



FRENCH & SPANISH

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
LDD: Fonctionnement et diagnostic du moteur Ford Powerstroke de 6,7 L	James Shields	CTI/WTI	<p>Cette classe presentera un aperu complet et dtail du fonctionnement et du diagnostic actuels du diesel Ford 6.7 Powerstroke. Il est conu non seulement pour tirer parti des techniques OE, mais galement pour les comparer ce que la plupart des magasins proposent sur le march secondaire. Les sujets comprendront. Les sujets incluent:</p> <ul style="list-style-type: none"> • Prsentation des fonctionnalits du moteur • Systemes de carburant • Contrle de bougie de prchauffage • Systemes dmission, y compris post-traitement • Gestion de l'air et turbocompresseur • Fonctions de loutil analyse OE et aprs-vente
Anlisis con herramienta de escaneo: Manejo moderno de aire/combustible	Abel Castillo	CTI/WTI	<p>Esta clase es una continuacin de STA-3803-4. Se concentrar en las estrategias de gestin de aire / combustible implementadas en plataformas de nivel avanzado. La gestin del aire / combustible ha cambiado drsticamente en los ltimos aos y lo que esperamos ver en las reacciones de ajuste del combustible a fallas en los sistemas puede no aplicarse a los vehculos actuales. Los temas incluyen:</p> <ul style="list-style-type: none"> • La ecuacin del aire • Suministro de combustible • Dispositivos de retroalimentacin • Rango adaptativo y estrategia • PIDS clave y anlisis
EET: Configuracin y operacin de un osciloscopio de almacenamiento digital	Gustavo Algozain	CTI/WTI	<p>El osciloscopio de almacenamiento digital (DSO), esta rapidamente convirtiendose en una herramienta de primera necesidad para un tecnico diagnosticador. Aprende a como tomar ventaja de tu osciloscopio y de todas sus caracteristicas.</p> <ul style="list-style-type: none"> • Adquiere seales de onda para diagnosticos • Aprende a guardar formas de onda para futuras referencias • Ajuste de voltajes • Base de tiempo vs voltaje • Tecnicas de incitamiento (trigger) • Analiza seales precisas eficientemente
EET : Osciloscopio de almacenamiento digital - Aplicacin y pruebas	Gustavo Vidal	CTI/WTI	<p>Aplicacion practica y tecnicas del uso del osciloscopio de almacenamiento digital (DSO).</p> <ul style="list-style-type: none"> • Metodos de chequeo para sistemas mayores automotrices • Sistemas de inyeccion de gasolina • Sistemas de encendido • Sistemas de carga y de arranque • Analisis de motores (con osciloscopio) • Tecnicas de analisis para cada sistema • Metodos para analizar cada sistema usando, voltaje y corriente inductiva



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ATV: Diagnostic des moteurs hybrides et onduleurs	Herman Chabot	CTI/WTI	<p>Ce cours explorera le fonctionnement, le diagnostic et la réparation de véhicules hybrides. Les sujets traités comprennent: le câblage, les inverseurs, les générateurs de moteurs et les convertisseurs. Les sujets incluent:</p> <ul style="list-style-type: none"> • processus de diagnostic • l'identification des outils • le fonctionnement des composants • Analyse des données numériques • Service et réparation
ATV: Effectuer le diagnostic des batteries de véhicules hybrides	Herman Chabot	CTI/WTI	<p>Ce cours porte sur le fonctionnement, le diagnostic et la réparation de systèmes de packs de batteries hybrides dans des systèmes hybrides classiques autrement dit, hybrides non-plug-in. Les sujets incluent:</p> <ul style="list-style-type: none"> • Fonctionnement et les tests des composants • Toyota Prius de générations I et II • Honda Civic et Insight et hybrides • Ford Escape et Fusion, en particulier batteries hybrides • Les diagnostics et les procédures de remplacement
Inyección directa de gasolina : Prueba de manejo analítica	Roberto Ibarra	CTI/WTI	<p>Una prueba de manejo no está diseñada para aislar fallas que puedan estar causando un síntoma o preocupación. El propósito de una prueba de manejo analítica es simplemente recopilar información para el análisis. Si el problema es impulsado por DTC o por síntomas, un ciclo de prueba repetible determinará si la causa raíz está relacionada con el aire (VE), el combustible o la adaptación. Los temas incluyen:</p> <ul style="list-style-type: none"> • Entender lo que los datos PID le están diciendo • Diseñando su ciclo de prueba de manejo • Análisis de problemas relacionados con el aire. • Análisis de problemas relacionados con el combustible • Análisis de problemas relacionados con la adaptación
Injection directe essence : essai routier analytique	Serge Pouliot	CTI/WTI	<p>Un test de conduite n'est pas destiné à isoler les pannes susceptibles de causer un symptôme ou une préoccupation. Le but d'un test analytique est simplement de rassembler des informations pour l'analyse. Que le problème soit déterminé par le DTC ou par le symptôme, un cycle de conduite de test répétable déterminera si la cause fondamentale est liée à l'air (VE), au carburant ou à l'adaptation. Les sujets incluent:</p> <ul style="list-style-type: none"> • Comprendre ce que les PID de données vous disent • Concevoir votre cycle d'essai • Analyser les problèmes liés à l'air • Analyser les problèmes liés au carburant • Analyser les problèmes liés à l'adaptation



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Inyeccion directa de gasolina: Tcnicas prcticas de diagnostico	Jorge Suazo	CTI/WTI	<p>Este curso se centra en las tcnicas de pruebas prcticas aplicadas a los motores de gasolina inyeccion directa (GDI) soportados por una comprensin de trabajo del sistema y el funcionamiento de los componentes. Los temas incluyen:</p> <ul style="list-style-type: none"> • Pruebas del sistema de combustible a baja presin. • Pruebas del sistema de combustible a alta presin. • Diagnostico de la bomba HP • Anlisis de sensores de realimentacin de presin de combustible. • Anlisis de captura de datos de prueba correcta
Hybrid Electric Vehicle First Look - In Spanish	TBD	Delphi	



DOMESTICS

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Domestic Charging Systems and Energy Management	Peter Orlando	CTI/WTI	<p>Are you replacing the alternator unnecessarily? The connected development of next-generation electrical and electronic architectures (EEAs) has led to a whole new level of balance between modern batteries and the charging systems that support the vehicles electrical needs. Topics include:</p> <ul style="list-style-type: none"> • Systems approach to testing • Understanding the interaction of alternator and alternator control • Details of the Big 3 Domestic systems • Load control and load shedding • Effective use of scan data
Ford Diagnostics and Programming - IDS, FJDS, FDRS	Chris Snyder	Autologic	<ul style="list-style-type: none"> • IDS <ul style="list-style-type: none"> ○ Vehicle scans, history codes, on demand self tests ○ Live data monitoring and recording ○ Service functions ○ Fuel system testing ○ Ignition system testing ○ Base engine testing • FJDS pass thru usage and vehicle coverage • FDRS - pass thru usage and vehicle coverage • Security programming (PATS) <ul style="list-style-type: none"> ○ Key learn process and related modules ○ Timed vs LSID access and required browser settings ○ Fault diagnostic case study • Module programming and configuration <ul style="list-style-type: none"> ○ New module initialization ○ Module update ○ Module configuration ○ Used module installation ○ Failed programming recovery ○ Sync APIM programming • Motorcraft Service Publication Navigation <ul style="list-style-type: none"> ○ Browser settings and software requirements ○ TSBs, SSMs ○ Workshop manual <ul style="list-style-type: none"> ▪ Navigation and guided diagnostics ▪ Description and operation ○ PCED <ul style="list-style-type: none"> ▪ Actual values ▪ Description and operation ○ Wiring Diagrams <ul style="list-style-type: none"> ▪ Navigation and structure ▪ Connector and pigtail identification



DOMESTICS

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Ford ADAS Systems	Chris Snyder	Autologic	Ford ADAS Systems, Overview and Operation <ul style="list-style-type: none"> • Blind spot monitoring / Cross Traffic alert <ul style="list-style-type: none"> ○ System operation ○ Setup and configuration ○ Diagnosis case study • Lane Keep Assist / Adaptive Cruise Control <ul style="list-style-type: none"> ○ System operation ○ Setup and configuration ○ Diagnosis and case study • 360 View Camera Systems <ul style="list-style-type: none"> ○ Setup and configuration ○ System operation • Heads up Display (2018 continental) <ul style="list-style-type: none"> ○ Setup and configuration ○ System operation • Collision Warning and Collision Avoidance System <ul style="list-style-type: none"> ○ Setup and configuration ○ System operation • Active Park Assist <ul style="list-style-type: none"> ○ Setup and configuration ○ Diagnosis and case study ○ System operation
Ford Engine Diagnostics - All Engines	Chris Snyder	Autologic	Modern Ford Engine Diagnostics <ul style="list-style-type: none"> • 3.5/3.7 Engine <ul style="list-style-type: none"> ○ Engine design and application ○ Special Service procedures / tools ○ Diagnostic case study <ul style="list-style-type: none"> ▪ Coil driver short to ground melted coils ▪ VCT timing / chain stretch ▪ Lean engine issues - Purge leak • 3.5 EcoBoost <ul style="list-style-type: none"> ○ Engine design and application ○ Special Service procedures / tools ○ Diagnostic case study <ul style="list-style-type: none"> ▪ Misfires under load ▪ Under boost issues • 5.0 engine <ul style="list-style-type: none"> ○ Design overview and application ○ Service tools and procedures ○ Case study • 3.0 Diesel (2018 F150) <ul style="list-style-type: none"> ○ Design and overview ○ Special service procedures • 3.2 Diesel (Full size transit) <ul style="list-style-type: none"> ○ Design and overview ○ Special tools and procedures ○ Unique service information ○ Case study aftertreatment / SCR system



DOMESTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Ford EcoBoost Platforms - Operation and Diagnosis	Glen Young	CTI/WTI	<p>Since 2010 Ford has been putting the majority of their engineering efforts into the EcoBoost family of engines. Offering displacements from 1.0 liter to 3.5 liter, Ford expects this engine family to be an option for up to 90% of their vehicles. Topics include:</p> <ul style="list-style-type: none"> • Engine mechanical highlights • Fuel system operation and diagnosis • Ignition system operation and diagnosis • Air Induction and turbocharging • Emission components and monitoring strategies
General Motors Platforms - Operation and Diagnosis	Tom Smith	CTI/WTI	<p>General Motors has been improving and refining their powertrains and engine management system at an accelerated pace over the past few years. This course will present the operation and diagnostic techniques the aftermarket will need to service this large segment of the repair market. Topics include:</p> <ul style="list-style-type: none"> • Engine mechanical highlights • Fuel system operation and diagnosis • Ignition system operation and diagnosis • Emission components and monitoring strategies • Network configuration and reprogramming
GM - Starting and Charging System Diagnosis - Start & Stop	TBD	ACDelco	
GM - Vehicle Lighting and Access	TBD	ACDelco	
GM - Electronic Brake Boost System and Electronic Parking Brake System	TBD	ACDelco	
GM - Braking Systems Diagnosis and Repair	TBD	ACDelco	
GM - Collision Mitigation, Avoidance and Safety Systems	TBD	ACDelco	



