Innovation for the Real World

Training and Diagnostics Services
2013 Training and Education Curriculum

delphi.com/tools
Delphi Training and Education Overview

Vision:
• To be recognized by the industry and our customers as the premier aftermarket training and services provider, creating the standard to which all others are compared.

Mission Statement:
• To provide training and support services for the aftermarket service provider in order to compete with the OE dealerships for repair.

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Delphi Training Instructors

Dave Cochrane
Dave has more than 29 years of experience as a technician and instructor. He holds multiple certifications and currently is a professor of automotive technology at Niagara College Canada, as well as in-field automotive service technician and shop foreman for a major automotive service repair corporation.

Mario Demers
Mario has been a successful shop owner and a tools and equipment representative which led to becoming an on-site technical instructor. Mario’s experience has allowed him to also develop technical courses and provide training in unique ways, such as IDL broadcasts for CARS Network, online training for large corporations, and in-class training and consultation for vehicle manufacturers and aftermarket suppliers.

Mario has also provided training in service issues, compliance and regulatory standards, and translation concerns to various manufacturers, government committees, and colleges across the country. Mario is currently providing training and technical assistance for a major vehicle manufacturer. Mario is bilingual in French and English.

Mark DeKoster
Mark is an Associate Professor in the Auto Service Technology and the Automotive Management Programs at Ferris State University. Mark is experienced with teaching specialty certifications for major vehicle manufacturers that include the ASE L1 Test preparation for technicians. Mark has more than 12 years of experience in the industry where he worked as line technician, team leader and as the service director of a multi-line General Motors dealership. Mark’s portfolio of certificates includes Mobile Air Conditioning Society (MACS), ASE Master Technician, ASE L1 Engine Performance and ASE 9 Automotive Light-Duty Diesel.

Dave Droz
Dave has been in the automotive industry for 45 years serving as a Ford Dealer technician, and owning and operating a full service repair shop, as well as a transmission specialty shop. Dave is a graduate of Engineering Institute of Pittsburgh and has also held positions as a technical instructor for Behr Automotive Test Equipment, training manager for Snap-on (Sun Electric) and an engineer for Delphi Product and Service Solutions.

Dave has been an ASE certified Master Technician since 1973, recertifying six times, and is also certified with Mobile Air Conditioning Society (MACS) and ASE Alternative Fuels, along with several other certifications. He has been a member of SAE (Society of Automotive Engineers) for 12 years and is currently serving on the Board of Governors for the Pittsburgh Section of SAE.

David Hobbs
Since 1989, Dave Hobbs has served as a hotline adviser, field engineer and technical instructor for Delphi Automotive (formerly Delco Electronics) where he has assisted thousands of dealer and independent technicians with diagnostic problems. An ASE Master L1 technician, member of IATN, MACS, NACAT, TST and SAE, Dave also has more than 15 years of hands-on experience as an independent repair shop technician and service manager.

Dave also served more than 15 years as an adjunct instructor for Indiana’s Ivy Tech College teaching drivability and electronics. Known as a frequent speaker at national training seminars, Dave is a qualified master hybrid instructor, has been featured in numerous automotive training videos, hosts a weekly radio program, and writes for several automotive magazines including Motor Magazine and Mobile Air Conditioning Society (MACS) Worldwide, Action. Over two decades of training engineers and service technicians around the world has given Dave the unique ability to bridge the theoretical with the practical.
Delphi Training Instructors

**Barry Hoyland**
Barry has been in the independent aftermarket for more than 35 years as a technician, shop manager, technician instructor, and for the past 22 years has owned and operated a successful Southern California automotive repair center that offers complete auto care and specializes in emission and diagnostic services. Barry also operates a company that modifies vehicles to perform as emergency response units and mobile command centers, incorporating high-end electronic components into today's vehicles.

Barry has provided consulting services for many automotive shops, fleets, and government agencies in order to improve their operational efficiencies. In addition Barry has worked with many NHRA drag racing teams as a crew chief on supercharged alcohol and nitro-methane fueled cars. Barry holds active memberships with a variety of organizations such as SAE, IATN, and STS. Barry also holds certifications in ASE: A1, A6, A8 and L1, maintains a California Advanced Emission license, and certification with Mobile Air Conditioning Society (MACS).

**Greg Moyers**
Greg joined Delphi’s (formerly General Motors Delco Electronics division) engineering team in 1983. He worked nine years as a product designer before transitioning into Original Equipment Manufacturer (OEM) service. As an advanced service engineer, he worked more than seven years interfacing with OEM customers, developing and validating service information, schematics, diagnostics, and scan tools, in addition to developing new product training curriculum and conducting the “Train The Trainer” courses for the OE training instructors.

Greg has assisted with diagnostic issues on new vehicle electronic systems undergoing development prior to vehicle production. Greg has served as a hotline advisor and field service engineer for Delphi Product and Service Solutions for more than 10 years, assisting dealer and independent technicians with diagnostic problems. Currently, Greg is an aftermarket service instructor for Delphi Product and Service Solutions.

**Antonio “Tony” Salas**
An automotive and diesel instructor with more than 13 years of teaching experience, Tony has provided contract training for General Motors Fleet and Commercial, as well as AC Delco. His training experience includes GM 6.5 and Duramax 6.6L training, and has also instructed various other topics such as electrical/electronics, automatic transmissions and body control features.

Tony’s experience includes instruction in the post-secondary level where he developed curriculums and taught for a community college in Las Vegas, Nevada. He also provided entry-level training at the Toyota Urban League Automotive Training Center. Tony holds an associate degree in automotive and diesel technology. He is an ASE Master Technician and holds a teaching credential from California State Long Beach. Tony currently operates Performance Training Techniques as a training provider for diesel and gasoline systems. Powerstroke 7.3L, 6.0L and Dodge Cummins 5.9L are other diesel powertrain engines he instructs on as well. Tony is bilingual in Spanish and English. Starting in 2011, he now runs Powertrain Performance LLC Diesel and Automotive Repair in Las Vegas.

