales
Building Customer Loyalty
Customer Follow Up and Going Forward
Conflict Resolution
Profit Margins
Introduction to Selling Service

PRODUCT TRAINING

Engine Repair
Engine Leak Repair
System-Specific Leak Repair
Fel-Pro Counter Skills
Twin Tube Shock Technology
Monroe CCES Technology
Low Gas No Gas - EP
Monroe OESpectrum
Feel the Difference in Ride Control
Monotube Shock Absorbers
The Safety Triangle
Catalytic Converter Technology
The Quiet-Flow Stainless Steel Muffler
Emissions Control - Intro to Catalytic Converters
Direct Fit Catalytic Converter Installation
Muffler Technologies
Direct Fit Exhaust Opportunity
Dynomax American Muscle
RS5000X Shock Technology
RS7000MT Shock Technology
RS9000XL Shock Technology
Low Copper Friction
Wagner Brake Features and Benefits
Introduction/Sealing Segment Opportunities
Modern Engine Sealing

HEAVY DUTY COURSES



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HEAVY DUTY TRAINING WORKSHOPS

The in-class workshop experience allows students to work hand-in-hand with a Garage Gurus HD Master Trainer at one of our conveniently located Technical Support Centers (TSCs).

HD.701.1.WS | HD Foundation Drum Brakes Workshop

Workshop Length: 4 Hours Tuition: \$99.00 per person 10 Student Maximum

This workshop is designed with a combination of classroom and hands-on education to enhance the technician’s ability to properly diagnose and service Heavy-Duty Truck Foundation Brakes. Emphasis is placed on defining CVSA (Commercial Vehicle Safety Alliance) Out-of-Service Criteria. In addition, we define the function of the brake system components. We overview diagnostic procedures used to understand air balance, mechanical balance, torque balance and friction balance.

After completing this workshop, the student will have the knowledge to:

- Properly identify foundation brake components and their function
- Understand Out-of-Service conditions and repairs
- Identify failed components and repair procedures
- Perform measurements on foundation brake components

HD.702.1.WS | HD Air Disc Brake Workshop

Workshop Length: 4 Hours Tuition: \$99.00 per person 10 Student Maximum

This workshop emphasizes classroom and hands-on experience to increase the technician’s ability to properly diagnose and service Heavy-Duty Air Disc Brakes. We discuss CVSA (Commercial Vehicle Safety Alliance) Out-of-Service Criteria and define the function of the disc brake system components. We highlight the understanding air balance and friction balance.

After completing this workshop, the student will have the knowledge to:

- Properly identify air disc brake components and their function
- Understand Out-of-Service conditions and repairs
- Identify failed components and repair procedures
- Perform brake related measurements

HD.801.1.WS | HD Bearings and Seals Workshop

Workshop Length: 4 Hours Tuition: \$99.00 per person 10 Student Maximum

This workshop is designed with a combination of classroom and hands-on education to enhance the technician’s ability to properly diagnose and service wheel end bearings and seals. We define the function of bearings, seals and hubcaps. We focus on proper removal, cleaning and installation procedures. We perform proper end play torque procedures.

After completing this workshop, the student will have the knowledge to:

- Properly identify wheel end components and their function
- Identify failed components and repair procedures
- Perform bearing adjustment
- Understand end play

HEAVY DUTY ONSITE TRAINING

The field clinic brings the Garage Gurus HD ASE Certified Master Trainer to the technician’s location.

HD.701.1.FC | HD Foundation Drum Brake Hands-On Training

Course Length: 3 Hours 10 Student Maximum

This clinic is a hands-on education to enhance the technician’s ability to service Heavy-Duty Truck Brakes. We discuss components, service procedures, diagnostic procedures and out of service criteria. Emphasis is placed on brake balance.

After completing this clinic, the student will have the knowledge to:

- Properly service foundation brakes
- Inspect and identify component failure modes
- Utilize the proper service tools



**Call your HD sales representative*



HD.702.1.FC | HD Air Disc Hands-On Training

***Course Length: 3 Hours 10 Student Maximum**

This clinic provides the technician the ability to properly service Heavy-Duty Air Disc Brakes. We define the function of the disc brake system components and discuss inspection and service procedures. We overview system balance and proper maintenance.

After completing this clinic, the student will have the knowledge to:

- Understand maintenance simplicity vs. foundation brakes
- Relate repairs procedures to failed components
- Discuss brake performance issues in relation to basic design

HD.801.1.FC | HD Bearings and Seals Hands-On Training

***Course Length: 3 Hours 10 Student Maximum**

This clinic will focus on the technician's ability to properly service wheel end bearings and seals. Procedures for cleaning, inspection and installation will be emphasized. Proper identification of hub types and fasteners are discussed.

After completing this clinic, the student will have the knowledge to:

- Understand proper seal removal and installation
- Identify the proper service tools
- Recognize common failure modes

**Call your HD sales representative*

TECHNICAL LUNCH AND LEARN PRESENTATIONS

The Lunch and Learn training presentation brings an ASE Certified Garage Gurus HD On-the-Go trainer right to the technician's location. These presentations range in duration from 30-90 minutes, during which the trainer delivers the latest in specific heavy-duty vehicle systems and diagnostics in a shop environment. The use of hands-on demonstrations (where applicable) makes this a fully interactive training experience for all technicians. Lunch and Learn training presentations are free – please contact your Federal-Mogul Motorparts representative for details.

