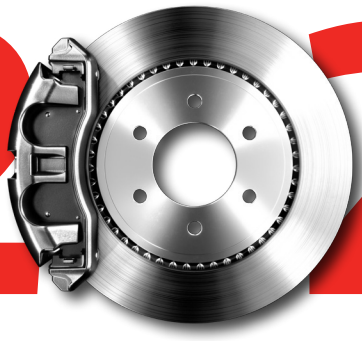

# 2025

# MOTORCRAFT® UNIVERSITY COURSE CATALOG

MotorcraftUniversity.com
Headquarters@MotorcraftU.com
800-517-0173

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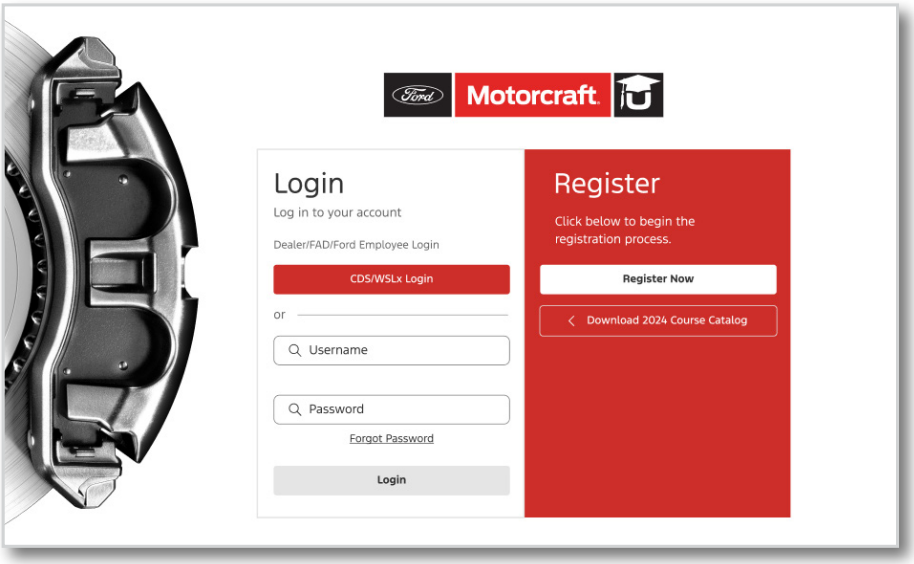
# MOTORCRAFT UNIVERSITY
# PORTAL FEATURES

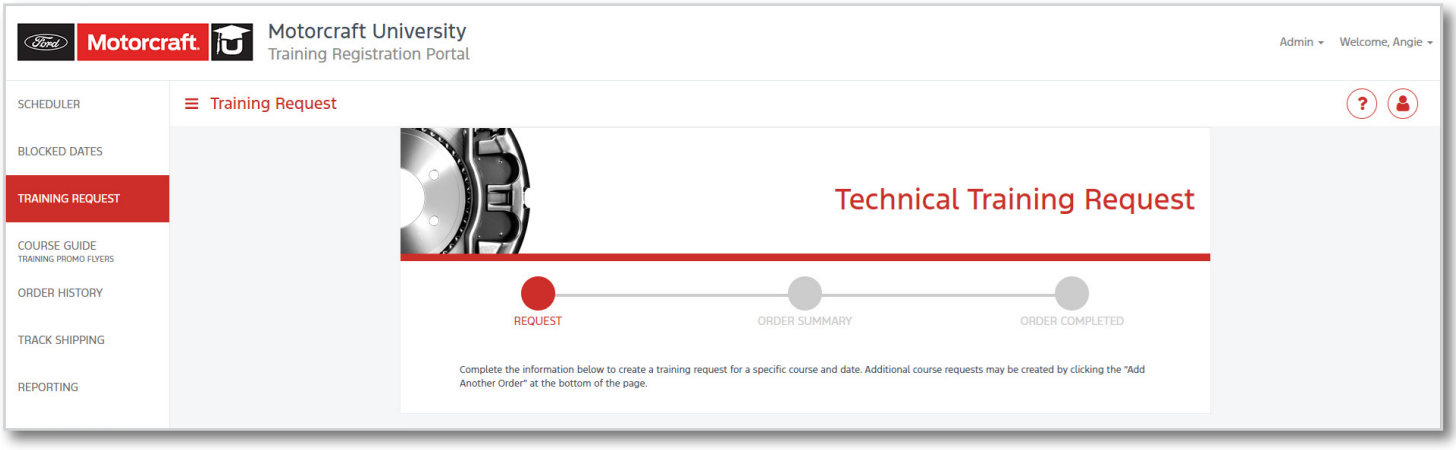
## Login Page

When you first visit MotorcraftUniversity.com, you will be instructed to log in or register for an account. To log in using a CDS ID, click the red Dealer/FAD/Ford Employee Login button. To log in using an already registered account, fill in your email address and password.