**Karl Schneider**
Karl owns and operates Karl’s Automotive Center, Inc, in Winchendon, MA, founded in 1985. A Master L1 technician with the National Institute for Automotive Service Excellence (ASE) for many years, he keeps abreast with industry trends by participating in ongoing training and hands-on vehicle and emission repairs. In 2001, Karl became an adjunct instructor for Mass Bay Community College and in 2005, added to his responsibilities as an instructor for companies such as Snap-On Tools, Delphi and large tire companies.
Hybrid Electric Vehicle Training and Seminar Series

**Title: Hybrid Electric Vehicle – First Look (SV10908-11B1) / Spanish (SV20005-11B1)**
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket technicians
- Prerequisites: None
- Duration: 4 hours

This course is intended to provide an overview of hybrid electric vehicles (HEVs) and covers the different hybrid designs, systems and operation principles. It will help today’s automotive technicians prepare for the future of servicing and retaining current customers who purchase hybrid electric vehicles.

This course will introduce shop owners and technicians to HEVs. We will cover the history of hybrids and review different hybrid types and designs. This course also covers proper safety practices and precautions when using specialty tools or performing basic service on HEVs.

**Title: Hybrid Electric Vehicles – Service and Maintenance (SV11240-11B1)**
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: “Hybrid electric vehicles – First look” recommended
- Duration: 4 hours

This course is designed to educate technicians and shop owners on proper methods when servicing and maintaining hybrid vehicles. One of the most important aspects of this type of work is maintaining proper safety precautions – it is crucial when dealing with high voltage vehicles.

The electronic components on these vehicles are often complex and expensive; therefore, proper diagnostic techniques and procedures are also crucial. Hybrid vehicles differ from year and manufacturer, and this course will guide you through the differences and similarities of the various hybrid vehicles you are likely to service.
Hybrid Electric Vehicle Training and Seminar Series (continued)

Title: Hybrid Electric Vehicles – Diagnosis and Repair (SV11242-11B1)
- Course skill level: Advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: “Hybrid electric vehicles – Service and Maintenance” completed
- Duration: 8 hours

Now that you understand the major components and have performed maintenance services on hybrid vehicles, it’s time to prepare for the diagnosis and replacement of failed components. Hybrids vehicles have been on the road since the late 90s and most of these vehicles are out of the manufacturer’s warranty period. Being prepared to diagnose and replace major components is important.

This course is designed to educate technicians, and shop owners on proper diagnosis, testing procedures and replacement of components related to hybrid vehicles. Important safety procedures, and the disabling of high voltage systems making them safe to test and repair will also be covered.

Hybrid vehicle repairs differ from other automobile repairs due to sophisticated electronic systems and components used to drive electric motors and generators. These complex systems have the ability to switch back and forth between gasoline engine and electric power, or operate both simultaneously. They require technicians to have the latest knowledge ensuring correct diagnosis the first time. This course will guide you through the maze of electronic and mechanical systems you are likely to encounter when diagnosing, and repairing hybrid vehicles.

PLEASE NOTE: The customer must provide a facility to bring a vehicle into. A lift is preferred. You must also provide one of the following hybrid vehicles: Toyota Prius, Nissan Hybrid Altima, Ford Hybrid Escape Mercury Hybrid Mariner or Ford Hybrid Fusion, Mercury Hybrid Milan.

Title: Hybrid Electric Vehicles - For First Responders (SV11117-11B1)
- Course skill level: Beginner to intermediate
- Audience: Police, fire, rescue and vehicle recovery workers
- Prerequisites: None
- Duration: 4 hours

Toyota Prius, Ford Escape Hybrid, Honda Civic Hybrid, Cadillac Escalade Hybrid, the list goes on and on. All kinds of hybrid electric vehicles are on the road today. Each year thousands of them are involved in accidents and roadside breakdowns. Most have potentially lethal levels of high voltage electrical current that can further complicate the jobs of police, fire, rescue and recovery personnel.

We want to help you stay as safe as possible by providing hands on practical and accurate training in the handling of hybrid vehicle high voltage situations.
Diesel Engine Training and Seminar Series

Title: Direct and Common-Rail Systems Awareness and Overview (SV10912-11B1) / Spanish (SV20004-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket technicians
- Prerequisites: Basic knowledge of diesel systems
- Duration: 4 hours

The number of diesel engines in cars and light-duty trucks on the road today is increasing, driven most likely by the fuel economy gained by these efficient engines. Diesel systems are becoming more refined and manufacturers will be offering these types of engines in more makes and models. Since the diesel common-rail direct injection system relies heavily on electronics to control its operation, modern diesel systems are difficult to diagnose without proper training.

In this course, we will discuss common-rail direct injection components, as well as review how the entire system is designed and operates with detailed graphics and demonstrations. We will cover internal injector operation in detail, including nozzle types, edge filters, spill port operation and nozzle springs. Single high mounted, low mounted and two stage nozzle springs will also be discussed as well as fuel sac, needle lift and nozzle hole arrangement.

Title: Controlling Diesel Emissions and OBD-II (SV10913-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket technicians
- Prerequisites: Basic to intermediate knowledge of diesel systems
- Duration: 4 hours

As the vehicle production increases on diesel engines due to fuel efficiencies gained by this engine technology, the need for proper emission and OBD-II diagnosis is also increasing. Diesel OBD-II is a complex technology, and while emission laws continue to evolve so will the system components and diagnostic techniques.