HYBRID & HIGH VOLTAGE

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Basic Electric Engineering - ZF High Voltage Certificate - class 1 of 5	Dirk Fuchs	ZF	<p>Students must pass eLearning prerequisites to attend this class</p> <ul style="list-style-type: none"> • Learn to work safely on Automotive High Voltage Systems, including hands-on exercises • 5 classes with an end-of-class exam • Fundamental electrical engineering using experimental equipment • Build electrical circuits to understand resistance, diodes, and capacitors • High Voltage Systems - Component functions, common failures, and diagnostic strategies • Safely disconnect High Voltage Systems • New measurement tools for isolation and component equalization • Learn the 4-wire measurement method • An all new measurement method for diagnosing High Voltage Systems • Prove your knowledge and practical skills with our final exam
Basic Electric Engineering II - ZF High Voltage Certificate - class 2 of 5	Dirk Fuchs	ZF	
High Voltage Basics - ZF High Voltage Certificate - class 3 of 5	Dirk Fuchs	ZF	
High Voltage Expert - ZF High Voltage Certificate - class 4 of 5	Dirk Fuchs	ZF	
High Voltage Exam - ZF High Voltage Certificate - class 5 of 5	Dirk Fuchs	ZF	
48 Volts and Beyond Advanced Hybrid Diagnostics	TBD	Delphi	<p>Hybrid vehicles are here to stay and will gain in popularity in years to come, is your shop ready?</p> <ul style="list-style-type: none"> • High voltage interlock circuit diagnoses • Main relay testing • Isolation faults in high voltage circuits • Use scan tool data PIDS to diagnose battery pack faults • 48v upcoming systems overview
Hybrid Electric Vehicles Diagnosis and Repair	TBD	Delphi	<ul style="list-style-type: none"> • Hands on testing • Disassembly of high voltage components • Properly diagnose high voltage electrical systems • Mechanical operation and diagnostic of the hybrid system • Learn to safely power down hybrid systems for work to be performed



HYBRID & HIGH VOLTAGE

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Ford Hybrid Diagnostics - Hybrid Drive Diagnostics	Eric Walker	Denso	<ul style="list-style-type: none"> • Common Ford hybrid diagnostic and repair issues • Real world failures from a variety of Ford hybrid models • Confidently diagnose the main hybrid drive components: batteries, inverters and transaxles • Identifying module responsibility by model (PCM, TCM, TBCM, BECM, BPSM & BEC) • Disabling, interlock circuits, inertia switches, and other power-up/power-down information • Traction Battery - air & HVAC cooling systems • Transaxle cooling and controls (MECS) • Various combinations of electro-hydraulic braking systems • Electric power steering • HVAC compressors • Hybrid drive diagnostics, high voltage isolation faults, battery performance, transaxle performance, battery cooling, and transaxle cooling
Toyota Hybrid Diagnostics	Jeff Canida	Denso	<ul style="list-style-type: none"> • Hybrid system interaction and integration • The best tools and tests to safely isolate faults • High voltage battery diagnostics • Misleading codes & symptoms due to low voltage faults • Battery and transaxle overheating faults • Various READY-up issues • Avoiding A/C-cooled traction battery faults • Electric power steering and A/C system failures • ABS & regenerative braking problems • Shifting and Park command faults • Prius coolant storage, HC storing cats, and exhaust-heated cooling systems • Engine no-start, no-crank, misfire, whining, rumbling, and other diagnostic tips • Known-good Scan Tool and Lab Scope examples from the most problematic systems • Gen 2 & 3 Prius, Camry, Highlander and many other Toyota & Lexus hybrid models



DIESEL

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Duramax Engines LML and LGH - Operation and Diagnosis	Brent Delfel	CTI/WTI	<p>The Duramax maintenance and repair market requires the understanding of many RPO code specific systems and testing procedures. Focusing on complete system analysis is critical to isolating the root cause of component failure and can save wasted time and money when repairing the LML/LGH Duramax. Topics Include:</p> <ul style="list-style-type: none"> • Newly designed high pressure pump • Piezo injectors • Engine features • Air management and turbocharging • SCR aftertreatment system
Light Duty Diesel Exhaust Aftertreatment	Brent Delfel	CTI/WTI	<p>Since 2007, all light duty diesel vehicles sold in the United States are equipped with an exhaust aftertreatment system of some type. This class will present the operation and design of these complex systems along with techniques for effective diagnosis. Topics include:</p> <ul style="list-style-type: none"> • Diesel oxidation catalysts • NOx catalysts • Diesel particulate filters • Selective catalyst reduction • Diesel emissions fluids
Controlling Diesel Emissions and OBD-II	TBD	Delphi	<ul style="list-style-type: none"> • Modern diesel emissions systems • Diesel fuel system strategies • Emission System failure analysis • OBD II monitoring on diesel engines • Misfire diagnosis • Learn to use continuous and non-continuous monitors for emission failure evaluation
Ford 6.7L Powerstroke Emissions - Operation & Diagnostics	Jeff Canidia	Denso	<ul style="list-style-type: none"> • Real-world diagnostics, testing developed and verified in aftermarket shops • System, code and symptom coverage • Which models have non-sequential Exhaust Gas Temp Sensor numbering • DPF regeneration tips • DPF loading & regeneration issues due to exhaust gas temperatures and intake leaks • DPF & SCR codes due to EGT sensor faults • Fuel System Failures causing false DPF codes • The role of Variable Geometry Turbo in EGR flow • Finding clogs in the unmonitored Diesel Oxidation Catalyst • DEF injector, heater & related Glow Plug Control Module faults • Low and High Pressure fuel system faults and diagnostics



DIESEL

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Ford 7.3L Power Stroke Diagnosis	Keith Perkins	CTI/WTI	<ul style="list-style-type: none"> Basics of electronic direct injection systems Scan tool diagnosis Common pattern failures Preventive maintenance service procedures Properly test and diagnose major systems <ul style="list-style-type: none"> Fuel supply HEUI injection High pressure oil regulator systems Exhaust backpressure regulator systems.
Cummins Common Rail Diesels - Components Operation Diagnostics	Rick Kelley	Denso	<ul style="list-style-type: none"> Are you running in circles performing tests based on inconsistent repair information? Identify high level indicators to make a better possible-cause list Trim your possible-cause list as fast as possible Find elusive Cummins internal fuel leaks Modifications & retrofits that make sense Tips for successful DPF regeneration Hard fault stored DEF messages and codes Easy tests for injector ball faults Simplified no-start & hard-start diagnostics Great tests for low power complaints Turbo faults & diagnosis
Duramax LML & LGH Diesels - Components Operation Diagnostics	Rick Kelley	Denso	<ul style="list-style-type: none"> Practical and efficient steps for Duramax diesel diagnosis Steps to rule out the most likely causes in the least amount of time Under-used Scan Tool functions High/low pressure fuel fault differentiation Simple vacuum-side fuel system tests Pressurized fuel return operation & tests Hard fault non-clearable emissions messages, code tips & techniques Quick no-start & hard-start trouble shooting Variable Geometry turbo faults & tips
Ford 6.7 Powerstroke - Operation and Diagnosis	Jerry Stewart	CTI/WTI	<p>This class will present a full and detailed look at current Ford 6.7 Powerstroke diesel operation and diagnosis. It is designed to not only leverage OE techniques but also compare those to what most shops have available in the aftermarket. Topics will include:</p> <ul style="list-style-type: none"> Engine feature overview Fuel systems Glow plug control Emissions systems including Aftertreatment Air management and turbocharging OE vs. Aftermarket scan tool functions



HVAC

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
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A/C Operation, Performance & Diagnostics - Pressure & Temperature Analysis

Rick Kelley

Denso

- A complete look at automotive air conditioning, real world examples and case studies
- Learn our unique 3-Loop strategy covering the roles of the:
 - Refrigerant Loop
 - Air Loop
 - Coolant Loop
- Get to an efficient (and profitable) solution by ruling out the two loops that are not the problem
- Systemic pressure & temperature analysis
- Pressure & temperature feedback loops
- Compressors, variable displacement and controls
- Evaporators & condensers operation and diagnostics
- Pressure drop devices, including fixed orifice and thermal expansion
- Airflow controls (e.g. source, blend and mode doors and controls)
- Blower motors and detailed current and controls testing
- Cooling fan current testing and alternative diagnostic methods
- Recovery, pressure testing & leak detection equipment
- Refrigerant & lubrication types, identification & warnings
- Service & repair best practices

Automotive HVAC - Essential Diagnostics

Kevin Roberts

CTI/WTI

This class provides essential HVAC diagnostic procedures, based upon diagnostic best practices, in order to assure correct and complete diagnostic conclusions of common HVAC failures. Special emphasis will include how to evaluate overall performance and efficient choice of diagnostic methods. Topics include:

- Essential HVAC diagnostic procedures
- Diagnostic best practices
- Temperature and pressure testing
- Diagnosis of compressor clutch controls
- Variable displacement compressor controls



HVAC

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Automotive HVAC - Automatic Temperature Control Operation	Sam Strickland	CTI/WTI	<p>Automatic climate control is the ability to monitor and influence the temperature of a specified space without manual intervention. Climate Control is no longer Summer seasonal! Topics include:</p> <ul style="list-style-type: none"> • Focus behind the firewall • Identify the types of HVAC systems being used on today's vehicles • Describe how dual and rear climate control systems operate • Cover advanced features not usually associated with HVAC • Explain climate control system operational strategies
R1234YF HVAC Essentials	TBD	Nissens	<p>What you have to know about R1234YF</p> <ul style="list-style-type: none"> • Lubricants • Sealants • System Diagnostics • Failure Analysis
Automotive HVAC - Automatic Temperature Control Diagnosis	Tim Iezzi	CTI/WTI	<p>Advances in Automatic Temperature Control technology requires that diagnostic techniques advance with it. This class will build upon an understanding of ATC operation and apply skills that include service information application, scan tool use, meter and oscilloscope techniques, and network diagnostics. Topics include:</p> <ul style="list-style-type: none"> • Diagnostic Strategy • Focus behind the firewall • Identify and utilize specific scan tool PIDs • Perform pinpoint tests with a meter or oscilloscope • Analyze networking issues • Verify post-repair operation



HVAC

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Automotive HVAC - 2020 Technology Update	Tim lezzi	CTI/WTI	<p>This HVAC Update class is designed to familiarize the shop and technicians with the current state of A/C service. While it is not designed as a complete A/C refresher course it touches on many foundations from previous courses and adds current information regarding new technologies, diagnostic techniques and the critical nature of HVAC systems today. Topics include:</p> <ul style="list-style-type: none"> • Current equipment standards and how to verify capabilities • The future with R-1234yf and how it will impact the service bays and customer satisfaction • Real information on safety with new refrigerants • Changes in leak detection and how to verify equipment operation • A thorough review of the new service process and machines including video demonstrations • A review of testing practices with added tools and techniques to save time and increase accuracy
HVAC System Controls - Sensors - Servicing - Diagnostics	TBD	Nissens	