HD Foundation Drum Brakes

45 Minute Introduction to Air Drum Brake Systems

- Fundamentals of air drum brake design and operation
- Identifying standard stroke vs. long stroke brake chambers

HD Air Disc Brakes

45 Minute Introduction to Air Disc Brake Systems

- Understanding maintenance simplicity vs. foundation drum brakes
- Fundamentals of air disc brake design and operation

HD Bearings and Seals

45 Minute Introduction to Heavy Duty Bearings and Seal Systems

- Fundamentals of heavy duty hub seal design and operation
- Understanding heavy duty wheel bearing design and operation

HD Ride Control and Vehicle Dynamics

45 Minute Introduction to Heavy Duty Vehicle Suspension and Ride Control Systems

- Fundamentals of heavy duty suspension design and operation
- Understanding heavy duty shock absorbers and their effect on vehicle stability

HOW TO REGISTER



Student selects desired workshop and course date then calls
888-771-6005
with credit card payment information



About CASE Continuing Education Units (CEUs)

The Continuing Education Unit (CEU), is commonly used by many organizations as the standard unit of measure to quantify adult education and training activities. The International Association of Continuing Education and Training (IACET) defines the CEU as “ten contact hours of participation in organized continuing education experience under responsible, qualified direction and instruction.” The CASE CEU was introduced under this program to represent an automotive industry-specific unit of measure that not only quantifies the ten hours of training, but also qualifies the training as having been provided in accordance with the CASE Standards. Therefore, only ASE-accredited CASE Providers are authorized to issue CASE CEUs. One CASE CEU is equal to ten (10) contact hours of participation in a CASE Activity. One “contact hour” is equal to a minimum of fifty (50) minutes of instructional time within one clock hour.





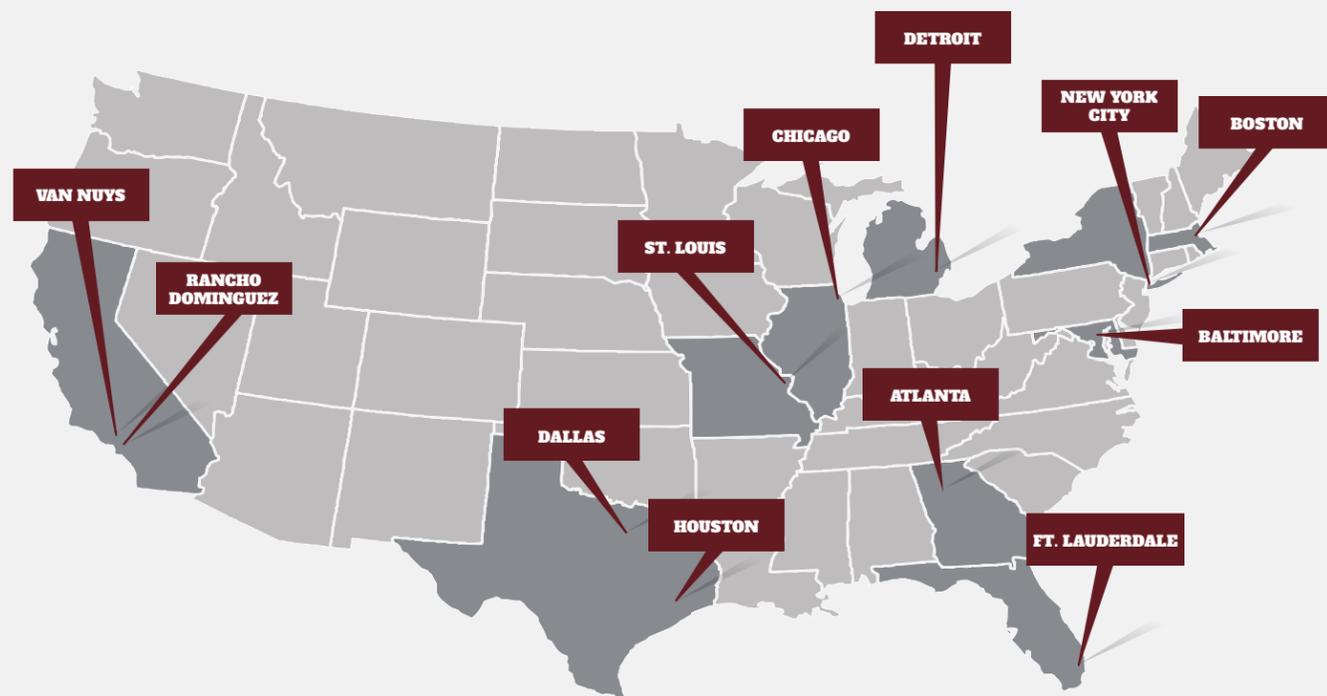
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