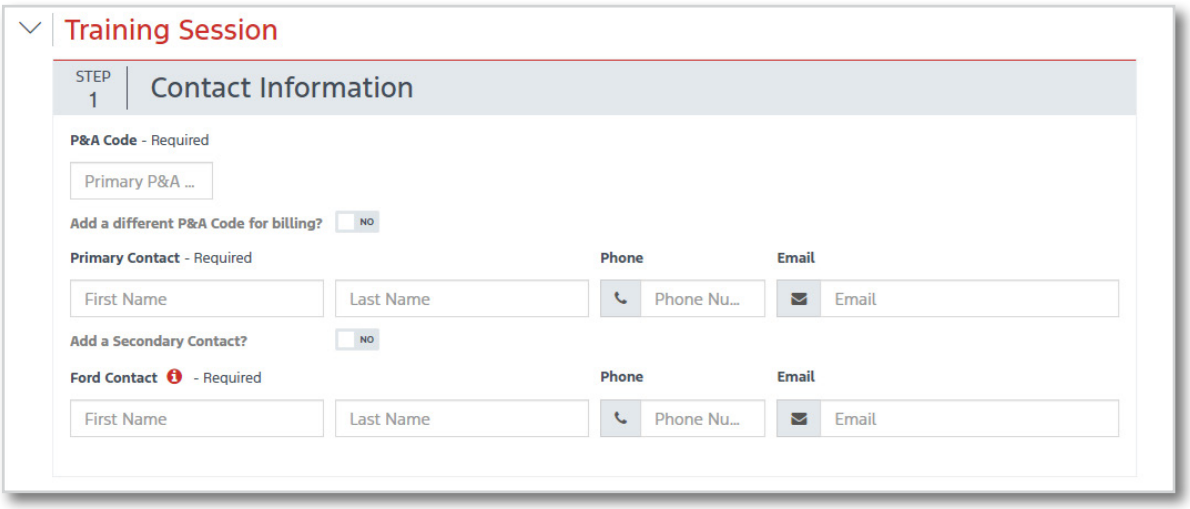

## Requester Homepage

Once you have registered/logged in, you will be taken to the Training Request Form. Additional navigation is available on the left-hand menu.



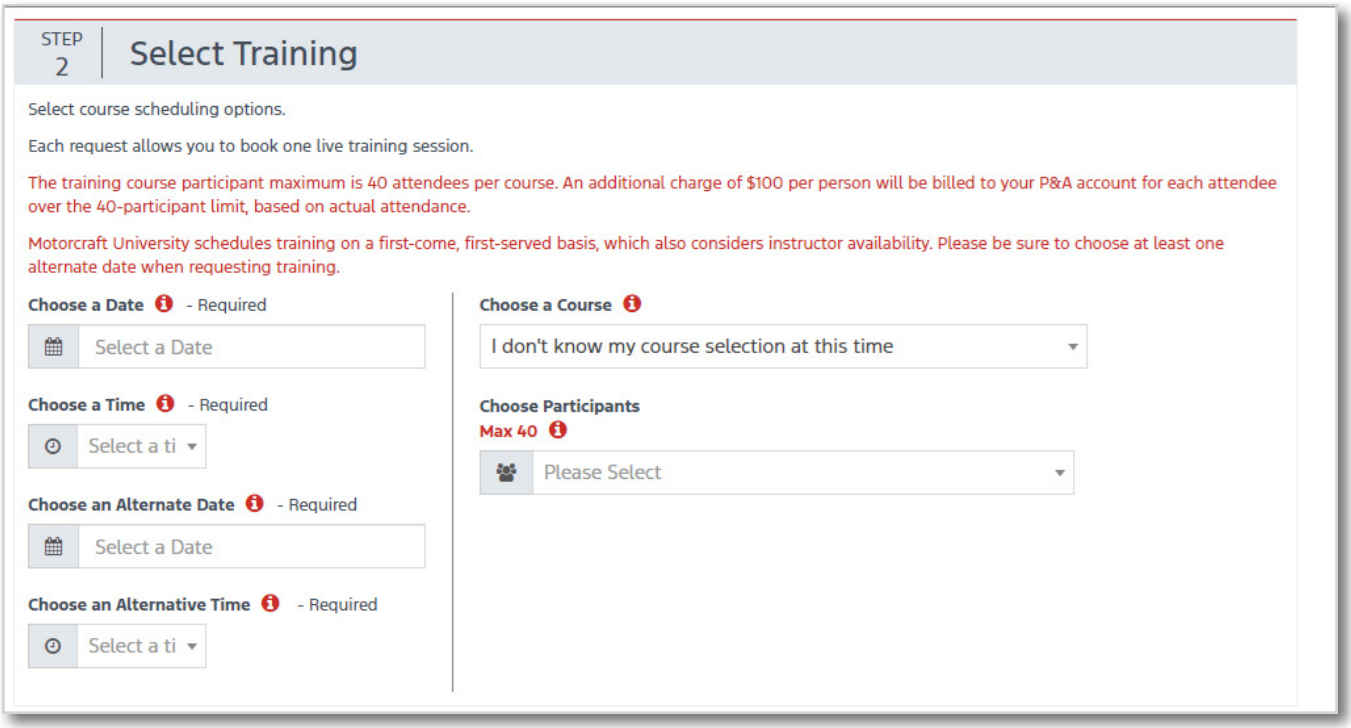
## Training Registration Form – Complete the Form for One or Multiple Sessions

Fill in the Contact Information section. Required information to submit your form includes: Primary Contact, Ford Contact and Billing P&A Code. Secondary contacts can be added as needed.




## Select Training

Select your course options. Required information includes: Training Date(s), Time and Alternate Date and Time.