PERFORMANCE

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Performance Turbo Technology	Allen Osborne	WTI/CTI	<ul style="list-style-type: none"> • How Does a Turbocharger Work? More complex than it appears • How to Select the Correct Turbocharger for the application • Engine Prep for Successful Turbocharging • Boost Pressure, How Much is too Much and What to Realistically Expect for Power • Inter-cooling. "The Car With the Best inter-cooler wins" • Turbocharging with Different Fuels
ZF Race Engineering in Performance for Suspension and Powertrain	Niel Speetjens	ZF	<ul style="list-style-type: none"> • Performace Clutch, Shocks, and Suspension • Pull and Push type clutches • Calculate transferrable torque to help select a performace clutch • Clutch system modifications for higher torque flow • Clutch release systems • Wheel alignment for performance systems - Toe, caster, and camber settings • Kamm's Circle • Why certain racing teams choose different suspension systems • Racing shock absorber systems compared - Advantages and disadvantages • Upside down solution for performance shock absorbers • Rod damper technology
Data Acquisition for High Performance Driving and Chassis Set Up	Cameron Conover	WTI/CTI	<ul style="list-style-type: none"> • An overview of various Data Acquisition tools at all budget levels • Choosing the crucial data, which channels to prioritize • Information overload, CAN integration • Making sense of squiggly lines • Getting the most out of your driver • Getting the most from the car • How to stream live telemetry to the crew and the fans during the event
Motorsport Customer Services - In the Shop and Trackside	Cameron Conover / Tony Callas	WTI/CTI	<ul style="list-style-type: none"> • Race Car preparation and maintenance • Preventing the DNF • Race Car Alignment strategies, tools, and guidelines • The typical trackside day • Structure of a Race Team • Tire management • Trackside tools and equipment • The Green Flag doesnt wait



PERFORMANCE

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Linux Single Board Computers for Automotive Applications	Cameron Conover	WTI/CTI	<ul style="list-style-type: none">• Choosing your SBC hardware• Getting Started, Burning an image and booting up• SSH for remote management and configuration• Power Supply and management 5VDC• DIY infotainment• CAN Sniffer Tool• Custom Control module for automotive accessories



ASIAN IMPORTS

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Toyota Platforms - Operation and Diagnosis	Jim Cokonis	CTI/WTI	<p>This class is geared toward the technician with an established background in general engine management, network, electrical and body system operation and diagnosis. The class will focus on using the tools, service information and techniques provided by Toyota to service their systems. Topics will include:</p> <ul style="list-style-type: none"> • TechStream Lite Usage and Data Analysis • TIS Toyota Information System • Wiring Diagram Features and Use • Powertrain Management • Networking Operation and Tips • New Technologies
Honda Hybrid - Integrated Motor Assist (IMA) and Beyond	Isaac Rodell	WTI/CTI	<p>Honda Hybrid - The Shocking Truth</p> <ul style="list-style-type: none"> • Honda's IMA Hybrid Systems • Evolution of Honda Hybrid Powertrain • Integrated Motor Assist (IMA) Batteries that can kill you, even with the safety switch off • NiMH Batteries • Lithium Batteries • Best practices when dealing with NiMH and End of Life • HV Battery Diagnostics
Toyota Hybrid - Real World Diagnostics	Isaac Rodell	WTI/CTI	<p>Toyota Hybrid - A High Voltage Education</p> <ul style="list-style-type: none"> • How the eCVT works • Toyota's leading hybrid system • Operation of the eCVT and Power Split Device (PSD) • Evolution of Toyota Hybrid Powertrain • Best practices when dealing with NiMH and End of Life • Should you recondition NiMH batteries in house? • HV Battery Diagnostics • NiMH Batteries • Lithium Batteries
Toyota Hybrid Transaxles	Greg Jones	WTI/CTI	<ul style="list-style-type: none"> • MG1, MG2, MGR - Operation & Diagnostics • Transaxle Input Damper • Compound Gear Unit • Motor Resolvers - Operation & Diagnostics • Motor Testing - All Test Pro, Megaohm Meter • Park Lock Actuator • Common Failures, Maintenance and More



ASIAN IMPORTS

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Toyota Hybrid Battery Diagnosis and Repair	Greg Jones	WTI/CTI	<ul style="list-style-type: none"> • Safety Considerations • Battery Components and Overview • Load and Performance Testing Using Tech Stream Live Data • Isolation Faults • Battery Replacement and More
Unique Toyota Hybrid Vehicle Diagnostics	Greg Jones	WTI/CTI	<ul style="list-style-type: none"> • No-start conditions • Where to begin with a tow in No Start • Engine Failed To Start - P0A0F • Poor Engine Power - P3190 • Discharged HV Battery Pack - Can it Be Charged? • How to determine the difference between a Start/Stall and a No Start. • HV battery fan - P0A82 • Power Resource - P3004 • DC-DC Converter Status - P0A94 • Precharge Contactor Stuck Closed - P0AE2 • HV CPU Power Sense Circuit Intermittent or No Continuity - P2511
Evaporative Emissions Systems - Asian Import Diagnosis	Mark Olinger	CTI/WTI	<p>This course covers the operation and diagnosis of modern Asian import evaporative emission systems. Technicians will gain valuable knowledge about how these systems really work, as well as practical testing techniques which can be used immediately to improve diagnostic efficiency. Topics include:</p> <ul style="list-style-type: none"> • Toyota, Honda, Nissan and Mazda operation and strategies • Split vacuum based system analysis • Engine Off Natural Vacuum system analysis • Effective use of bidirectional controls • Practical leak testing techniques
Nissan Diagnostics - 2.5 / 3.5 Engines	Steve Woolfson	Autologic	<ul style="list-style-type: none"> • Engine Overview & Application • Variable Valve Timing (VVT) 3.5L Walkthrough • Diagnosing VVT issues, associated codes, testing • Technical Service Bulletins - common issues 2.5L / 3.5L • P0101 Case Studies by Model 2.5L and 3.5L • Throttle body Issues, cleaning procedures, relearn procedures



ASIAN IMPORTS

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Nissan & Infiniti Programming	Steve Woolfson	Autologic	<ul style="list-style-type: none"> • Website Navigation / Creating an Account • System requirements • Downloading NERS Software • Understanding NERS and its capabilities • How to find and download correct files by VIN • Walkthrough on TCM files and folder usage • Installing NEW vs USED ECM Pros and Cons
Network Operation and Analysis for Asian Vehicles	David Patrick	CTI/WTI	
Honda & Acura High-Tech Update	Brandon Steckler	WTI/CTI	
Toyota & Lexus ADAS - Toyota Safety Sense and Lexus Safety System	Dave Macholz	WTI/CTI	
Nissan Leaf - Complete Vehicle Systems	David Uryash	WTI/CTI	
Nissan & Infiniti Anti-Theft System (NATS)	John Rogers	WTI/CTI	



TRANSMISSIONS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Transmission In-Car Diagnostics - Get it Right the First Time	Wally Mouradian	Denso	<ul style="list-style-type: none"> • Become a transmission specialist to diagnose transmission codes & concerns • Find the fault quickly and take apart the least components • Quickly differentiate between transmission, engine mechanical, engine management, suspension & other likely causes • Use application charts to map out power flow to determine what components are being used under fault conditions • More effectively test sensors, switches & solenoids under loaded conditions • Leverage Scan Tool PIDs & functions to eliminate the most likely causes
ZF 6HP Transmission Overhaul and Diagnostics	Francisco Moreno	ZF	<ul style="list-style-type: none"> • ZF 6HP Transmission - Function, common failures, and repair • Shifting strategy, shifting elements, and how to read the shift matrix • Adaptation using general diagnostic tools • Planetary gear set, clutches, and brakes • Torque converter and lock up clutch function, and torque flow • Pressure regulator and solenoids - functions, characteristics, and differences • Identify mechanical faults, such as burned clutches and hydraulic pressure loss • Step by step disassembly and rebuild • Special Tools • Proper transmission oil check and oil change service procedures • Covers 6HP transmissions for BMW, Jaguar, Land Rover, Volkswagen and Audi
ZF 8HP Transmission Second Generation Operation and Diagnostics	Francisco Moreno	ZF	<ul style="list-style-type: none"> • ZF 8HP Transmission - Common failures and how to diagnose them • Torque converter and lock-up clutch - Function, common failures, and diagnostics • The shifting matrix, and why it's important for diagnostics • Transmission adaptation • Limp home function and coding issues • The differences between pressure regulators and solenoids • The right way to check transmission oil • Transmission oil and filter service procedures • Chrysler, Jeep, BMW, Volkswagen, Audi, Jaguar, Land Rover, Maserati, Aston Martin, Bentley and Rolls-Royce



TRANSMISSIONS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
ZF 8HP Transmission Second Generation Overhaul	Francisco Moreno	ZF	<ul style="list-style-type: none"> • ZF 8 speed transmission - Fundamental facts and full working knowledge, including Live-Demo exercises • Identify and repair mechanical faults and common failures • Disassembly and assembly • Clutch packs and planetary gears • The best way to open snap rings, and the proper way to handle transmission components • Special tools • Chrysler, Jeep, BMW, Volkswagen, Audi, Jaguar, Land Rover, Maserati, Aston Martin, Bentley and Rolls-Royce
ZF 9HP Transmission for Honda, Chrysler and Land Rover in Operation and Overhaul	Francisco Moreno	ZF	<ul style="list-style-type: none"> • ZF 9HP Transmission - Function, common failures, and repair • Shifting strategy, shifting elements, and how to read the shift matrix • Torque converter and lock up clutch function, and torque flow • Planetary gear set, clutches, and brakes • Pressure regulator and solenoids - functions, characteristics, and differences • Adaptation using general diagnostic tools • Identify mechanical faults, such as burned clutches and hydraulic pressure loss • Step by step disassembly and rebuild • Special Tools • Proper transmission oil check and oil change service procedures • Covers 9HP transmissions for Honda, Chrysler and Land Rover
Inside Look at ZF Mechatronics	Francisco Moreno	ZF	<ul style="list-style-type: none"> • ZF Mechatronics - 6HP and 8HP transmissions • Mechatronic operation and internal components • Differentiate between Mechatronic types and functions • Shifting elements • Mechatronic brakes and clutches • Pressure regulator and solenoid function • Remove, disassemble, and assemble Mechatronic the right way • Pressure regulator failure repair process • 9HP valve body



TRANSMISSIONS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Hybrid Transmission Technologies in Audi and BMW	Dirk Fuchs	ZF	<ul style="list-style-type: none"> • Audi and BMW 8 Speed Automatic Hybrid Transmission • Common Failures, Step-by-step disassembly and Assembly • How the electric motor is engaged and disengaged from the combustion engine • Micro, Mild and Full Hybrid concepts explained • Torque flow, Electric Motor, K0 Clutch, Inverter • Battery with maintenance connector • Disassembly to explain Rotor, Stator, and Engine disconnect clutch (K0 Clutch) • Shifting strategy, and Shifting matrix • Adaptation with general diagnostic tools • Oil service • Special Tools & Service



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Hands-On Electrical Diagnostics - Circuit Analysis	Brian Chaffe	Autologic	<ul style="list-style-type: none"> • Hands on electronic circuit testing • Hands on Scope testing including CAN and Bus systems • Training Boards, Construct electronic circuits • Testing and Understanding Diagnostic Communication • Understanding Can and Bus systems
Diagnosing Difficult Deposit Related Driveability Concerns	Gary Smith	WTI/CTI	<p>How fuel and oil depositing plays a major role in getting the diagnosis right the first time</p> <ul style="list-style-type: none"> • Critical knowledge that the OEM's are not teaching today • Save time and money • Stop unnecessary parts replacement • Have fewer comebacks
Diagnostic Strategy and Approach	Gary Smith	WTI/CTI	<p>Problematic Vehicles - How to Formulate a Controlled and Successful Diagnostic Strategy</p> <ul style="list-style-type: none"> • Save hours on guided fault testing • Actual diagnostics from the field • Studying both Intermittent, and Common, DTC diagnostics • Lean codes • P0420 • Misfires • No-start
GDI (Gasoline Direct Injection) Technology, Diagnosis and Field Issues	Gary Smith	WTI/CTI	<ul style="list-style-type: none"> • The two main operating characteristics of GDI engines • Theory and Operation • VVT strategies • Misfire and Depositing issues • GDI-specific diagnostic strategies
Lab Scope Diagnostics and Pressure Transducer Testing	Gary Smith	WTI/CTI	<p>The Power of Pressure Transducer Diagnostics</p> <ul style="list-style-type: none"> • No Start and intermittent diagnostic scenarios • Learn how to identify mechanical valve problems • VVT issues • PCM and Mechanical signal overlay
Technology Needs for Today's Diagnostics	Gary Smith	WTI/CTI	<p>The Equipment You Need to Fix Newer Vehicles</p> <ul style="list-style-type: none"> • Scanners, scopes, and testing software • How to shop to get what you need • Model and testing coverage • DSO Lab scopes vs. handhelds • Pressure transducers