In this course, we will cover the changes in diesel emission system failures, including misfire, fuel and comprehensive component monitoring. The use of OBD-II monitors has changed diesel check engine lamp operation, so in this course we will also cover emission-related failures with input sensors and actuators.

We will cover proper diesel diagnosis for diesel service and repair. And because diesel OBD-II has both similarities and differences from the gasoline OBD-II, we’ll review continuous and non-continuous diesel monitors - essential during proper repair of emission rated failures.
Gasoline Powertrain Training and Seminar Series

Title: Diagnosing and Repairing Catalyst and O2 Monitor Failures (SV-11246-11B1)
• Course skill level: Intermediate to advanced
• Audience: All automotive aftermarket technicians
• Prerequisites: Proficiency with scan tool; basic understanding of OBD-II
• Duration: 4 hours

The technology used in controlling the oxygen sensor monitor has become very complex. This advanced course will guide you through the sophisticated strategies of the oxygen sensors and its logic. The many new types of oxygen sensors, from standard zirconia to planar to side band/air fuel, all have different diagnostic techniques.

We will also discuss the close relationship of the catalyst efficiency test and oxygen sensor diagnostic strategy. You will learn how to get the most out of your scan tool in diagnosing O2 and catalyst failures, as well as verifying the repair to help prevent unnecessary comebacks.

Title: Diagnosing and Repairing Misfire Monitor Failures (SV10918-11B1)
• Course skill level: Intermediate to advanced
• Audience: All automotive aftermarket technicians
• Prerequisites: Proficiency with scan tool; basic understanding of OBD-II and vehicle ignition systems
• Duration: 4 hours

Misfire monitor failures, something that used to be relatively simple, have joined the ranks of “complex.” With this comes the need for technology-driven diagnostic systems because an engine misfire can lead to high emissions and costly destruction of engine management components. In this course, we will discuss the strategies involved in OBD-II vehicles used to decide if a misfire has occurred and how the system knows which cylinder is affected.

We will explore how the PCM detects a misfire, the type of misfire detected, the components that can cause a misfire and the methods used to test them. Information is presented on how to use oscilloscopes and low amp probes to diagnose components like ignition coils and fuel injectors that can cause misfires. We’ll also show varying methods used by scan tools, such as graphing and Mode $06$ capabilities.
Gasoline Powertrain Training and Seminar Series (continued)

Title: Diagnosing and Repairing Fuel Trim and Fuel Control Monitor Failures (SV10919-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Proficiency with scan tool; basic understanding of OBD-II
- Duration: 4 hours

Diagnostic techniques have changed over the years as related to fuel control. The quantity of inputs and actuators have more than doubled to keep up with the demand for precise fuel control, and technicians are faced with the challenge of keeping up with these advances in technology every day. This course is designed to give a comprehensive look at the OBD-II fuel monitor operational requirements used by automotive manufacturers to meet the stringent standards for fuel economy and emission control.

In this course, we will review fuel system control monitoring and provide a generic diagnostic strategy process technicians can use to efficiently troubleshoot and repair the system, and provide a method of verifying repair effectiveness. We’ll look at the long- and short-term fuel trim values and discuss how to use fuel trim as a diagnostic tool. We will also examine the use of a scan tool and how Mode $06 can help with some of the more difficult diagnoses.

Title: Diagnosing and Repairing Evaporative Monitor Failures (SV10920-11B1) / Spanish (SV20003-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Proficiency with scan tool; basic understanding of OBD-II
- Duration: 4 hours

Evaporative emission systems are mandated by the federal government for the control of Volatile Organic Compounds (VOCs). This course is designed to take you through a vehicle’s evaporative control system, its components and diagnostic techniques to aid in a timely diagnosis and repair. In this course, we will discuss various system requirements to provide an understanding of why the malfunction indicator lamp (MIL) illuminates and the criteria for setting a code. Technicians will also become familiar with systems that use a pump and those that do not.

Trying to locate a .020” leak can be very difficult, so we will cover the proper equipment, safety and procedures to do so. We will also demonstrate this by using industry case studies that prove monitor theories and diagnostic techniques.
Instructor Led Programs

Gasoline Powertrain Training and Seminar Series (continued)

Title: Diagnosing and Repairing EGR Monitor Failures (SV10921-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Proficiency with scan tool; basic understanding of OBD-II
- Duration: 4 hours

The EGR system has evolved from a simple system to a complex monitor in OBD-II vehicles. And did you know the EGR system also affects fuel economy? This course will give you an understanding of how today’s systems are monitored, diagnosed and repaired. We will also discuss the EGR system components and testing procedures.

You will understand the function and purpose of the EGR system, and how it controls emissions. We will also provide information on how to use the scan tool and the Mode $06 function to aid in diagnosis and how variable valve timing and camshaft phasing can replace the EGR system components. The course will include case studies and tech tips to improve diagnostic time and first time repair.

Title: Mode $06 Data and Drive Cycle Diagnostics (SV10922-11B1) / Spanish (SV20006-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Proficiency with scan tool; basic understanding of OBD-II and vehicle ignition systems
- Duration: 4 hours

Mode $06 data is some of the most misunderstood and underused scan tool data available on today’s vehicles. This course will help you understand and interpret Mode $06 data in order to use it to its full advantage.