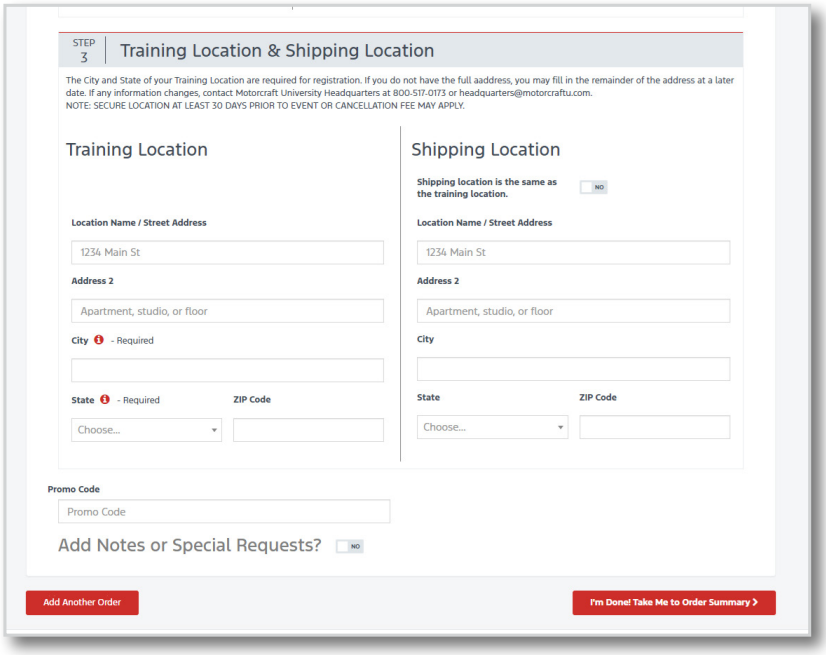


## Training Location & Shipping Location

Enter your Training and Shipping Location information. Required information to submit your form includes: Training/Shipping City and State.

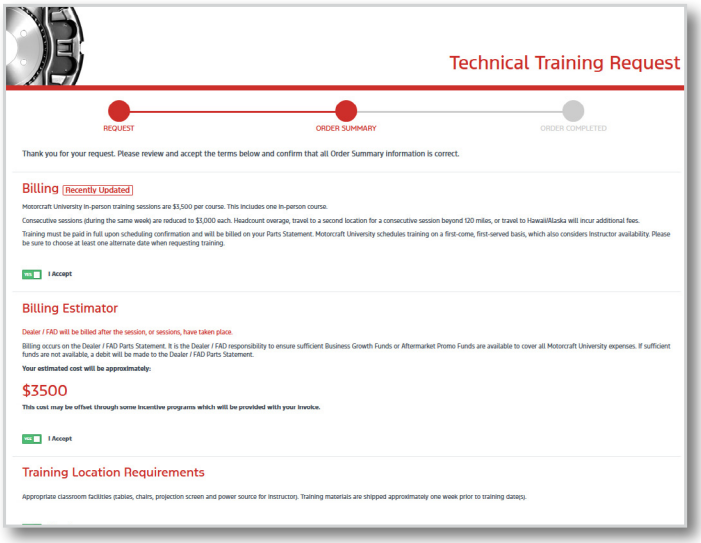
Notes or special requests can also be added to a training request at the bottom of the form by switching the toggle from No to Yes.

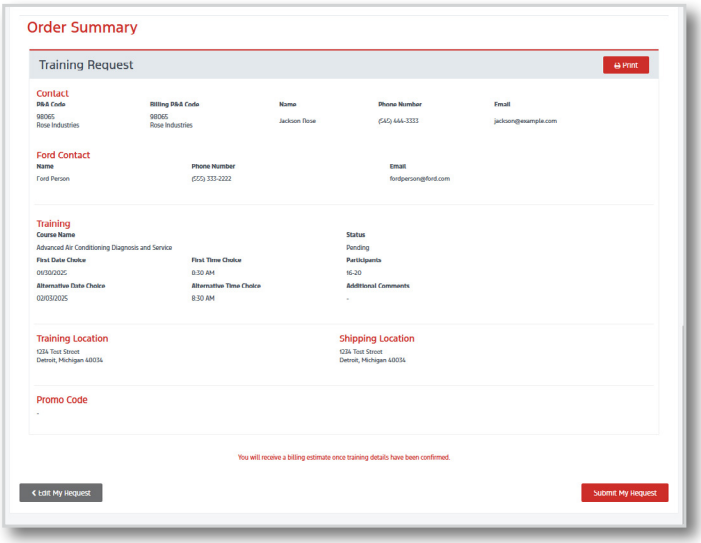
Then add another session to your request by selecting “Add Another Order,” or submit your completed request and go to your Order Summary.




## Order Summary

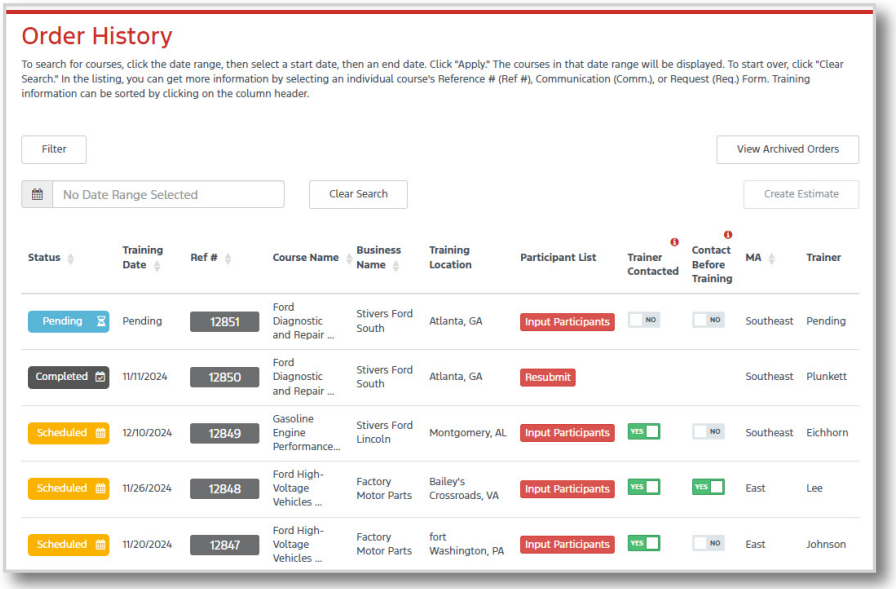
Review and accept the terms and confirm that all Order Summary information is correct.