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
How to Master YOUR Lab Scope	Chris Martino	Autologic	<p>REQUIRES YOU TO BRING SCOPE, LEADS, & AMP CLAMP</p> <ul style="list-style-type: none"> • Why is a scope necessary? • What kinds of things can you do with a scope? • How you can use YOUR scope to make YOU money? • Learn using your own scope. • Scope supplied if you cant bring your own • How, where, and why to test certain components • Capturing, labeling, saving, and sharing waveforms • Stop the guesswork. Learn to diagnose with 100% confidence
Advanced Current Probe Application and Diagnostics	Kevin Leiby	CTI/WTI	<p>Using amperage waveforms to diagnose electrical circuits is certainly not new. Proper diagnosis depends on not only operational knowledge of the amp probe, but a thorough understanding of the circuit being measured. Topics include:</p> <ul style="list-style-type: none"> • Current and its behavior in inductive circuits • Current probe setup and interpretation • Interpretation of current ramp waveforms • Alternative uses for current probe diagnostics
Vehicle Fluids: Lubricant & Filtration Technology Update	Peter Orlando	CTI/WTI	<p>Students attending this class will actively use provided worksheets and other support material to understand modern lubricants and filtration technologies. We will discuss advanced gasoline engine technologies which rely on proper OE oil formulations to work properly. Topics include:</p> <ul style="list-style-type: none"> • Advanced gasoline engine oil technologies • Choosing the correct oil and filter media • Laboratory analysis of oils • What occurs to the oil in its useful life • Why oil is an engineered part
ADAS - Advanced Driver Assist Systems Operation	Randy Briggs	CTI/WTI	<p>You have seen them publicized on television. Advanced Driver Assist Systems (ADAS) that are developed to automate/adapt/enhance vehicle systems for safety and improved vehicle control. These systems are entering the aftermarket repair world. Be up to date on operation and diagnostic techniques that will enable you to keep these jobs profitably in your shop. Topics include:</p> <ul style="list-style-type: none"> • Sensing technology • Calibration environment • Targets and tooling • Networking • How todays common services effect ADAS systems



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Diagnostics Using Domestic OE Schematics	Rich Falco	CTI/WTI	<p>When a simplified wiring schematic doesn't provide the necessary diagnostic information, access to the added features of OE wiring diagrams can help save valuable diagnostic time. Learn how to access wiring information directly from the vehicle manufacturer as well as through aftermarket information systems.</p> <p>Topics include:</p> <ul style="list-style-type: none"> • Accessing OE websites • Hardware requirements • Maximize the use of hyperlinks • Explore added information found in OE diagrams • Complementary testing techniques
Advanced Chassis Alignment Diagnostics	Lonnie Horn	CTI/WTI	<p>The importance of diagnostic angles and their function will be explained in detail in this class, along with the aftermarket adjustment solutions that are available when no OEM adjustments are provided. Topics include:</p> <ul style="list-style-type: none"> • Vehicle symmetry and thrust angle • Steering axis inclination • Scrub radius and offset • Identifying component damage • Identifying chassis damage
Multisource Leak Detection and Sealing Solutions	Lonnie Horn	CTI/WTI	<p>Finding the source of fluid leaks is a task every technician faces on a weekly (if not daily) basis. Engineers fighting for every inch of room in the modern vehicle have added some difficulty to this task. Its just a leak, right? But, where is it originating and is there anything else I need to check before the repair? Topics include:</p> <ul style="list-style-type: none"> • Root cause analysis • Pre-installation unit leak checks • RA checks and correction • Head gasket best practices • Unique leak analysis tools
Noise, Vibration and Harshness Tools and Techniques	Lonnie Horn	CTI/WTI	<p>Since man began to build machines for industrial use, and especially since motors have been used to power them, problems of vibration reduction and isolation have engaged engineers. This class will show you how to use modern techniques to identify the vibration source, track the transfer path and pinpoint the responding component. Topics include:</p> <ul style="list-style-type: none"> • Root causes of vibration • Understanding frequency and amplitude • Use of piezo sensor for analysis • Unique diagnostic software • Best practices for corrective measures



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
GDI - Practical Diagnostic Techniques	Todd Doty	CTI/WTI	<p>This course focuses on practical testing techniques applied to gasoline direct injected (GDI) engines supported by a working understanding of system and component operation. Topics include:</p> <ul style="list-style-type: none"> • Low pressure fuel system testing • High pressure fuel system testing • HP pump diagnosis • Analyzing fuel pressure feedback sensors • Proper test drive data capture analysis
Practical Electronics	Dave Buttars	CTI/WTI	<p>This class is an advanced foundation course for those technicians who desire an update or review of existing electrical skills. All content is directed to automotive platforms. Topics include:</p> <ul style="list-style-type: none"> • Circuits and their behaviors • Voltage drops explained • Current and inductance • Current ramping • Parasitic draw • Capacitance and its effect on circuits • Time saving test tips
TRW Brake Technology and Diagnostics	Niel Speetjens	ZF	<ul style="list-style-type: none"> • Common diagnostic methods for brake systems • Brake boosters, master brake cylinders, brake pads, calipers, rotors, and drums • Brake pad installation - Common errors • Brake noise - identifying the source • ABS - Passive and active sensors, function and diagnosing • Electrical parking brake systems - servicing, and steps to take if mechanical release is required • Adaptive Cruise Control • Assistance-based emergency braking • Radar sensors - Basic settings
Electrical Testing Tools and Techniques	Jerry Stewart	CTI/WTI	<p>This class explores how to select the best electrical test tool for the job at hand. Whether its a short, an open, or an intermittent issue there is a specialized test too available to help you be more efficient.</p> <p>Topics Include:</p> <ul style="list-style-type: none"> • Circuit fault characteristics • Understanding measurement errors • Proper measurement of frequency and duty cycle • Locating harness faults efficiently • Measuring frequency and duty cycle



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Electronic Transmission Control Analysis	Jerry Stewart	CTI/WTI	<p>The modern transmission can be very difficult to diagnose properly without an understanding of the wide range of inputs and strategies that make up transmission control. Diagnostic analysis of the transmission must take into consideration the mechanical aspects of the transmission, as well as the electrical, hydraulic and engine control influences. Topics include:</p> <ul style="list-style-type: none"> • Use of shift solenoid application charts • Leveraging scan data for analysis • Testing PWM and On/Off solenoid circuits • Effective test drive analysis • Understanding adaptive strategies
Advanced Engine Mechanical Condition Testing	Brian Ward	CTI/WTI	<p>Evaluating engine mechanical condition in today's vehicles requires much more than a compression gauge. Learn how to test more than just the engine's ability to seal. Topics include:</p> <ul style="list-style-type: none"> • Compression testing best practices • Oscilloscope based tests • Utilizing scan data for base engine analysis • Interpreting pressure transducer results • Leveraging specialized software
Digital Storage Oscilloscope Setup & Operation	Brin Kline	CTI/WTI	<p>The Digital Storage Oscilloscope (DSO) is fast becoming a primary tool for the automotive diagnostic technician. Learn how to take advantage of your DSO's many features.</p> <ul style="list-style-type: none"> • Acquire correct waveforms • Interpret waveforms for diagnostics • Store waveforms for future reference • Voltage settings • Time base • Triggering techniques • Analyze signals accurately and efficiently
GDI - The Analytic Test Drive	Buttars	CTI/WTI	<p>A test drive is not intended to isolate faults which may be causing a symptom or concern. The purpose of an analytic test drive is simply to gather information for analysis. Whether the problem is DTC driven or symptom driven, a repeatable test drive cycle will determine if the root cause is air (VE) related, fuel related, or adaptive related. Topics include:</p> <ul style="list-style-type: none"> • Understanding what the data PIDs are telling you • Designing your test drive cycle • Analyzing for air related issues • Analyzing for fuel related issues • Analyzing for adaptive related issues



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Electronic Power Steering Operation - Diagnosis - Common Problems & Solutions	Peter David / Todd Ciccone / David Hirschhorn	CRP	Learn From the Experts that Rebuild, Diagnose, and Support Electronic Power Steering Systems Every Day <ul style="list-style-type: none"> • Electronic Steering Components, Operation, Diagnostics • Vehicle specific issues and fixes • Common Codes That Don't Work and Fixes • Vehicle Specific Issues and Fixes
Electronics 101 - Hands-On - Circuit & Waveform Analysis (8 Hours)	Bernie Thompson	WTI/CTI	REQUIRES YOU TO BRING SCOPE, LEADS, & AMP CLAMP <ul style="list-style-type: none"> • Intense hands on electrical system fundamentals • Understanding electrical system functions • Live test boards • See what your scope sees • Learn on YOUR equipments • Advanced engine simulator • Ignition waveforms • Manipulate faults on live boards
Digital Storage Oscilloscope Application & Testing	Blake Cassidy	WTI/CTI	Practical application of Digital Storage Oscilloscope (DSO) Techniques <ul style="list-style-type: none"> • Testing methods for major automotive systems <ul style="list-style-type: none"> ○ Fuel Systems ○ Ignition ○ Charging and Starting Systems ○ Engine Mechanical • Techniques for approaching each system • Testing methods using voltage, current, and inductive current
The Pressure is On - Transducer & Scope - Running Engine Live Demo	Bernie Thompson	WTI/CTI	Live in Class Running Engine Demo <ul style="list-style-type: none"> • In cylinder waveforms • Accurately diagnose mechanical issues without teardown • Understanding in cylinder transducer waveforms • Accurate diagnose valve sealing issues • Finding misfires • Find timing problems
Reprogramming with J2534 - Practical Set Up and Operation	Jerry Truglia	WTI/CTI	Using the J2534 box to reprogram vehicles in the aftermarket: <ul style="list-style-type: none"> • When to program and when NOT to program • How to prevent and recover module/computer failure • OE websites - Navigation, access, and pricing • Software compatibility and conflicts • How to look up (and find) the correct information • Battery Maintainers - The good, the bad, and the ugly • Installing J2534 Toolbox • Updating your J2534 software • Updating the firmware



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
P0300 and No Code Misfire Diagnosis - Tools & Techniques	Jerry Truglia	WTI/CTI	Misfire Diagnostics get it right the first time <ul style="list-style-type: none"> • P0300 DTC's - When is it not a misfire? • Strategies and diagnostic techniques • The tools you need <ul style="list-style-type: none"> ○ Standard testers ○ OE scan tools ○ Lab scopes ○ Pressure transducer diagnostics
Gasoline Direct Injection GDI Driveability and Diagnosis	Jerry Truglia	WTI/CTI	GDI - Components, operation, diagnostics, and repair <ul style="list-style-type: none"> • Scan Data Analytics • Fuel Trim Diagnostics • Carbon build up driveability symptoms, diagnostics and cleaning • Low pressure Fuel Pump • Direct Injection Fuel Pump • Lab Scope connection to the GDI injector • Tools and equipment • Injector removal processes • Injector seal replacement and installation • High pressure pump failures - Diagnostics and repair • PCV and breather system issues • Common failure case studies
Critical Thinking-Diagnostic Strategies - Logical Diagnostics	Jerry Truglia	WTI/CTI	Sharpen your diagnostic skills <ul style="list-style-type: none"> • Setting up a diagnostic game plan • Strategy based diagnostics and diagnostic routines • PCM strategies and Enabling Criteria • Batteries testing and coding and reprogramming • Parasitic draw • Voltage drop • Engine testing: <ul style="list-style-type: none"> ○ Relative compression ○ Gas analysis ○ Fuel flow testing ○ Fuel trim ○ Current ramping ○ PCM testing ○ Pressure transducers ○ Reprogramming ○ A new way to test EVAP