Mode $06 diagnostic skills also give the technician the opportunity to identify marginally performing components and advise the vehicle owner of future potential problems. Combined with drive cycle diagnostics, Mode $06 diagnostic skills can be looked at as a kind of “insurance policy” against unnecessary comebacks.
Gasoline Powertrain Training and Seminar Series (continued)

Title: Controller Area Networks (CAN) and Multiplexing (SV11162-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Proficiency with scan tool; basic understanding of OBD-II; Usage of DMM and oscilloscopes
- Duration: 4 hours

For more than two decades, Delphi has been a pioneer in electronic controls and communications; tying electronic modules together on multiplexed (serial) busses. This training course covers the latest CAN bus systems from the mid-1990s through current model year on GM, Ford and Chrysler vehicles.

The course covers how to troubleshoot stubborn communications problems with electronic control modules. Practical tips on the uses of meters, scopes, and factory and aftermarket scan tools are combined with theory and real world case studies to demonstrate how to diagnose everything from U-codes to power mode masters to serial bus gateways.

Vehicle Systems Training and Seminar Series

Title: Engine Management Systems (SV10924-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Basic knowledge of engine management systems
- Duration: 4 hours

This drivability update course for the professional technician is specific to engine management, input signals, output commands, and control systems.

We'll cover PCM/ECMs, powertrain sensors, including air, temperature, load, speed, throttle position and other related input sensors/signals. We'll also cover the latest information on planar O2 sensors and wideband technology. During this course, we will discuss the characteristics of gasoline types, as well as alcohol-based fuel, and describe how the differences in fuel can affect today's diagnostics and repair processes. Additionally, we'll discuss scanners/codes, technical service bulletins, diagnostic tips, and the latest factory updates.

Today's drivability problems are still some of the most difficult problems for technicians to diagnose and pinpoint. Problem symptoms can often point toward multiple items being the possible cause, when in fact it is usually just one malfunctioning component creating the problem. By utilizing the information and diagnostic tips you learn in this course, you can be able to diagnose drivability problems quicker and more accurately.
In many parts of the country, air conditioning is somewhat seasonal and as we approach this year’s A/C season, it’s time to get prepared for the service work that is certain to come your way. This updated seminar covers the latest diagnostic and service procedures to help address various system performance problems. We’ll discuss what’s going on with the new R1234yf refrigerant and the J2788 standards and what it could mean for your business. Learn the procedures that help safeguard against compressor failures and what you can do to help avoid comebacks. You’ll get current service information and tech bulletins that can help you keep ahead.

Title: ECM/PCM Reflash, Reprogramming and J2534 (SV10927-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket technicians
- Prerequisites: None
- Duration: 4 hours

This course for the shop owner and professional technician includes information on sensors, actuators and controlling systems all used as the inputs and outputs to and from ECMs and PCMs. Discussions include basic computer sequences, processor memory types, and diagnostic trouble code types all to improve your understanding of the ECM and PCM role as part of the powertrain management system.

Information on “What’s failing today” is reviewed and discussed. Diagnostic process and electronic drivability worksheets are presented. Programming or flashing and/or reflashing of modules are covered in detail, reviewing what J2534 is, and correcting common misconceptions regarding flashing. The business advantages of flashing, for both you and your customers are discussed. ECM/PCM core acceptance criteria is reviewed and explained. An OBD-II composite vehicle supplement is included in every attendee’s student guide.
Instructor Led Programs

Vehicle Systems Training and Seminar Series (continued)

Title: Advanced Fuel Systems including Gasoline Direct Injection (GDI) (SV10928-11B1)
- Course skill level: Intermediate to advanced
- Audience: All automotive aftermarket technicians
- Prerequisites: Basic knowledge of fuel systems
- Duration: 4 hours

As automotive technology continues to evolve, shop owners and professional technicians must revisit fuel systems training and education to ensure proper understanding of design change and diagnostic techniques. This course is specific to fuel systems, fuel pumps, modular reservoir assemblies (MRA), fuel pressure regulators and fuel injectors. We’ll review newer technologies like direct fuel injection and control strategies that will help your shop and technicians keep pace with the changes in automotive technology. Other discussions in this course will include diagnosis, test procedures, service bulletins and factory updates.

Title: Diagnosing and Repair Fuel Systems (SV11243-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket technicians
- Prerequisites: Basic understanding of gasoline electronic fuel injection systems.
- Duration: 4 hours

This course was designed to help technicians become familiar with performing fuel system diagnosis. Taught in a classroom the instructor will demonstrate how to use various test equipment on an operating “mock” fuel system so technicians can see the tests and the results on a functioning fuel system. Also covered in the class are common mistakes that lead to misdiagnosis and well as how to analyze a failed fuel pump or module to learn why it failed and then use that information to identify areas on a vehicle that need further service or repair.

Title: Conquering Comebacks (SV11228-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket technicians
- Prerequisites: Basic understanding of fuel management and A/C systems, including use of diagnostic tools.
- Duration: 4 hours

It’s difficult to build a profitable business by performing comeback repairs. Delphi’s service engineering data reveals some interesting facts about root cause component failures. By following specific manufacturer service procedures when performing routine maintenance or replacing various components you will gain assurance that comeback risk is greatly reduced. This course focuses on air conditioning system service to prevent compressor failures and fuel system service to prevent electric fuel pump failures.
Vehicle Systems Training and Seminar Series (continued)

**Title: Warranty Mitigation (SV10931-11B1)**
- Course skill level: Beginner to advanced
- Audience: Sales personnel who deal with parts being returned for warranty or anyone who is preparing warranty claims to be submitted to Delphi and other suppliers.
- Prerequisites: None
- Duration: 4 hours

It’s difficult to build a profitable business when processing excessive warranty. Many parts returned for warranty could be rejected if you know what to look for. This course focuses on electric fuel pump and air conditioning compressor warranty processing. We’ll review warranty paperwork, and what to look for on parts returned for warranty that void manufacturer warranties. We will also discuss how to determine whether or not a part has been installed. Examples of uninstalled returns that can be returned to stock will be shown, in addition to non-warranty parts that failed due to system contamination or vehicle electrical issues. Part identification is also covered for Delphi fuel pumps and compressors.