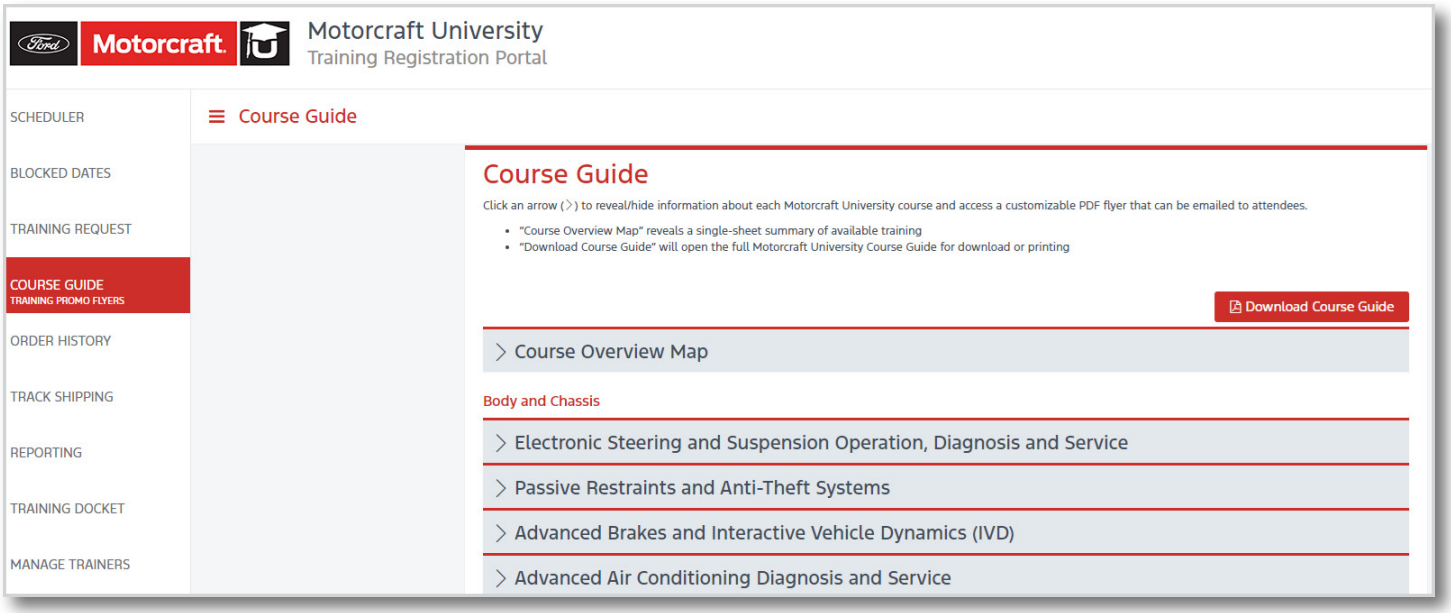
## View Order History

Review status of requested training and training details from the Order History tab.