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Engine Mechanical Testing with Electronic Tools (8 Hours)	John Thornton	WTI/CTI	Want to beat flat rate without time consuming disassembly? <ul style="list-style-type: none"> • How to perform a quick Relative Compression Test without removing any spark plugs • Analyzing Pressure Transducer Cranking Vacuum Waveforms • In-cylinder Pressure Testing Waveform analysis • How to determine engine breathing issues • Intake and exhaust path restrictions • Identify cam timing problems quickly • BMW Valvetronic operation and unique testing strategies • Proper compression testing techniques on BMW Valvetronic equipped engines • How to apply the proper technique and capture waveforms to identify a problem
Mechanics of Waveform Analysis	Jorge Menchu	WTI/CTI	<ul style="list-style-type: none"> • Gain a Deeper Understanding of Circuit Analysis and Performance • Diodes, Transistors and Capacitors Effects on Waveforms • Coils, Pintles and Magnetic Fields Effects on Waveforms • Understanding How Electronics Affect a Waveform and How it Can Show the Circuit Elements • Case Studies in Waveform Analysis
Wiring Diagram Analysis - A Framework for Complex Testing & Diagnostics	Jorge Menchu	WTI/CTI	<ul style="list-style-type: none"> • Effective use of wiring diagrams with color coding • Electrical circuit basics and waveform effects • Waveform analysis • Really understand scope functions and operation
Steering System Technology and Diagnostics	Francisco Moreno	ZF	<ul style="list-style-type: none"> • Hydraulic and Electro-mechanical steering systems - Common failures, diagnostics, maintenance, and repair • Finding the cause of steering heaviness - It might not be a pump failure • Diagnosing steering system noise • Using a diagnostic tool to identify suspension misalignment • Sensors - Diagnostics, initialization and activation • Steering angles in active steering systems • Hydraulic flushing and bleeding
Advanced Diagnostic Strategies	Tanner Brandt	WTI/CTI	Build an Effective Diagnostic Routine - narrow down problems fast <ul style="list-style-type: none"> • Diagnostic routine building • Short cuts used by the best diagnostic technicians • Scan tool data selection • Scan tool data analysis • Tool technology to make your life easier • Oscilloscope quick tests



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Turbo Chargers 101	Tanner Brandt	WTI/CTI	<p>Dont Let a Turbocharged Vehicle Get The Best of You</p> <ul style="list-style-type: none"> • Turbocharger mechanical operation • Theory and operation - The science of how a turbo works • Turbocharger diagnostic strategies • Common failures and causes • Best maintenance practices to prevent failure
Pressure Waveform Aquisition and Analysis from the Inside Out	Brandon Steckler	WTI/CTI	<p>Technicians with a good understanding of labsopes and engine mechanical operation can learn to leverage the power of pressure transducers in their diagnostic routine by attending this course. Pressure waveform readings from the intake manifold, combustion chamber, and the exhaust stream can provide a wealth of information that can make difficult problems easy to find. Topics include:</p> <ul style="list-style-type: none"> • Absolute and delta transducers • Setup and data acquisition • Pressure testing and analysis • The diagnostic approach • Real-world examples
Import Mechanical & Variable Valve Timing	Bryan Perrin	Denso	<ul style="list-style-type: none"> • Scan Tool PID Analysis & Functions to eliminate the most common causes quickly • Strategies to quickly eliminate causes of timing problems • Differentiating mechanical & VVT failures • Diagnosing stretched/jumped timing without disassembly • Stuck actuators vs. stuck solenoid diagnostics • Diagnosing internal oiling faults from the outside • Hydraulic, Electronic & Magnetic Clutch VVT system operation & diagnostics
Advanced Circuit & Electrical Testing and Analysis	Kris Lewis	Denso	<ul style="list-style-type: none"> • Stop wasting time with unnecessary tests • How to determine tools and tests to use based on fault type • Answer key variables without a single circuit test • Classify the fault • Trace the current path, parallel paths, and enabling paths • Combine and compare results to quickly rule out & eliminate almost everything that can't be wrong with the circuit



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Advanced Drivability Diagnostic Strategies - VE - Fuel Trim - Misfire	Wally Mouradian	Denso	<ul style="list-style-type: none"> • Real-world tests to quickly isolate root cause for drivability and trouble code faults • Determine the most effective diagnostic path • Get better results using Scan Tools & test equipment you already own • Engine breathing tests, including Volumetric Efficiency, VE mapping & crankcase pressure • Engine fueling tests, including Fuel Trim, Rear Fuel Trim, and VE relationships • Simplified cylinder contribution & misfire detection strategies and root-cause analysis
Intermittent Electrical Diagnostics - Tools & Techniques	Rick Kelley	Denso	<ul style="list-style-type: none"> • Strategies to flush out intermittent codes and symptoms • Best tools and tests to isolate faults and validate repairs • Customer interrogation worksheets • Best practices for voltage measuring tools • Largely unused DVOM features & functions • Specific Scan Tool tips & tricks • Circuit isolation • Load Substitution Tools & Techniques • Tool limitations & shortfalls • Case studies to reinforce every concept
Leveraging the Lab Scope - Transducers - Current Probes - Engine Mechanical	Kris Lewis	Denso	<ul style="list-style-type: none"> • New tips and techniques to leverage the power of your Lab Scope • Measure circuit activity under actual operating conditions • Hand held & PC based Lab Scopes • Rarely used high side & ground voltage drop waveforms • Engine mechanical analysis using voltage & current waveforms • Detailed pressure/vacuum transducer diagnostics • Current probe testing strategies • Minimally-invasive circuit connection tools • The best test setup for the specific components
Scan Tools - Beyond the Flowchart - Scan Tool Data Analysis	Bryan Perrin	Denso	<ul style="list-style-type: none"> • Know how to efficiently use your scan tool • Create your own diagnostic path <ul style="list-style-type: none"> ◦ Fuel Trim code & parameter analysis ◦ Evaporative emissions system fault code diagnostics ◦ Oxygen and Air/Fuel sensor evaluation • Misfire code isolation techniques • EGR functional and flow codes assessment • Body & Chassis codes examination • Scan Tool No-Communication fault analysis



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Import Gasoline Direct Injection - Operation & Problem Solving	Kris Lewis	Denso	<ul style="list-style-type: none"> • A unique approach to rule out possible causes before parts come off • The shortest diagnostic paths from analysis of actual diagnostic struggles • GDI high level pressure & performance tests • Carbon deposit prevention methods • Best valve carbon removal tools/techniques • Excellent strategies for the process of elimination • Manufacturer-specific faults & tips • Shortcuts for validating sensors & actuators
Import Air Induction System Diagnosis - Electronic Throttle Control - Turbo Systems - Variable Intake Control	Wally Mouradian	Denso	<ul style="list-style-type: none"> • Practical, repeatable strategies for analyzing induction system functionality and creating a test plan • Never leave a stone unturned in your diagnostic process • Electronic throttle control operation and diagnostic • Traditional solenoid wastegate turbos • Motor actuator wastegates • Intake side boost bypass systems • Variable intake geometry • Variable intake tumble/swirl • Integrated crankcase breathing systems • Manufacturer-specific faults & tips
Import Evaporative Emissions Leak, Flow & Function Testing	Eric Walker	Denso	<ul style="list-style-type: none"> • A faster, layered approach to EVAP System diagnosis • Profitable diagnosis without wasted (and unbillable) diagnostic time • Universal techniques that apply to every system <ul style="list-style-type: none"> ○ Traditional & Split Purge/Seal Systems ○ Leak Detection Pumps (KOER & Key-OFF) ○ Natural Vacuum (EONV, NVLD, ESIM) • DMTL - Diagnostic Module for Tank Leakage (comparative current flow) • Manufacturer and system-specific tips and tricks for when you need them • Case studies to demonstrate effectiveness of our approach



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Vehicle Network Diagnostic Strategies - CAN LIN MOST Flexray - Operation & Diagnostics	Eric Walker	Denso	<ul style="list-style-type: none"> • A flexible diagnostic plan that adapts to the nature of the fault and the tools you already have • Tackle High Level Indicators first, to quickly eliminate most likely causes • Define fault type, determine network configuration and expected test values • High level Indicator tables for communication faults, network codes, and symptoms • Isolating communication faults the easy way • Identifying Protocols & Gateways • Finding the easiest access points • Network isolation, bypass, and other techniques • Lab Scope & Scan Tool case studies • Controller Area Networks & LIN • High speed MOST & FlexRay protocols • Manufacturer-specific protocols such as ISO 9141, KWP, SCI, SCP, Class 2, BEAN, AVC-LAN, & more • Case studies that include unexpected system and component interactions
Failed Emissions Test Analysis - Tailpipe No Code Diagnostics	Bryan Perrin	Denso	<ul style="list-style-type: none"> • Lambda or Air/Fuel ratio calculations to create a focused diagnostic path for failed emissions test diagnosis • Using 5 gas analysis to increase diagnostic accuracy • A repeatable process to get a vehicles into fuel control, before worrying about the effectiveness of emissions systems • Possible cause lists, tests and shortcuts for HC, CO and NOX faults • Real world diagnostics using cases from failed California emissions tests
Catalytic Converter Diagnostics - P0420 Tools and Techniques	Kris Lewis	Denso	<ul style="list-style-type: none"> • Catalytic Converter diagnostic strategies similar to the vehicle test • Functionality tests that are more accurate and take less time • Why the old Cat failed and sell a complete repair • Engine breathing tests • Fuel Trim analysis • O2 & air/fuel sensor testing and comparison • Cylinder imbalance faults • 5-gas Lambda calculations • Finding exhaust leaks • Manual & automated oxygen storage capacity testing options



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Vibration Analysis - Tools, Techniques and Tricks	Gary Machiros	WTI/CTI	Systematically Diagnose and Correct Noise, Vibration and Harshness (NVH) concerns <ul style="list-style-type: none"> • Specific vehicle tests used to troubleshoot NVH complaints • Isolate problems to certain component groups: <ul style="list-style-type: none"> ○ Tire and wheel ○ Driveline ○ Engine ○ Torque converter • Hands-on pinpoint tests with worksheets and instructor oversight • Using a vibration analyzer
Advanced Lab Scope Diagnostics Part 1	Scot Manna / Matt Fanslow	WTI/CTI	Multi-trace Lab Scopes - Testing Strategies, Part One <ul style="list-style-type: none"> • Capabilities and limitations of lab scopes • Picking the right scope setting for the desired test • Using vacuum and pressure transducers • Advanced trigger settings • Using math channels • Manipulating the waveform buffer • Graphing various control signals vs. looking at raw signals • Well-documented case studies
Advanced Lab Scope Diagnostics Part 2	Scot Manna / Matt Fanslow	WTI/CTI	Multi-trace Lab Scopes - Testing Strategies, Part Two <ul style="list-style-type: none"> • Capabilities and limitations of lab scopes • Picking the right scope setting for the desired test • Using vacuum and pressure transducers • Advanced trigger settings • Using math channels • Manipulating the waveform buffer • Graphing various control signals vs. looking at raw signals • Well-documented case studies
ADAS Diagnosing & Servicing - ADAS Systems Overview - Equipment	TBD	Bosch	Are you and your shop prepared to service ADAS systems? <ul style="list-style-type: none"> • Operational design, function and components involved in Drivers Assistance Systems: <ul style="list-style-type: none"> ○ Lane Departure Warning ○ Night Vision System ○ Lane change assist ○ Adaptive Cruise Control • Special Service Tools Sensor replacement tools needed • Drive Assistance Calibration Types of different aligning systems • The SAE ADAS levels