Business and Operations Training and Seminar Series

**Title: Safe, Green and Connected: Emerging Vehicle Technologies (SV10934-11B1)**
- Course skill level: Beginner to advanced
- Audience: All automotive aftermarket service providers
- Prerequisites: None
- Duration: 4 hours

Vehicle systems technology is accelerating at an incredible rate and creating great opportunities for the aftermarket. In fact, 90% of future innovation in the vehicle will be driven by electronics. Aftermarket shops and technicians across the country need to embrace the vehicle electronics revolution and take advantage of the business opportunities it brings.

This course is designed to provide insight as to the kind of systems you’ll be seeing and what you need to do to be prepared to diagnose and service them. We’ll work to determine your personal or business roadmap to get your shop prepared for what’s coming down the road.

We’ll highlight the systems that are categorized under the key drivers of the revolution: safe, green and connected. Safe systems include occupant protection, driver and situation awareness management, and vehicle stability. Green relates to not only emission controls, but advanced engine systems like gasoline direct injection engines, hybrid electric vehicles, fuel cell technology, and direct diesel injection systems. The connected category will include discussion on in-vehicle communication, controller area networks (CAN), media systems and telematics.
Instructor Led Programs

Business and Operations Training and Seminar Series (continued)

Title: Generating Service Sales – Essential Communication Skills (SV10935-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket service providers
- Prerequisites: None
- Duration: 4 hours

Business in today’s automotive industry has changed drastically in the past 10 years. Automobiles have longer life expectancy and warranty protection and in order to remain competitive, we have had to change from a repair-based to a maintenance-based business model. To survive we need to understand how to approach automotive service now and in the future. In this course, we will discuss ways to stay competitive by gaining and keeping customers.

Learn how to communicate with employees and customers about maintaining vehicles in the new green and clean marketplace. We will cover methods to provide service advisors the skills to effectively communicate with customers, helping them to understand today’s automotive technology.

The course will provide the necessary communication skills to help you keep customers coming back and at the same time view your shop as a professional service center with their best interests in mind. It will help you to maintain your customer base and not lose it to the competition. Remember, we are not in the business of fixing vehicles, but in the business of taking care of our customers. It is important to spend your training dollars wisely, not only on technical skills, but also on communication skills.

Title: Vehicle Maintenance and Repairs for MPG (SV10930-11B1)
- Course skill level: Beginner to intermediate
- Audience: All automotive aftermarket service providers
- Prerequisites: None
- Duration: 4 hours

It’s been reported that up to 60% of vehicles on the road today have maintenance issues that are being ignored. Many have severe underperformed or non-performed service that is having a significant impact on fuel economy. This course is designed to help shop owners identify service opportunities. We’ll also provide the skills to help create an organized, comprehensive inspection and performance analysis process using known methods and information to create meaningful service recommendations for the vehicle owner. Often these services result in improved fuel economy, performance and longer vehicle life.

This course is targeted to service writers/advisors, owners and technicians who perform repairs and services. The business will benefit from uncovering needed maintenance that may have gone unattended. Additionally, the customers will benefit from having an optimally performing vehicle that can help enhance fuel economy, improve performance and reduce emissions.
Additional Training Time

Title: Instructor Follow Up Class (SV11247-11B1)

- Course Skill Level: None
- Prerequisites: This course is designed to enhance many of Delphi’s normal training classes. It is run as a follow up class the same day or the day after a normal Delphi training class has been conducted. The content of the class is determined and agreed upon by the customer and Delphi instructor prior to the class. There are no course materials.
- Duration: 4 hours

You’ve taken a Delphi training class and thought it was great, but you want more. No problem. Delphi offers a follow up class to enhance the training course just completed. Working with our Delphi instructors, you develop a unique “follow up” class expanding on our normal training class.
Self Study Programs

Hybrid Electric Vehicle Training and Seminar Series

- **Hybrid Electric Vehicle – First Look (SV11234-11B1) Book**
  This course is intended to provide an overview of hybrid electric vehicles (HEVs) and covers the different hybrid designs, systems and operation principles. It will help today's automotive technicians prepare for the future of servicing and retaining current customers who purchase hybrid electric vehicles.

  This course will introduce shop owners and technicians to HEVs. We will cover the history of hybrids and review different hybrid types and designs. This course also covers proper safety practices and precautions when using specialty tools or performing basic service on HEVs.

- **Hybrid Electric Vehicles – Service and Maintenance (SV11241-11B1) Book**
  This course is designed to educate technicians and shop owners on proper methods when servicing and maintaining hybrid vehicles. One of the most important aspects of this type of work is maintaining proper safety precautions – it is crucial when dealing with high voltage vehicles.

  The electronic components on these vehicles are often complex and expensive; therefore, proper diagnostic techniques and procedures are also crucial. Hybrid vehicles differ from year and manufacturer, and this course will guide you through the differences and similarities of the various hybrid vehicles you are likely to service.

- **Hybrid Electric Vehicles - For First Responders (SV11233-11B1) Book**
  Toyota Prius, Ford Escape Hybrid, Honda Civic Hybrid, Cadillac Escalade Hybrid, the list goes on and on. All kinds of hybrid electric vehicles are on the road today. Each year thousands of them are involved in accidents and roadside breakdowns. Most have potentially lethal levels of high voltage electrical current that can further complicate the jobs of police, fire, rescue and recovery personnel.