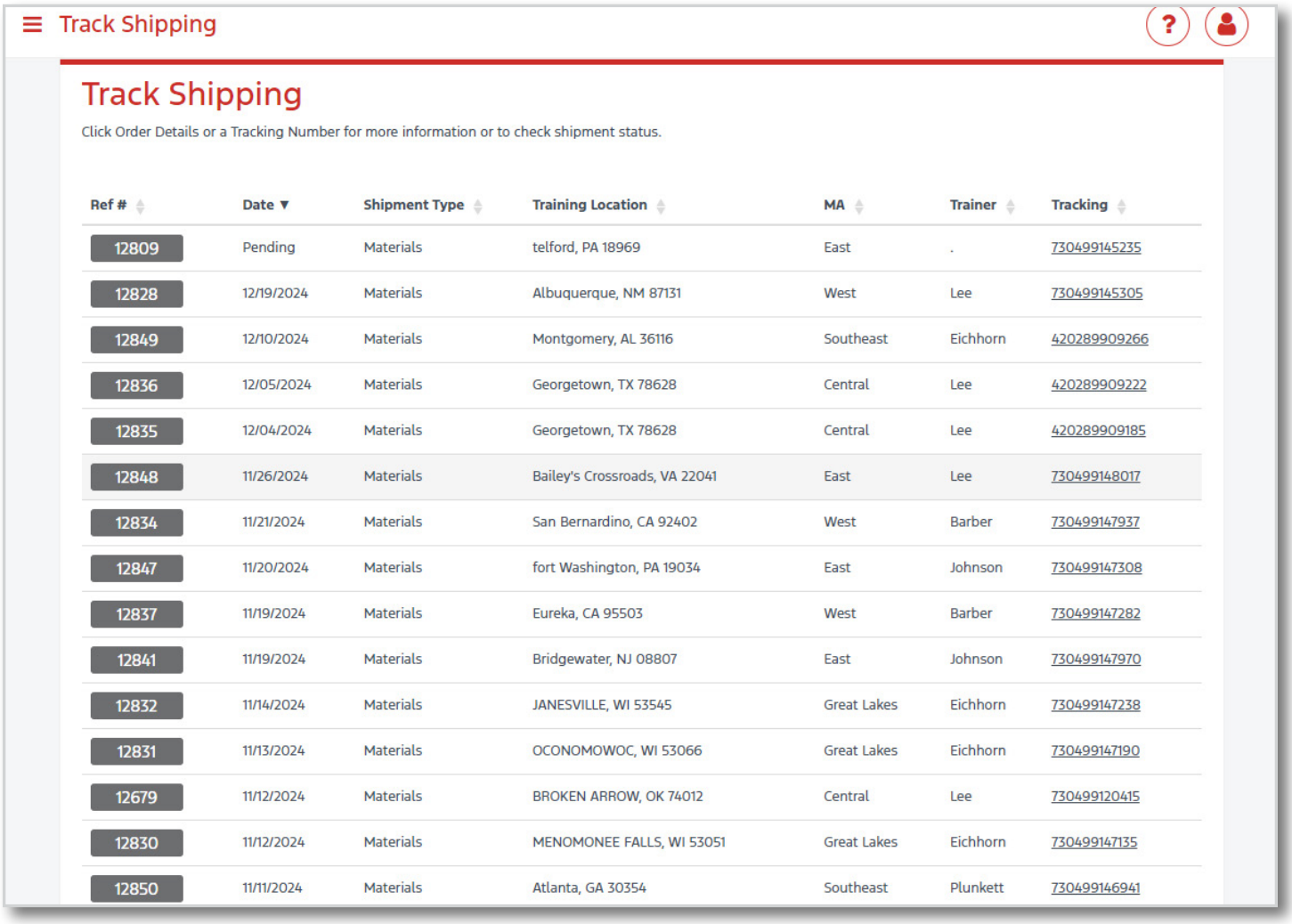

## Review Course Guide

On the Course Guide tab you can view a full list of available courses along with downloadable, customizable flyers to help promote your training.



## Track Materials Shipments

Easily track shipping of training materials and participant certificates from the Track Shipping tab.




| Ref # | Date ▼ | Shipment Type | Training Location | MA | Trainer | Tracking |
|---|---|---|---|---|---|---|
| 12809 | Pending | Materials | telford, PA 18969 | East | . | 730499145235 |
| 12828 | 12/19/2024 | Materials | Albuquerque, NM 87131 | West | Lee | 730499145305 |
| 12849 | 12/10/2024 | Materials | Montgomery, AL 36116 | Southeast | Eichhorn | 420289909266 |
| 12836 | 12/05/2024 | Materials | Georgetown, TX 78628 | Central | Lee | 420289909222 |
| 12835 | 12/04/2024 | Materials | Georgetown, TX 78628 | Central | Lee | 420289909185 |
| 12848 | 11/26/2024 | Materials | Bailey's Crossroads, VA 22041 | East | Lee | 730499148017 |
| 12834 | 11/21/2024 | Materials | San Bernardino, CA 92402 | West | Barber | 730499147937 |
| 12847 | 11/20/2024 | Materials | fort Washington, PA 19034 | East | Johnson | 730499147308 |
| 12837 | 11/19/2024 | Materials | Eureka, CA 95503 | West | Barber | 730499147282 |
| 12841 | 11/19/2024 | Materials | Bridgewater, NJ 08807 | East | Johnson | 730499147970 |
| 12832 | 11/14/2024 | Materials | JANESVILLE, WI 53545 | Great Lakes | Eichhorn | 730499147238 |
| 12831 | 11/13/2024 | Materials | OCONOMOWOC, WI 53066 | Great Lakes | Eichhorn | 730499147190 |
| 12679 | 11/12/2024 | Materials | BROKEN ARROW, OK 74012 | Central | Lee | 730499120415 |
| 12830 | 11/12/2024 | Materials | MENOMONEE FALLS, WI 53051 | Great Lakes | Eichhorn | 730499147135 |
| 12850 | 11/11/2024 | Materials | Atlanta, GA 30354 | Southeast | Plunkett | 730499146941 |

MOTORCRAFT UNIVERSITY IS DEDICATED TO PROVIDING TECHNICIANS WITH OEM-LEVEL TECHNICAL KNOWLEDGE THAT IS ESSENTIAL TO SUCCESSFULLY SERVICING AND REPAIRING MODERN FORD VEHICLES.

# FIX IT RIGHT THE FIRST TIME

Motorcraft University offers courses on critical Ford and Lincoln systems that can benefit repair facilities of all sizes.

With the insight that only Ford can provide, Technicians at Installers can get insider tips and tricks that complement Ford OE and Motorcraft part installation to deliver a quality repair for their customers.

Our three-hour in-person sessions let aftermarket Technicians get up to speed and back to the shop the same day. And, class size is limited to focus on the needs of those attending, allowing for questions to be answered when they arise.

# COURSE STRUCTURE

- Available to Ford and Lincoln dealerships and Ford Authorized Distributors (FADs) only
- Each course is designed to be three hours in length
- Presented in a live training format with up to 40 attendees
- Courses are usually scheduled in evenings, after normal work hours, but can be scheduled at any time during the day to accommodate local needs
- Allows for one-on-one interaction between Dealer/Distributor and participants
- Course cost may be offset by parts purchase offers for attending the training. Dealers/Distributors may also fund certain events with:
  - Promotional Growth Funds/Business Growth Funds
  - Ford PSN Seller Incentive, if applicable
- Courses are usually held at a local venue or the Dealer/Distributor facility
- It's customary for the hosting Dealer/Distributor to begin the seminar with a meal