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Essential Skills for Vehicle Actuator Diagnostics	TBD	Bosch	<p>Has the diagnostic flow chart has pointed you in the right direction?</p> <ul style="list-style-type: none"> • Get the most out of your diagnostic tools • Electrical circuit analysis for common actuators • Review of fuel pumps, ignition coils, injectors, and solenoids • How to create a baseline for circuit diagnosis and validation • Develop a diagnostic plan after researching the issue
Essential Skills for Vehicle Sensor Diagnostics	TBD	Bosch	<p>Beyond the Flow Chart - A solid process for diagnostic validation</p> <ul style="list-style-type: none"> • Electrical circuit analysis for common sensors • 2-wire, 3-wire, multi-wire, and networked sensors • Create a baseline for circuit diagnosis and validation • Develop a diagnostic plan after researching the issue • Get the most out of your diagnostic tools
Unlock the Power of Global OBD2 for European Vehicles	TBD	Bosch	<p>Unlock the Power of Global OBD2 for European Vehicles</p> <ul style="list-style-type: none"> • The ten global OBD2 modes • Mode \$01 data parameters • Freeze Frame Data - The power of Mode \$02 • What is Mode \$06 • DTC set criteria • Using Short Term and Long Term Fuel Trim as a diagnostic baseline and repair verification tool • Differences between generic scan tools
Bosch Essential Skills for Electrical Diagnostics	TBD	Bosch	<p>Where is the power really coming from?</p> <ul style="list-style-type: none"> • Applying electrical theory in real-world situations • Series circuit diagnosis for pumps, motors and lighting circuits • Series and Parallel Circuits - Identifying and diagnosing • Why you need understand the type of circuit for proper diagnosis • How to check the power and ground side of any circuit • Voltage drop is your best friend
EURO Evaporative Emission Diagnostics	TBD	Bosch	<p>Prevent costly misdiagnosis in European EVAP systems</p> <ul style="list-style-type: none"> • Operational design, function and components used in European EVAP systems: <ul style="list-style-type: none"> ○ Leak Detection Pump Systems (LDP) ○ Diagnostic Module Tank Leakage (DM-TL) ○ Natural Vacuum Leak Detection Systems (NVLD) • Fault code analysis • Diagnostic techniques to locate and identify leaks



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Bosch Oxygen Sensor Diagnostics	TBD	Bosch	<ul style="list-style-type: none"> • Oxygen sensor design & theory • Oxygen sensor construction • Air Fuel Ratio • Wide Band Sensor Overview • Sensor Diagnostics with Scan Tool & Lab Scope • Diagnostic Strategies
Advanced Fuel Systems including Gas Direct Injection	Ken Zanders	Delphi	<ul style="list-style-type: none"> • Direct Injection fuel system strategy analysis • Use of modular reservoir assemblies in today's fuel systems • Diagnose fuel system faults on modern fuel systems • Test procedures for high pressure fuel systems • Service bulletins and factory updates
Diagnosing & Repairing Fuel Trim / Fuel Control Systems	Mark DeKoster	Delphi	<ul style="list-style-type: none"> • Use fuel trim data to diagnose drivability problems • Mode 6 data that can be used to aid in difficult situations • Provide a method to verify repair using data available at the tips of your fingers • Learn what effect sensor inputs can have on fuel control and strategy
Mode \$06 Data and Drive Cycle Diagnostics	Mark DeKoster	Delphi	<ul style="list-style-type: none"> • Use of Mode 6 data to advise vehicle owners of potential future failure items • How to prevent a come backs using Mode 6 data • How to find misfires that may not currently be present
Good C.O.P. / Bad C.O.P. - Advanced Ignition Diagnostics	Ken Zanders	Delphi	<p>Don't let Coil On Plug ignition systems get the best of you!</p> <ul style="list-style-type: none"> • 2, 3, and 4 wire Coil on plug system diagnoses • Bench testing and meter usage, what can we still do? • Oscilloscope ignition waveform analysis • C.O.P. feedback circuits and how they can be used to your benefit • Ignition related misfire diagnosis
Mastering the Variables of Variable Displacement Engines	Dave Hobbs	Delphi	<p>Can you diagnose and repair Variable Displacement engines with confidence?</p> <ul style="list-style-type: none"> • Gain an understanding of today's variable displacement engines • Manufacturers covered will be GM AFM, Chrysler MDS & Honda VCM • Overview of GM Dynamic Fuel Management system • Problems faced in the bay when servicing these systems • How to easily test and diagnose these systems in the bay • Common failures



DIAGNOSTICS

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Controller Area Networks (CAN) and Multiplexing	Ken Zanders	Delphi	<ul style="list-style-type: none"> • Troubleshoot U codes & power mode masters • Use of meters and sicoes to diagnose communication faults • Factory and aftermarket scan tool usage for diagnostics of CAN systems • Case studies of CAN system failures and fixes
Essentials in Electrical Circuits - Hands On	Hobbs & Almanzan	Delphi	<ul style="list-style-type: none"> • Parasitic Draw testing tips and techniques • Master multimeter functions to speed up your diagnostic process • Electronic testing of relays and solid state components • Case studies of electrical system failure and repair
Radar Ready! Diagnosing Advanced Driver Assistance Systems	Dave Hobbs	Delphi	<ul style="list-style-type: none"> • Overview of Lane Keep Assist, Lane Departure Warning, Blind Spot Monitor & Adaptive Cruise • Cover hardware being used, Radar, LIDAR, smart cameras and ultrasonic sensors • Camera/Sensor aiming equipment • Windshield and paint concerns/problems • ABS, electronic throttle and steering interactions to be aware of • Static and dynamic camera and radar sensor calibration requirements, tips and tricks • The do's and don'ts of ADAS calibrations • Diagnostic tool data interpretations and what the numbers mean
Diagnostic Strategies - From a Mobile Tech - Case Studies	John Rogers	WTI/CTI	
Diagnostics Tools & Techniques	John Rogers	WTI/CTI	



PORSCHE

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Porsche Panamera Type 970	Caleb Pancheco	Autologic	<ul style="list-style-type: none"> • Review of the Panamera (970) Model • Mechanical and Electrical Overviews • Network Overview • Autologic Functions and Routines
Porsche 911 Type 991	Caleb Pancheco	Autologic	<ul style="list-style-type: none"> • Review of the 911 (991) Models • Overview of Forced Induction Engines (991.2) • Engine Management System Overview • Running Gear and Body Changes
Porsche PDK Transmission in Operation, Diagnostic and Overhaul	Niel Speetjens	ZF	<ul style="list-style-type: none"> • Porsche PDK Transmission - Common failures • Disassembly and assembly • Double clutch - Operation and diagnostics • Limp Home function and coding issues • The shifting matrix, and why it's important for diagnostics • Torque flow for all gears • Mechatronic function • Transmission adaptation • Oil and filter service procedures • Special tools
Porsche Engine Management	Tony Callas / Joe Finger	WTI/CTI	
Porsche Factory Scan Tool - PIWIS 2	Tony Callas / Joe Finger	WTI/CTI	
Porsche Macan Complete Vehicle	Tony Callas / Joe Finger	WTI/CTI	



VOLVO

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Volvo Online Programming and Coding Services - VIDA	Allen Osborne	WTI/CTI	
Volvo "Light Hybrid"	Allen Osborne	WTI/CTI	



JAGUAR & LAND ROVER

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Jaguar & Land Rover 5.0 Liter Engine (live demonstration)	Kelly Conklin	Autologic	<ul style="list-style-type: none"> • Live demo covering major engine issues • High pressure fuel pumps • Cam timing and how to set up and check the engine • Components overview
Jaguar New Launch Models and Technology	Steven White	Autologic	
Jaguar & Land Rover Security and New Body Systems	Steven White	Autologic	
Land Rover Suspension Diagnosis	Duncan Jarvis	Autologic	
Land Rover Diagnostic Procedures and Common Faults	Duncan Jarvis	Autologic	
Land Rover Network and Communications	Duncan Jarvis	Autologic	



VOLKSWAGEN & AUDI

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
VW & Audi 2.0L Engine - Evolution of the EA888	Cameron Conover	WTI/CTI	<ul style="list-style-type: none"> • Known Mechanical Faults and Repair <ul style="list-style-type: none"> ○ Camshaft Bridge Issues on 4-Cyl. Engines ○ Critical VW and Audi Part Supercessions ○ Best Practices - Carbon Deposit Cleaning Methods. What Tools Work Best ○ Timing Chain Tensioner Issues and Repair Techniques for CCTA (2.0 L) Engine • Engine Management <ul style="list-style-type: none"> ○ Direct Injection Fuel System Operation and Evolution ○ Turbocharger - Diagnosis and Effective Fixes for Boost DTCs ○ Audi Valvelift System Operation, Common DTCs and Repairs ○ Variable Camshaft Timing Design and Function ○ VCDS and Scan Tool Navigation and Use, including How and When to Adapt Individual Components • EVAP and Exhaust Emissions - Components, Operation, Diagnosis, Repair • Cooling Systems Repair Tips, Tools
VW & Audi True V Engines	Cameron Conover	WTI/CTI	<ul style="list-style-type: none"> • 3.0L V6, 4.2L V8, 4.0L Twin Turbo V8, 5.0L V10 Engines • Fuel System components & operation • Engine oil systems and Volumetric Flow Control • Map Controlled Thermostat • Common oil leaks and repairs • Crankcase breather issues • Gear operated accessory drive • Vacuum Actuated Coolant valve • Cylinder Deactivation methods
VW & Audi Offboard Diagnostic Information System (ODIS) - Coding and Diagnostics	Craig Shippy	Autologic	<ul style="list-style-type: none"> • Vehicle Diagnostics • Engine Control Unit replacement • Control Unit Updating and Coding • Component Protection Removal • Key Programing • Component Protection Removal • Remote Programing



VOLKSWAGEN & AUDI

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Volkswagen & Audi 6 speed DSG Transmission (02E DQ250) Operation and Diagnostics	Niel Speetjens	ZF	<ul style="list-style-type: none"> • Volkswagen DSG Transmission - Common failures and diagnostics • Mechatronic operation • Double clutch fundamentals • DSG shifting matrix, shifting elements, and torque flow • Identify transmission faults, such as burned clutch or hydraulic pressure loss • Pressure regulators and solenoids • Internal shift and external transmission faults, including dual mass flywheel faults • Limp home function and coding issues • Adaptation using a general diagnostic tool • Oil change service done right
Volkswagen & Audi 6 speed DSG Transmission (02E DQ250) Overhaul	Niel Speetjens	ZF	<ul style="list-style-type: none"> • Volkswagen/Audi 6 speed DSG transmission - Common failures and repairs, including hands-on exercises • Disassemble and assemble the right way • Identify and repair mechanical faults • Mechatronic - Fundamentals, disassembly, and assembly • Double clutch function • Open snap rings and handle transmission components correctly • Special Tools • Oil change service procedures
Volkswagen Chassis Dynamics	Niel Speetjens	ZF	<ul style="list-style-type: none"> • Chassis dynamics and Kamm's Circle • McPherson and Multi-link suspension systems - Common failures and repair • Chassis angles, angle settings • Toe in curve, wheel alignment • Electro-mechanical steering systems - Common failures, diagnosing and servicing • Radar and Camera systems - Function and basic settings • Lemfoerder and TRW chassis systems for Volkswagen and Audi
VW & Audi Diagnosis Procedures and Common Faults	Damon Howes	Autologic	
VW & Audi New Launch Models and Technology	Damon Howes	Autologic	
VW & Audi Body Electronics	Chris Martino	Autologic	
VW & Audi Bus Systems	Chris Martino	Autologic	
VW & Audi Coding and Programming	Craig Shippy	Autologic	