  We want to help you stay as safe as possible by providing practical and accurate training in the handling of hybrid vehicle high voltage situations.
Self Study Programs

Diesel Engine Training and Seminar Series

- **Direct and Common-Rail Systems Awareness and Overview (SV10952-11B1) Book / (SV20001-11B1) Spanish Book**
  The number of diesel engines in cars and light-duty trucks on the road today is increasing, driven most likely by the fuel economy gained by these efficient engines. Diesel systems are becoming more refined and manufacturers will be offering these types of engines in more makes and models. Since the diesel common-rail direct injection system relies heavily on electronics to control its operation, modern diesel systems are difficult to diagnose without proper training.

  In this course, we will discuss common-rail direct injection components, as well as review how the entire system is designed and operates with detailed graphics and demonstrations. We will cover internal injector operation in detail, including nozzle types, edge filters, spill port operation and nozzle springs. Single high mounted, low mounted and two stage nozzle springs will also be discussed as well as fuel sac, needle lift and nozzle hole arrangement.

- **Controlling Diesel Emissions and OBD-II (SV10944-11B1) Book**
  As the vehicle production increases on diesel engines due to fuel efficiencies gained by this engine technology, the need for proper emission and OBD-II diagnosis is also increasing. Diesel OBD-II is a complex technology, and while emission laws continue to evolve so will the system components and diagnostic techniques.

  In this course, we will cover the changes in diesel emission system failures, including misfire, fuel and comprehensive component monitoring. The use of OBD-II monitors has changed diesel check engine lamp operation, so in this course we will also cover emission-related failures with input sensors and actuators.

  We will cover proper diesel diagnosis for diesel service and repair. And because diesel OBD-II has both similarities and differences from the gasoline OBD-II, we’ll review continuous and non-continuous diesel monitors - essential during proper repair of emission rated failures.

- **Diesel Engine Technology (SV10865-11B1) Book / (SV10862-11B1) Book and CD**
  This comprehensive program will familiarize technicians with current clean diesel technology. The diesel combustion event and various combustion chamber designs are explained including pre-combustion, swirl and direct type combustion chambers. Fuel injection systems are covered beginning with mechanical, inline and rotary pump types, and continuing with electronic unit injection systems.
Diesel Engine Training and Seminar Series (continued)

- **Diesel Engine Technology (SV10865-11B1) Book / (SV10862-11B1) Book and CD (continued)**
  Today’s common-rail injection systems are explained in detail with many graphics to explain direct injection operation. Diesel engine management is covered beginning with diesel input sensors and actuators. PCM / ECM internal architecture is explained along with fuel injection and glow plug control modules. OBD-II diesel diagnostic monitors are explained for a typical 2008 LD diesel. Diesel exhaust after-treatment such as SCR, particulate filters and diesel oxidation catalysts are explained. Superchargers and turbochargers are covered including the variable geometry type. Diesel emissions are fully covered such as NOx and PM.

Gasoline Powertrain Training and Seminar Series

- **Diagnosing and Repairing Misfire Monitor Failures (SV10845-11B1) Book**
  Misfire monitor failures, something that used to be relatively simple, have joined the ranks of “complex.” With this comes the need for technology-driven diagnostic systems because an engine misfire can lead to high emissions and costly destruction of engine management components. In this course, we will discuss the strategies involved in OBD-II vehicles used to decide if a misfire has occurred and how the system knows which cylinder is affected.

  We will explore how the PCM detects a misfire, the type of misfire detected, the components that can cause a misfire and the methods used to test them. Information is presented on how to use oscilloscopes and low amp probes to diagnose components like ignition coils and fuel injectors that can cause misfires. We’ll also show varying methods used by scan tools, such as graphing and Mode $06$ capabilities.

- **Diagnosing and Repairing Fuel Trim and Fuel Control Monitor Failures (SV10858-11B1) Book**
  Diagnostic techniques have changed over the years as related to fuel control. The quantity of inputs and actuators have more than doubled to keep up with the demand for precise fuel control, and technicians are faced with the challenge of keeping up with these advances in technology every day. This course is designed to give a comprehensive look at the OBD-II fuel monitor operational requirements used by automotive manufacturers to meet the stringent standards for fuel economy and emission control.

  In this course, we will review fuel system control monitoring and provide a generic diagnostic strategy process technicians can use to efficiently troubleshoot and repair the system, and provide a method of verifying repair effectiveness. We’ll look at the long- and short-term fuel trim values and discuss how to use fuel trim as a diagnostic tool. We will also examine the use of a scan tool and how Mode $06$ can help with some of the more difficult diagnoses.
Gasoline Powertrain Training and Seminar Series (continued)

- **Diagnosing and Repairing Evaporative Monitor Failures (SV10844-11B1) Book** / **(SV20000-11B1) Spanish Book**
  Evaporative emission systems are mandated by the federal government for the control of Volatile Organic Compounds (VOCs). This course is designed to take you through a vehicle’s evaporative control system, its components and diagnostic techniques to aid in a timely diagnosis and repair. In this course, we will discuss various system requirements to provide an understanding of why the malfunction indicator lamp (MIL) illuminates and the criteria for setting a code. Technicians will also become familiar with systems that use a pump and those that do not.

  Trying to locate a .020” leak can be very difficult, so we will cover the proper equipment, safety and procedures to do so. We will also demonstrate this by using industry case studies that prove monitor theories and diagnostic techniques.

- **Diagnosing and Repairing EGR Monitor Failures (SV10843-11B1) Book**
  The EGR system has evolved from a simple system to a complex monitor in OBD-II vehicles. And did you know the EGR system also affects fuel economy? This course will give you an understanding of how today’s systems are monitored, diagnosed and repaired. We will also discuss the EGR system components and testing procedures.