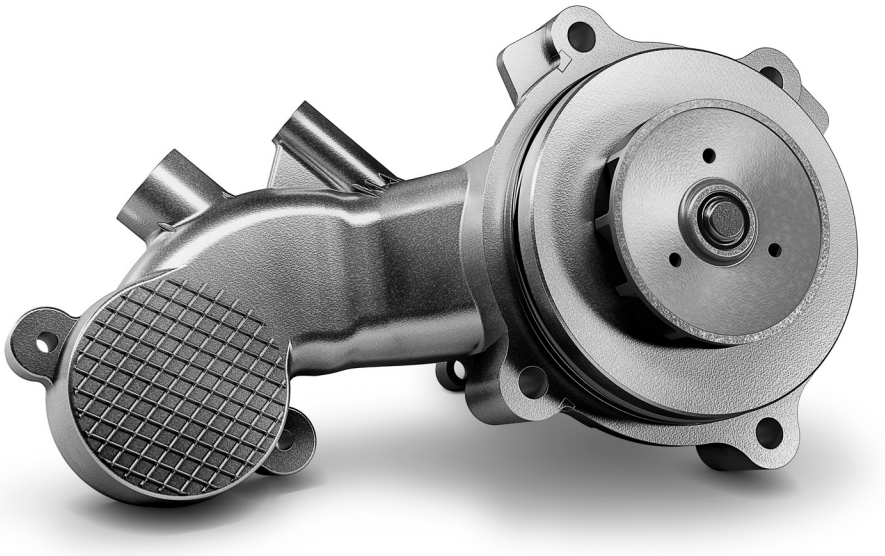
**COURSE STRUCTURE (continued)**

# MOTORCRAFT UNIVERSITY TECHNICAL TRAINING – ADVANTAGE: YOU

Motorcraft knows that many Aftermarket Technicians receive limited technical training, especially if they happen to work in a smaller facility. Through Motorcraft University, Motorcraft provides OEM-level training on vehicle systems and technologies, which Technicians may have seen and worked on, but without a full understanding.

Motorcraft University training gives Independent Repair Facilities the confidence to deliver high-quality Ford and Lincoln parts and service from every bay.

But Motorcraft University doesn't just benefit the Technician. By offering training, customer relationships with the dealership or Distributor can be created when trying to win over new customers, or enhanced with existing customers. And, in addition to Motorcraft University training being an instant headliner for an open house or other event, the goodwill created can lead to higher recall when customers are shopping for parts, and eventually, greater parts sales.



# MOTORCRAFT UNIVERSITY COURSE MAP

## MOTORCRAFT UNIVERSITY
COURSE OVERVIEW MAP

### Electrical/Electronics

#### Advanced Driver Assistance Systems (ADAS)
■■□ Intermediate

*Recommended Prior Knowledge: Working knowledge of vehicle electronics including networks*

**Learning Objective:** This course provides students with the foundation required to understand the latest ADAS technologies being used on today's Ford vehicles.

#### Automotive Electronics Operation and Diagnosis
■□□ Basic

**Learning Objective:** Provide Technicians with essential current information on automotive electrical/electronics components and systems.

#### Body and Chassis Electrical/Electronics Diagnosis and Service
■■□ Intermediate

*Recommended Prior Knowledge: Working knowledge of vehicle electrical/electronics systems.*

**Learning Objective:** Enhance Technician ability to effectively diagnose and service vehicle electrical/electronics systems.

#### NEW Electrical Theory and Operation
■□□ Basic

**Learning Objective:** Provide Technicians with the foundation information needed to perform electrical testing during diagnosis.

#### Ford Diagnostic and Repair System (FDRS) and VCMM Operation
■◩□ Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed for the FDRS program and VCMM Tool.

#### Ford E-Transit Operation, Diagnosis and Service
■■■ Advanced

*Recommended Prior Knowledge: Electrical and electronic system operation*

**Learning Objective:** This course provides technicians with the fundamentals needed to understand high-voltage operation, and the knowledge required to service the Ford E-Transit safely and accurately.

#### Ford Explorer and Lincoln Aviator Hybrid Vehicle Components and Operation
■◩□ Basic to Intermediate

**Learning Objective:** Expand Technician knowledge needed to service the latest hybrid systems from Ford.

#### Ford High-Voltage Vehicles Components and Operation
■■□ Intermediate

**Learning Objective:** Provide Technicians with knowledge on Ford high-voltage vehicle technology components and operation so that they can complete repairs on Ford hybrid and electric vehicles.

#### NEW Ford Lightning Components, Operation and Service
■■◩ Intermediate to Advanced

**Learning Objective:** This course provides Technicians with the fundamentals needed to understand high-voltage operation, and the knowledge required to service the Ford F-150 Lightning safely and accurately.

#### Integrated Diagnostic Software(IDS) Operation and Utilization
■◩□ Basic to Intermediate

**Learning Objective:** Provide Technicians with key knowledge for the use of use the Ford Rotunda Integrated Diagnostic Software (IDS) Scan Tool for optimal utilization.

#### Networks and Control Module Operation, Diagnosis and Service
■■□ Intermediate

*Recommended Prior Knowledge: Working knowledge of vehicle electrical/electronics systems.*

**Learning Objective:** Deliver current information to Technicians on electronic networking systems, including components, strategies, symptoms, diagnosis and testing so that they can properly repair Ford network and control module issues.

### Engine Performance and Driveability

#### Emission Control Relationships for Driveability Diagnosis
■■□ Intermediate

**Learning Objective:** Technicians will be able to identify symptoms that can occur in modern engine on-board tests based on system and operating configuration.

#### Ford EcoBoost® Engine Operation, Diagnosis and Service
■□□ Basic

**Learning Objective:** Technicians will be able to understand how Ford EcoBoost engine technologies and systems operate so that Technicians can service these popular Ford engines.

#### Gasoline Engine Performance and Driveability
■■□ Intermediate

*Recommended Prior Knowledge: Working knowledge of engine operation, OBD II Systems and scan tool utilization.*

**Learning Objective:** Technicians will be able to describe driveability symptoms, diagnostic techniques and corrective actions for vehicle performance and driveability concerns.

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# MOTORCRAFT UNIVERSITY COURSE OVERVIEW MAP

Motorcraft

## Maintenance and Light Repair

### Maintenance and Light Repair (MLR) Procedures, Inspections and Service

■□□ Basic

**Learning Objective:** Provide Technicians with key knowledge in identifying the Maintenance and Light Repair (MLR) tasks and guidelines for several common vehicle systems.

### NEW Medium Duty Truck Brakes Theory and Operation

■◩□ Basic to Intermediate

**Learning Objective:** Describe the components, operation, and diagnosis of Ford Medium-Duty truck brake systems.

### Noise, Vibration and Harshness Diagnosis and Service

■◩□ Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed to service NVH issues on Ford vehicles.