MERCEDES-BENZ

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
MBZ Automotive Electronics and Introduction to 48 Volt Systems	Ian Lebby	WTI/CTI	<ul style="list-style-type: none"> • Introduction to chassis FlexRay a serial, deterministic and error tolerant bus system that utilizes Time Division Multiple Access, diagnosis and troubleshooting the bus. • CAN & Networking, Data Frames, D2B, MOST, LIN, Flex Ray, Ethernet, breaking down the frames to bit levels. • Protons and Electrons, principals and how they create semiconductors used in modern day electronics • Electrical circuits, wire identification, color codes and correct wire repair procedures, identification and diagnosis utilizing ohms law. Parallel, series circuit calculation and voltage drop calculation methods. • Digital Multimeter measurements and the importance of understanding and verifying the units involved in any measurement or specification, understanding, m (milli), (micro), n (nano), p (pico), k (kilo), M (mega), G (Giga), T (Tera) • Repairing SRS connectors to factory specifications, using the correct procedures when soldering and verification of the repair. • Dual battery systems, function and overview of multiple different dual battery systems, auxiliary , system, direct select and eco stop/start batteries, charging and jump starting correctly.
MBZ Body Systems 4	Ian Lebby	WTI/CTI	<ul style="list-style-type: none"> • MAGIC BODY CONTROL with Active, a foresighted suspension system that registers a road surface scan in front of the vehicle by utilizing stereo camera that Compensates for detected surface undulations, (Active Body Control), common issues. • Introduction to deep discharge protection system introduced as of model series 213 and how no-load currents perform hardware resets • Introduction to chassis FlexRay a serial, deterministic and error tolerant bus system that utilizes Time Division Multiple Access, diagnosis and troubleshooting the bus. • CAN & Networking, Data Frames, D2B, MOST, LIN, Flexray, Ethernet, breaking down the frames to bit levels. • Telematics generation 5.5 with Multifunction touchpad with controller and Introduction to Car-to-X communication



MERCEDES-BENZ

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
MBZ Intelligent Drive and Assist Systems	Ian Lebby	WTI/CTI	<p>How the new driver assistance systems assist the driver in various driving situations by utilizing System-piloted driving safety systems such as:</p> <ul style="list-style-type: none"> • Blind Spot Assist • Active Lane Keeping Assist • DISTRONIC Distance-Pilot with Steering-Pilot • Active Lane Keeping Assist • Active Blind Spot Assist • Active Brake Assist with cross-traffic function • Speed Limit Assist • Evasive Steering Assist • Driving Assistance Package Plus • Park-Pilot and 360 camera
MBZ Engines 4	Johann Chua	WTI/CTI	<ul style="list-style-type: none"> • Introduction to new engine family, with the model designations M 276 for the V6 engine and M 278 for the V8 engine, M270, M274, all high-power engines successfully combining exclusive performance and demanding fuel consumption goals • How a homogeneous combustible air/fuel mixture plug (=1) is produced & stratified operation at the spark plug • Introduction to M 276 and M 278 new 2-stage chain drive system with three gear chains compact design and reducing the crash-relevant height, how to check/set engine timing • Low and high-pressure fuel systems, direct injection system using non-return high-pressure supply with two separate rails. Function of the high pressure pump in engine M 276 and two in engine M 278, pup failures. Direct Injection, injector replacement procedures. • Ignition system and the use of multiple sparks per ignition cycle instead of just one, multi - spark ignition. • Introduction to the crossflow cooling system and electronically controlled thermostat via a map-controlled warm-up process and rotary ball valve water pump with volumetric flow rates. • ECO start/stop function • Charge air system M278 diagnosis and troubleshooting • Introduction to AMG 4.0 liter V8 bi-turbo engine M177 • CAMTRONIC cylinder shut off, M177, how intake and exhaust camshafts can be shifted axially via a shift gate for cylinder shut off.



MERCEDES-BENZ

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
MBZ Steering & Suspension System Diagnosis & Repair	Johann Chua	WTI/CTI	<ul style="list-style-type: none"> Steering Systems, operation & Common Problems Servolectric Steering System, overview & Common Problems Shock Absorbers, common problems Mercedes Active Body control (ABC & ABC 2), MAGIC Suspension Active Curve System (ACS) - W166 Mercedes-Benz Airmatic Systems, Common Problems & repair Lateral dynamics Principle design of suspension systems Vehicle Assist & Adaptaptive systems, overview Mercedes-Benz Composite Brake disc (Introduced on 222 S-class)
MBZ High Voltage Awareness, Hybrid & Plug-in HYBRID	Johann Chua	WTI/CTI	<ul style="list-style-type: none"> Mercedes-Benz High Voltage Awareness, Hybrid & Plug-in HYBRID The principles and goals of Hybrid vehicles The two types of parallel hybrid drivetrain and their advantages and disadvantages Introduction to the P2 Hybrid Drive and its characteristics P2 functions, sub-functions and operation strategy Networking and interoperation Safety and qualification types The principles of the Series Hybrid drivetrain Advantages of the Series Hybrid / Parallel Hybrid Series Hybrid / Parallel Hybrid system components Advantages of the Power-Split Hybrid Operation of the two-mode transmission Function, Diagnosis & Repair of Hybrid & Plug-in HYBRID



MERCEDES-BENZ

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
MBZ Sprinter - Complete Vehicle Systems	Nathan Canson	WTI/CTI	<ul style="list-style-type: none"> • History and Evolution of the Mercedes-Benz Sprinter, Dodge and Freightliner, product offerings and identification, knowing what you are working on. • Chassis Electrics, Power supply and correct jump start procedures, battery cutoff relay, CAN (Control Area Network), Auxiliary Electrical Consumer Terminal Strip usage, diagnosis and repair. • 903 and 906 on the job pictures, diagnosis and repair procedures. Common problems covered in detail for fuel system, DPF and SCR. • Function and replacement of Front Signal Acquisition / Actuation Module, Body Builder Electrical Connectors, Fuse and Relay Block, what electrical components are under Drivers Seat Pedestal? Sliding door failures and repairs. • Engine CAN and SCR Voltage Distributor (CAN C or M CAN), High speed networks require termination resistors, correct resistance and how to recognize failure. LIN Local Interconnect Network overview. • Parameterizable Special Module (PSM), Also known as Programmable special module, how it receives and transmits CAN data for input / output control of customer specific functions. • Engine Design and Operation, OM642.898 Overview, Common rail direct injection CDI 6 with up to 5 injections per cycle overview, Instant start glow system (ISS) function and repair. • Fuel System Operation and Diagnostics, emphasis on Low and High Pressure Fuel Systems, leakage repair kit installation and high pressure pump failures / identification. Pressure Regulator Valve (Y74/6) show and tell failures. • Frequent Drivetrain Codes, Diagnosis and Solutions • Maintenance and Service • Exhaust System and Exhaust After Treatment, DEF (Diesel Exhaust Fluid), SCR catalyst, Electronic controllers, Sensors, Heating elements, Dosing valve, DEF tank diagnosis and repair • Scan Tool Use DRBIII, Star Tester & Farsight coding using Drew Tec Pass through. • Sprinter Common Failures and Solutions open discussion.



MERCEDES-BENZ

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
MBZ Automatic Transmission (722.6 & 722.9) Operation & Repair - Live Demo	Nathan Canson	WTI/CTI	<ul style="list-style-type: none"> • 722.9 Modified Oil Container and Oil Change procedure • Hands-on disassemble & assemble of 722.9 • Electrohydraulic Control Module, solenoid replacement procedure • DIRECT SELECT module (DSM), common problems • Fuel Economy (FE) torque converter • Introduction of Auxiliary oil pump (ZP) • Procedure for customer complaints & repair • Comfort-related complaints in torque converter
MBZ Automatic Transmission (7G-DCT 724.0) Operation & Repair - Live Demo	Nathan Canson	WTI/CTI	<ul style="list-style-type: none"> • 7G-DCT overview • Disassembly & assembly of 7G-DCT • Rear axle assembly from all-wheel drive models • Use of special tools • Understanding the components in the 7G-DCT • Identifying transmission versions / axle component locations and functions • Practical experience activities / diagnosis
MBZ Automatic Transmission (9G-TRONIC 725.0) Operation & Repair - Live Demo	Nathan Canson	WTI/CTI	<ul style="list-style-type: none"> • The new 9-Speed Automatic Transmission (725.0) • Fuel Economy (FE) torque converter • System components • Power transmission power flow / Oil supply • Valve body components / Transmission control module
MBZ Windshield, Repair and Replacement Procedures, Camera Calibrations, in class demo	Johann Chua	WTI/CTI	
Mercedes Diagnostic Strategies	Stephen Jones	Autologic	
MBZ New Model Introduction	Ian Lebby	WTI/CTI	



BMW & MINI

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
BMW Driveability Diagnostics Part 1	Scot Manna	WTI/CTI	Improve your BMW Diagnostic Strategy <ul style="list-style-type: none"> • Case studies illustrate diagnostic processes • Diagnose issues with R56 Rev Limit • ISTA test plan diagnostics • Logical diagnostic strategies • Where to start on an emission failure • How to diagnose turbo faults • Elusive No-Crank
BMW Driveability Diagnostics Part 2	Scot Manna	WTI/CTI	Improve your BMW Diagnostic Strategy <ul style="list-style-type: none"> • Case studies illustrate diagnostic processes • Diagnose issues with R56 Rev Limit • ISTA test plan diagnostics • Logical diagnostic strategies • Where to start on an emission failure • How to diagnose turbo faults • Elusive No-Crank
BMW Fuel Management Systems	Luke Murray	WTI/CTI	<ul style="list-style-type: none"> • Low Pressure Fuel Supply - Components & Operation • High Pressure Pumps • Direct Injection Strategies • Fuel Tank Ventilation - EVAP Diagnostics • Common Failures and Diagnostic Routines
BMW Air Management Systems	Luke Murray	WTI/CTI	<ul style="list-style-type: none"> • Valvetronic Evolution • VANOS Systems • Crankcase Ventilation • Common Failures and Diagnostic Routines
BMW Turbo Technology	Luke Murray	WTI/CTI	<ul style="list-style-type: none"> • Various turbo designs used by BMW • Diagnostic routine for boost related fault codes • Electric and mechanical wastegate operation • Implementation of Valvetronic into the turbo engine • Direct and indirect intercooler systems
BMW New Engine Technology - 6 & 8 Cylinder Engines	Luke Murray	WTI/CTI	<ul style="list-style-type: none"> • Newest 6 & 8 Cylinders Engine Technology • B58 6 Cylinder Engine - Design, Function and Common Service Issues • N63TU2 8-cylinder Engine - Design, Function and Common Issues • Mechanical and Electrical System Changes, Updates and Improvements • Newest Crankcase Ventilation Technology • BMW's modular design - Functions and Overview