  You will understand the function and purpose of the EGR system, and how it controls emissions. We will also provide information on how to use the scan tool and the Mode $06 function to aid in diagnosis and how variable valve timing and camshaft phasing can replace the EGR system components. The course will include case studies and tech tips to improve diagnostic time and first time repair.

- **Mode $06 Data and Drive Cycle Diagnostics (SV10950-11B1) Book** / **(SV20008-11B1) Spanish Book**
  Mode $06 data is some of the most misunderstood and underused scan tool data available on today’s vehicles. This course will help you understand and interpret Mode $06 data in order to use it to its full advantage.

  Mode $06 diagnostic skills also give the technician the opportunity to identify marginally performing components and advise the vehicle owner of future potential problems. Combined with drive cycle diagnostics, Mode $06 diagnostic skills can be looked at as a kind of “insurance policy” against unnecessary comebacks.
Gasoline Powertrain Training and Seminar Series (continued)

- **Controller Area Networks (CAN) and Multiplexing (SV11163-11B1) Book**
  For more than two decades, Delphi has been a pioneer in electronic controls and communications; tying electronic modules together on multiplexed (serial) busses. This training course covers the latest CAN bus systems from the mid-1990s through current model year on GM, Ford and Chrysler vehicles.

  The course covers how to troubleshoot stubborn communications problems with electronic control modules. Practical tips on the uses of meters, scopes, and factory and aftermarket scan tools are combined with theory and real world case studies to demonstrate how to diagnose everything from U-codes to power mode masters to serial bus gateways.

- **Essentials in Engine Diagnostics – Compression (SV10848-11B1) Book / (SV10847-11B1) Book and CD**
  With the successful completion of this course you will be able to: understand the basic theory and operation of internal combustion engines, explain the history and characteristics of compression systems, understand the effects of octane, atmospheric pressure, and vacuum. Describe volumetric efficiency, variable valve timing, forced air induction, cam phasing, and variable compression ratio and perform compression testing.

- **Evolution of OBD-II (SV10631-11B1) Book / (SV10630-11B1) Book and CD**
  The goal of this course is to familiarize you with the history of vehicle emissions systems and the evolution of OBD-II, help you understand how input sensors and output components function, and help you understand how OBD-II requires standardization. In this course you will learn the differences between OBD-II inputs and outputs, compare the differences between the structures, retrieve scan data from OBD-II systems, and diagnose and repair primary sensors and output components. Covered are typical scan data values from OBD-II systems. Explained are how input sensors and output actuators function and how to diagnose and repair those components using a scan tool. Diagnostic strategies for the various sensors and actuators are included. Typical oscilloscope graphs are shown and explained.

- **OBD-II Diagnostic Scan Tools (SV10688-11B1) Book / (SV10687-11B1) Book and CD**
  OBD-II diagnostic scan tools will teach you how to fully use your scan tool. You will comprehend the evolution of the scan tool from 1980 to present and SAE requirements for OBD-II scan tools. Covered are the differences between generic and enhanced scan tools along with generic and enhanced data lists.

  You will understand freeze frame data, the use of bi-directional controls and automated system tests. Also covered are scan tool graphing and recording features. An in depth explanation of the OBD-II DLC connector along with the various communication protocols used on OBD-II. A series of seven OBD-II exercises are used to explain the though process for diagnosing OBD-II monitor failures. A series of typical scan tool data displays are included to explain the monitor exercises.
Vehicle Systems Training and Seminar Series

- **Engine Management Systems (SV10691-11B1) Book**
  
  This drivability update course for the professional technician is specific to engine management, input signals, output commands, and control systems.

  We'll cover PCM/ECMs, powertrain sensors, including air, temperature, load, speed, throttle position and other related input sensors/signals. We'll also cover the latest information on planar O2 sensors and wideband technology. During this course, we will discuss the characteristics of gasoline types, as well as alcohol-based fuel, and describe how the differences in fuel can affect today's diagnostics and repair processes. Additionally, we'll discuss scanners/codes, technical service bulletins, diagnostic tips, and the latest factory updates.

  Today's drivability problems are still some of the most difficult problems for technicians to diagnose and pinpoint. Problem symptoms can often point toward multiple items being the possible cause, when in fact it is usually just one malfunctioning component creating the problem. By utilizing the information and diagnostic tips you learn in this course, you can be able to diagnose drivability problems quicker and more accurately.

- **Automotive Air Conditioning Theory, Diagnosis and Service (SV10625-11B1) Book / (SV10624-11B1) Book and CD**

  In many parts of the country, air conditioning is somewhat seasonal and as we approach this year's A/C season, it's time to get prepared for the service work that is certain to come your way. This updated seminar covers the latest diagnostic and service procedures to help address various system performance problems. We'll discuss what's going on with the new refrigerants and the J2788 standards and what it could mean for your business. Learn the procedures that help safeguard against compressor failures and what you can do to help avoid comebacks. You'll get current service information and tech bulletins that can help you keep ahead.

- **Advanced Fuel Systems including Gas Direct Injection (GDI) (SV10949-11B1) Book**

  As automotive technology continues to evolve, shop owners and professional technicians must revisit fuel systems training and education to ensure proper understanding of design change and diagnostic techniques. This course is specific to fuel systems, fuel pumps, modular reservoir assemblies (MRA), fuel pressure regulators and fuel injectors. We'll review newer technologies like direct fuel injection and control strategies that will help your shop and technicians to keep pace with the changes in automotive technology. Other discussions in this course will include diagnosis, test procedures, service bulletins and factory updates.
Vehicle Systems Training and Seminar Series (continued)

- **ABS Brakes (SV10753-11B1) Book / (SV10752-11B1) Book and CD**
  The anti-lock braking systems (ABS) course is designed to introduce technicians to the theory, operation, and diagnosis of ABS. The information provided in this course should provide an understanding of anti-lock brake operation which can then be applied to all systems. Some of the topics covered in this training module are ABS overview, ABS system types, hydraulic components, electronic components, traction and stability control, diagnostic troubleshooting and service procedures. Also, ABS technologies are discussed such as adaptive cruise control, low tire pressure detection, and brake by wire. The ABS training program has been designed spherically to teach how the ABS systems operate so that automotive technicians will be trained to analyze, diagnose, and repair ABS systems.