## Body and Chassis

### Advanced Air Conditioning Diagnosis and Service

■■□ Intermediate

**Learning Objective:** Conduct a comprehensive analysis of modern climate control systems that will allow Technicians to properly service them.

### Advanced Brakes and Interactive Vehicle Dynamics (IVD)

■■□ Intermediate

**Learning Objective:** Understand the operation and function of advanced vehicle brake systems, including key diagnostic approaches to Interactive Vehicle Dynamics (IVD), so that Technicians can effectively service Ford Motor Company vehicles.

### Electronic Steering and Suspension Operation, Diagnosis and Service

■◩□ Basic to Intermediate

**Learning Objective:** Describe the function and operation of electronically controlled steering and suspension systems for optimal diagnosis and service.

### Passive Restraints and Anti-Theft Systems

■◩□ Basic to Intermediate

**Learning Objective:** Enable Technicians to safely and confidently work with and near passive restraints and anti-theft systems.

## Diesel

### 3.0L Power Stroke® Common-Rail Fuel System

■■◩ Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 3.0L Power Stroke® common rail fuel system components, operation, diagnosis and service.

### 3.0L Power Stroke® Diesel Components and Operation

■◩□ Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed to service the Ford 3.0L diesel engine.

### 3.2L Diesel Components, Operation and Service

■◩□ Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge that they need to service the Ford 3.2L diesel engine.

### 3.2L Fuel, Air and Exhaust Systems

■■◩ Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 3.2L Power Stroke® high-pressure fuel system, air management system, and EGR and exhaust system components, operation, diagnosis and service.

### 6.0L and 6.4L Diesel Components and Operation

■◩□ Basic to Intermediate

*Recommended Prior Knowledge: Take this course PRIOR to attending 6.0L Diesel Advanced Diagnosis and Testing or 6.4L Diesel Advanced Diagnosis and Testing courses.*

**Learning Objective:** Provide Technicians with key knowledge and insights on the location and operation of important aspects of two Ford diesel engines so that they can complete any necessary repairs on these engines.

### 6.0L Diesel Hydraulic Electronic Unit Injector (HEUI) Fuel System

■■■ Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.0L Power Stroke® Hydraulic Electronic Unit Injector (HEUI) fuel system components, operation, diagnosis and service.

## MOTORCRAFT UNIVERSITY COURSE OVERVIEW MAP

### Diesel (continued)

#### 6.0L Power Stroke® Diesel Advanced Diagnosis and Testing

■■■ Advanced

*Recommended Prior Knowledge: 6.0L and 6.4L Diesel Components and Operation course.*

**Learning Objective:** Technicians who successfully complete this course will better understand proper diagnosis and testing for the Ford 6.0L diesel engine so that they can complete any necessary repairs on this engine.

#### 6.4L Fuel, Air and Exhaust Systems

■■◩ Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.4L Power Stroke® high-pressure fuel system, air management system, and EGR and exhaust system components, operation, diagnosis and service.

#### 6.4L Power Stroke® Diesel Advanced Diagnosis and Testing

■■■ Advanced

*Recommended Prior Knowledge: 6.0L and 6.4L Diesel Components and Operation course.*

**Learning Objective:** Be able to understand advanced, in-depth diagnostic methods for the Ford 6.4L diesel engine.

#### 6.7L EGR and Exhaust System Operation and Service

■■■ Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.7L Power Stroke® EGR and exhaust system components, operation, diagnosis and service.

#### 6.7L Power Stroke® Common Rail Fuel System

■■◩ Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.7L Power Stroke® common rail fuel system components, operation, diagnosis and service.

#### 6.7L Power Stroke® Diesel Advanced Diagnosis and Service

■■■ Advanced

**Learning Objective:** Provide Technicians with key knowledge on the diagnostic processes that will enable them to more quickly and effectively diagnose and repair the 6.7L Power Stroke Diesel engine.

#### REVISED 6.7L Power Stroke® Diesel Components and Operation

■■□ Intermediate

**Learning Objective:** Be able to demonstrate the knowledge that Technicians need to service the Ford 6.7L diesel engine.

#### 6.7L Turbocharger Operation, Diagnosis and Service

■■□ Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.7L Power Stroke® Single Sequential Turbocharger (SST) and DualBoost Turbocharger components, operation, diagnosis and service.

#### 7.3L and 6.0L Diesel Engine Repair

■■■ Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 7.3L and 6.0L diesel engines service and repair procedures.

#### Air Management Systems

■■□ Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the fundamental principles of diesel air management and delivery components and operation.

#### Diesel Aftertreatment System

■■□ Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the fundamental principles of diesel air management and delivery components and operation.

#### Diesel Electronic Engine Control (EEC) System

■■□ Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the Electronic Engine Control (EEC) system's components and operation.

#### Diesel Engine Theory and Operation

■◩□ Basic to Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to understand the fundamentals related to diesel engine operation, electronic engine management and engine subsystems.

#### Diesel Maintenance and Service

■□□ Basic

**Learning Objective:** At the conclusion of this course, the student will be able to describe the periodic maintenance requirements of a diesel engine.

#### Understanding Diesel Fuel Systems

■□□ Basic

**Learning Objective:** At the conclusion of this course, the student will be able to describe the fundamental principles of diesel fuel system components and operation.

## MOTORCRAFT UNIVERSITY COURSE OVERVIEW MAP

### Powertrain

**Automatic Transmission Operation, Diagnosis and In-Vehicle Service**

■■□ Intermediate

**Learning Objective:** Provide Technicians with automatic transmission basic operation and diagnostics that may be needed when servicing the Ford vehicles.