BMW & MINI

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
BMW & MINI Bus Systems	Eric Scharping	Autologic	<ul style="list-style-type: none"> Identify the different Bus System Architectures used on BMW and MINI vehicles: <ul style="list-style-type: none"> Single wire (K protocol, LIN and BSD) Two wire (High and Low speed CAN protocol, Flexray) Optical (MOST and Byteflight) Ethernet protocol Scan Tool no communication - where do you start? A systematic diagnostic approach/routine for each of the systems. Differentiating the symptoms between module failure and harness defects Bus system waveform analysis and diagnostic procedures demonstrated Essential diagnostic tools
BMW Active Hybrid Vehicles	Eric Scharping	Autologic	<ul style="list-style-type: none"> F Chassis hybrid vehicles F01, F10, F30 Principles of Hybrid technology and safe work practices Powertrain components E Machine High and low voltage systems Electric climate control systems Hybrid braking system - Components & Operation
BMW & MINI Plug In Hybrids	Drew Wolfe	WTI/CTI	<ul style="list-style-type: none"> PHEV High Voltage Introduction Plug In Hybrid Components Safety Standards of Shutting Down HV Systems HV Battery Unit overview and Cell structure Programming Dos and Don'ts of PHEV Parallel Hybrid system Setup
BMW & MINI Passive Safety Systems	Drew Wolfe	WTI/CTI	<ul style="list-style-type: none"> Construction Materials - Crumple Zones Pedestrian Protection Airbag Systems SOS & Telematics OC3 and CSI Seat Mats Sensors Rollover Protection Head Restraints
BMW & MINI 3 and 4 Cylinder "B" Engines	Drew Wolfe	WTI/CTI	<ul style="list-style-type: none"> New B Engine Module Designs Low and High Pressure Fuel Supply and Direct Injection Overview and Repair Tips New VANOS Design for BMW/Mini Valvetronic Overview with Compression Test Do's and Dont's New Design MAP Controlled Oil Pump with Vacuum Pump Integration Common Issues and Repairs



BMW & MINI

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
BMW & MINI Driver Assistance Systems (ADAS)	Paul Rubert	WTI/CTI	<ul style="list-style-type: none"> • Heads Up Display • Stop & Go Cruise Control • Pedestrian Warning • Collision Avoidance • Lane Departure Warning • TPMS
BMW & MINI Climate Control	Paul Rubert	WTI/CTI	<ul style="list-style-type: none"> • Multi Zone Automatic Temperature Control • Rear Air Condition (FKA) • Variable Displacement Compressor • Coolant Temp Control vs Air Temp Control • Service Functions and Scan Tool Diagnosis • 1234YF Systems and Changes
BMW & MINI J2534 Pass Thru	Nelson Vargas	Autologic	<ul style="list-style-type: none"> • Subscription setup and cost • PC settings and minimum hardware requirements • Connectivity requirements • ISTA abilities and limitations • Installing BMW ISTA • ISTA/P first start up • Vehicle requirements before programming • Programming with J2534 • Technical support
BMW Central Body Electronics	Brian Chaffe	Autologic	<ul style="list-style-type: none"> • Central Locking Systems • Driveway Protection and Lighting • Sunroof and Convertible Top Systems • Wipe Wash Systems
BMW Digital Services - Infotainment	Brian Chaffe	Autologic	<ul style="list-style-type: none"> • Head Units and Drive systems • Radio Reception • Audio and Speaker Systems • Compressed Music • Communication Systems • BMW Connect Drive • Navigation Systems
BMW Driver Assistance Systems (ADAS)	Brian Chaffe	Autologic	<ul style="list-style-type: none"> • Speed Control Systems • Comfort Based Systems • Collision Prevention Systems • Parking Systems



BMW & MINI

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
BMW Diesel Engines	Simon Tyrell	Autologic	<ul style="list-style-type: none"> • BMW Fuel systems Overview of pre supply and high-pressure fuel systems. Highlighting the differences between the older M47/57 engines through to the latest B-series diesel engines with DDE8. Common faults and testing methods. • Camshaft and crankshaft sensor operation and synchronization. • Engine electrical systems common faults • Exhaust gas treatment Diesel emissions, particulate filters, and SCR 2/3. Common faults. • Intake air and exhaust systems Overview of high and low pressure EGR systems, intake manifold design and swirl flaps, throttle valves and HFM airmass meters will be covered. The difference between DDE6/7 airmass meter (HFM6/7) and DDE 8 (HFM8) will be covered. This section will also include an overview of single and multistage turbo charging as used on the M57/N47tu/ N57tu engines through to the latest B57 diesel engine. Common faults associated with the intake air and exhaust system. • Pre heating systems Overview of glow plug types. Additional systems added in the later B-series engines and common faults and testing methods.
BMW & MINI Online Information and Diagnostic Services - ISTA	Drew Wolfe	WTI/CTI	
BMW & MINI Online Programming and Coding Services - ISTA	Drew Wolfe	WTI/CTI	
BMW Networks and Communication	Simon Tyrell	Autologic	



BUSINESS & MANAGEMENT

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
10 Steps to Make Your Shop Self-sufficient to Give You the Freedom You Need	Keith Benline	WTI/CTI	<p>10 Steps to Make your Shop Self-sufficient to Give you the Freedom you need</p> <ul style="list-style-type: none"> • Proper procedures, people and culture = self-sufficiency • How you can lose the battle but win the war • Understand the power of todays customer • How to master your customer's wants • Ways to put the customer at ease • Preventing future complaints
The Inspiring Leader Building a Success Culture	Cecil Bullard	WTI/CTI	<p>Leadership is essential to motivating and managing people. What you do and say matters and sends clear messages to your staff.</p> <ul style="list-style-type: none"> • Creating a Success Culture • The 6 Stages of Leadership • The 4 Stages of Building Trust • Understand Others • Supporting Your Team • 6 Ways to Show You Care • Improving Communication • Avoiding Blame While Removing Excuses
Things Ive Learned about Management Getting Staff to do the Job	Cecil Bullard	WTI/CTI	<p>Getting your staff focused and excited to achieve their goals.</p> <ul style="list-style-type: none"> • Fostering the Best Culture • Leadership is Essential • They are ALWAYS Watching, so do the Right Things • Working Hard is not Necessarily Working Smart • What Equals Success, KPIs and Indicators • No Excuses No Blame • You Cannot Make Everyone Happy So • You Dont Always Win • Mistakes are not Pattern Failures • You Dont Know What you Dont Know
Make Selling Easy - Rigging the Game	Cecil Bullard	WTI/CTI	<p>Success in selling is about helping the client to like you and understand the value of what you have to offer. Real salespeople know how to improve the odds that the client will buy.</p> <ul style="list-style-type: none"> • Your Value Proposition - Positioning Yourself and Your Product • The 8 Keys to Getting to Yes • Helping the Client to say YES • 30+ Ways to Improve Your Odds • Creating Value for Your Client • Gaining and Keeping Control • The Art of Redirecting • How to Help the Client Feel Heard



BUSINESS & MANAGEMENT

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
Diagnosing and Repairing Your Business Finding and Fixing your Biggest Problems	Cecil Bullard	WTI/CTI	<p>Where are your biggest opportunities and biggest problems? More profit is made with the pencil than by your hard work.</p> <ul style="list-style-type: none"> • 6 Keys to Financial Success • Gross Profit Margins and Gross Profit Dollars • How Your Business Earns Profit • 8 Formulas You Need to Know • Management Numbers vs Accounting Numbers • What Your Profit and Loss is Telling You • How to Determine Where to Spend Your Time and Money for Best Results
Creating the Most Value in Your Business Your End Game	Cecil Bullard	WTI/CTI	<p>If I just fix enough cars I will make a profit. Why this statement is false and how to win the Game. Many business owners are working too hard and earning too little while their children grow up and they grow old.</p> <ul style="list-style-type: none"> • Gaining Control - Dont let the business control you • 8 Ways to Create Value in Your Business • Defining and Knowing Your End Game • How to Get the Team Engaged and on Task • 7 Keys to Getting What You Want
Increasing Car Count - Attracting More of the Right Customers to Your Business	Cecil Bullard	WTI/CTI	<p>Bringing in the wrong customers is painful and, in most cases, not very profitable. Having enough of the right customers in your shop every day could change your results, and your life.</p> <ul style="list-style-type: none"> • What successful shops are doing to attract the right customers • Defining What You Are • 10+ Successful Ways to Tell Your Story • Defining your Best Customers • Matching Customers to Product • Paretos Law and How it Applies • Your Unique Selling Proposition • Why Your Why is Extremely Important • The 7 Marketing Things You MUST DO today
Getting to YES! With Confidence	Rick White	WTI/CTI	<p>A day in a Service Advisor's shoes: How to be successful in an environment of problems, price shoppers and constant interruptions</p> <ul style="list-style-type: none"> • Arm yourself with tools to help ensure success during each and every sales situation • Proven methods to deal with customers who want the price first • Effectively handling walk-in customers • Working well with company stakeholders - technicians, service writers, managers, owners • Managing the constantly nagging phone • Learn how to be a winning Service Advisor from the key in the lock in the morning to closing the doors at night



BUSINESS & MANAGEMENT

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
How to Become a Talent Magnet	Rick White	WTI/CTI	Strategies to turn your shop into a talent magnet <ul style="list-style-type: none"> • The hiring mistakes you're making right now • What the best people want and need • How to stop chasing talent, and start attracting it • Find quality help in a shrinking talent pool • Keep the talent you've already invested in
Coaching & Counseling for Employee Success	Rick White	WTI/CTI	Get the most out of your team by coaching your employees to raise their performance levels <ul style="list-style-type: none"> • Learn to improve your ability to coach • Close the gap between what you have and what you need • Challenge your best performers to a greater level of success • Integrate coaching seamlessly into your daily interactions • Develop the skills to assess and maximize your employees individual effectiveness
Conflict in The Shop - Can't We Just All Just Get Along?	Rick White	WTI/CTI	Differences can be a positive force, if you know how to harness them <ul style="list-style-type: none"> • Identify your own strengths and weaknesses • Select and use productive communication strategies • Develop self-awareness and find your relationship style • Master the winning tactics to work in harmony with your team • Work in balance with your counterparts to achieve your goals • Eliminate potential tensions between Service Advisors and Technicians
Leadership: Letting Go of the Old Ways	Keith Benline	WTI/CTI	
Turn Online Reviews into Goldmines!	Keith Benline	WTI/CTI	
10 Things I Learned Going Backwards - Avoiding Perilous Mistakes	Keith Benline	WTI/CTI	
Advanced Closing Strategies for Selling Diagnostic Services	Jeremy O'Neal	WTI/CTI	
Maintenance Profit Masters - Where the Money Is	Jeremy O'Neal	WTI/CTI	



BUSINESS & MANAGEMENT

CLASS	INSTRUCTOR	SPONSOR	DOT POINTS
The 4 Pillars of Sales Success	Jeremy O'Neal	WTI/CTI	
The Green Light Sales Process - Best Practices	Jeremy O'Neal	WTI/CTI	
Dominate Your Social Media	Jeremy O'Neal	WTI/CTI	
Effective Time Management for Service Advisors	Jeremy O'Neal	WTI/CTI	
Improving Organizational Communications and Conflict Resolution	Dan Taylor	WTI/CTI	
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