- **Battery Starting and Charging (SV10629-11B1) Book / (SV10628-11B1) Book and CD**
  In this course, you will learn how to properly diagnose, and test battery starting and charging systems for today's vehicles. Properly service batteries, cables, starters, alternators and voltage regulation devices. Communicate effectively with customers about procedures used to diagnose battery, charging and starting problems.

- **Ignition Systems (SV10627-11B1) Book / (SV10626-11B1) Book and CD**
  In this course, you will learn how to identify the different types of ignition systems, understand ignition coil induction, operation of the different triggering devices, test the trigger devices, understand the test ignition control modules and perform functional test on the ignition systems.

- **Essentials in Engine Diagnostics – Electricity (SV10846-11B1) Book**
  This electrical course will teach technicians about automotive electrical circuits. Both theory and practical application are explained. Beginning with Ohms law, the book explains parallel, series, and series-parallel circuits. Electrical exercises are shown along with expected values of the various circuits. Voltage, available voltage, voltage drop, and amperage are fully explained. Meter usage and resistor values are covered. The book also covers short circuit detection methods and how to construct a short detector. Battery testing, alternator and starter testing are covered using easy to understand worksheets and diagnostic tests. A method for checking parasitic draw is also explained. This course is an excellent way to master automotive electrical.

- **Mastering the Digital Storage Oscilloscope (SV10685-11B1) Book / (SV10684-11B1) Book and CD**
  In this course, you will learn how to understand the various types of waveforms used in automotive systems. Understand how oscilloscope displays a signal. Adjust the oscilloscope to the correct settings for the system being tested. Understand trigger level and slope. Understand the four different types of electrical signals. Understand amplitude, frequency and sequence of events.
Self Study Programs

Business and Operations Training and Seminar Series

• Generating Service Sales – Essential Communication Skills (SV1108-11B1) Book
  Business in today’s automotive industry has changed drastically in the past 10 years. Automobiles have longer life expectancy and warranty protection and in order to remain competitive, we have had to change from a repair-based to a maintenance-based business model. To survive we need to understand how to approach automotive service now and in the future. In this course, we will discuss ways to stay competitive by gaining and keeping customers.

  Learn how to communicate with employees and customers about maintaining vehicles in the new green and clean marketplace. We will cover methods to provide service advisors the skills to effectively communicate with customers, helping them to understand today’s automotive technology.

  The course will provide the necessary communication skills to help you keep customers coming back and at the same time view your shop as a professional service center with their best interests in mind. It will help you to maintain your customer base and not lose it to the competition. Remember, we are not in the business of fixing vehicles, but in the business of taking care of our customers. It is important to spend your training dollars wisely, not only on technical skills, but also on communication skills.

AutoIQ (SV10693-11B1) CD

• Whether you are a shop owner or service writer, you can use Delphi’s AutoIQ to demonstrate to your customers the purpose, functionality and service requirements of a given vehicle system.

  What is Delphi AutoIQ? It’s an interactive program that explains repair and service procedures to the customer in a language vehicle owners can understand; what the parts are, what needs to be fixed and how to properly maintain the part. This information strengthens communication between shops and customers, allows shop owners to better explain service procedures, as well as validate individual labor expenses.

  This powerful tool benefits both repair personnel and shop customers. By following clearly defined links to all major vehicle systems, the user can specify the area about which they would like more information.

  Delphi AutoIQ helps its customers sell maintenance and repair services by increasing customer loyalty in these service centers. AutoIQ has the ability to help increase service retention and revenue. This Interactive Compact Disc (iCD) includes automotive terms and systems operations and is also a great tool for training new employees.

  Go to https://service.delphi.com/demo/autoiq to view a demo version of AutoIQ.
Automotive Hotline

- Delphi provides tele-diagnostic support by a group of more than 45 certified ASE Master Technicians as well as L-1 Advanced Engine Performance Specialists. With dedicated team members for specific vehicle manufacturers: General Motors, Ford, Chrysler, European and Asian vehicles, our hotline utilizes a library of manufacturer specific service information and technical service bulletins (TSB) in both print and electronic formats. Delphi support technicians have an average of 15 years experience working in dealerships and independent repair facilities.

Delphi’s Automotive Hotline can help save you hundreds of dollars in diagnostic time and unnecessary parts replacement. If a repair has you stumped the Automotive Hotline can help. Experienced ASE Master Technicians will walk you through the repair procedure, utilizing proper diagnostic methods, TSB’s, and their expertise. Spanish speaking support technicians are also available.

The Automotive Hotline will also help to save you time and improve customer satisfaction, by allowing you to get repairs completed faster, so you can return the vehicle to your customer quicker.

Automotive Hotline minutes can be purchased as individual minutes for a “test drive” or in blocks of 30, 60 or 90 minutes. Minutes remain active for one year from date of purchase. The Automotive Hotline is available in the United States and Canada with hours of operation from 8:00am to 8:00pm EST Monday through Friday. Not available on weekends or recognized holidays.

Fax back by request service is also an option. Instead of discussing information over the phone, you can request information or diagrams be faxed to your shop.

Please contact 877.550.TECH (8324) or log onto delphi.com/tools for all of your training and diagnostic needs.