**Four-Wheel Drive (4x4) and All-Wheel Drive (AWD) Operation, Diagnosis and Service**

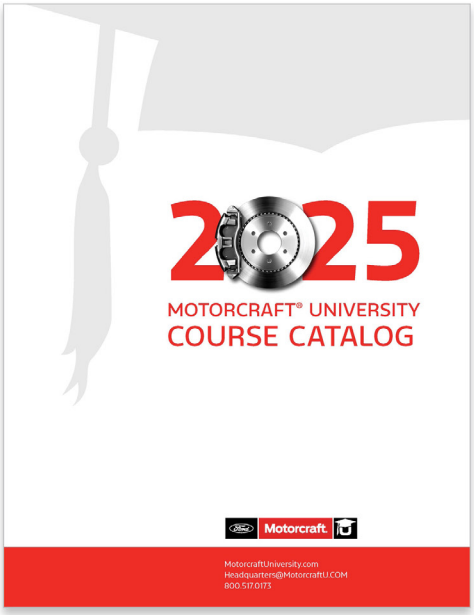
■◩□ Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed to service the four-wheel-drive (4x4) and all-wheel-drive (AWD) Systems on Ford vehicles.

**Gasoline Engine Diagnosis and Repair**

■□□ Basic

**Learning Objective:** Provide Technicians with core diagnosis and repair information related to Ford naturally aspirated gasoline engines.




*For full course details, see the Motorcraft University Course Catalog.*

## BODY AND CHASSIS

### Electronic Steering and Suspension Operation, Diagnosis and Service

Modern vehicles have steering and suspension systems that are electronically controlled by computers. These systems adjust to vehicle loading and road and driving conditions. To help Technicians stay competitive, this training will describe the components, operation, diagnosis and service of these systems.

**Topics Include:**

- Electronic Power-Assisted Steering (EPAS)
- Variable-Assist Power Steering
- Rear Load-Leveling Suspension
- Four-Wheel Electronic Suspension
- Automatic Ride Control (ARC) Suspension
- Interactive Vehicle Dynamics (IVD) Suspension

**Technical Content:** Basic to Intermediate

**Learning Objective:** Describe the function and operation of electronically controlled steering and suspension systems for optimal diagnosis and service.

### Passive Restraints and Anti-Theft Systems

Two of the most common systems found on vehicles today are passive restraints and anti-theft. Every Technician, regardless of specialty, must be able to work with and around these systems.

**Topics Include:**

- Supplemental Restraint System (SRS) Components and Operation (Single-Stage and Dual-Stage)
- SRS Diagnosis
- SRS Service
- Remote Keyless Entry (RKE) Components and Operation
- Perimeter Anti-Theft System Operation
- Passive Anti-Theft System (PATS) Components and Operation
- PATS Service

**Technical Content:** Basic to Intermediate

**Learning Objective:** Enable Technicians to safely and confidently work with and near passive restraints and anti-theft systems.

## BODY AND CHASSIS (continued)

### Advanced Brakes and Interactive Vehicle Dynamics (IVD)

Working on today's brake systems can be challenging. No longer is it just installing new pads and turning the rotors. Modern systems use more electrohydraulic controls than ever to control braking, vehicle traction and stability control. Technicians must understand how these systems work and what to look for when they do not work.

**Topics Include:**

- Anti-Lock Brake System (ABS) Operation
- Traction Control System Operation
- Interactive Vehicle Dynamics (IVD) Operation
- ABS/IVD Input and Output Components
- ABS/IVD Diagnosis
- Hybrid Vehicle Regenerative Braking
- Hydraulic Full-Power Brake Systems (Medium Trucks)
- Hydro-Max™ and Hydro-Boost™ Brake Systems (Medium Trucks)

**Technical Content:** Intermediate

**Learning Objective:** Understand the operation and function of advanced vehicle brake systems, including key diagnostic approaches to Interactive Vehicle Dynamics (IVD), so that Technicians can effectively service Ford Motor Company vehicles.

**RECOMMENDED:** Base brake system operation and service

### Advanced Air Conditioning Diagnosis and Service

You know how to recharge an air conditioning system, but do you know what makes it tick? Modern climate control systems are much more than a compressor and tubes; they are complete computer controlled systems. Technicians must understand the different operating strategies and components of these systems to effectively service them.

**Topics Include:**

- EPA Regulatory Requirements for MVAC Service
- Refrigerant System Testing – R-134a and R-1234yf
- AC Testing Setup Procedure
- Register Discharge Air Temperature Test
- Leak Testing
- Refrigerant Pressure Concerns
- General Service Procedures
- Refrigerant Analyzer
- Refrigerant System Service

**Technical Content:** Intermediate

**Learning Objective:** Conduct a comprehensive analysis of modern climate control systems that will allow Technicians to properly diagnose and service them.

# COURSE GUIDE

Diesel Engines

## DIESEL ENGINES

### Diesel Maintenance and Service

All diesel engines require periodic maintenance to operate optimally. Diesel engines create extreme high pressure for combustion to occur. Lack of maintenance can prematurely age and damage engine components. This course describes maintenance and service procedures to keep Ford diesel-equipped vehicles in top-running condition.

**Topics Include:**

- Maintenance Overview
- Engine Overviews
- Recommended Maintenance Intervals
- Inspection Process
- Air Management System Maintenance and Service
- Under-Vehicle Inspections
- Lubrication Maintenance and Service
- Fuel Quality
- Fuel System Service
- Cooling System Maintenance and Service
- DPF Maintenance and Service
- SCR Reductant Maintenance and Service

**Technical Content:** Basic

**Learning Objective:** At the conclusion of this course, the student will be able to describe the periodic maintenance requirements of a diesel engine.

### Understanding Diesel Fuel Systems

The function of the diesel fuel system is to inject a precise amount of atomized and pressurized fuel into each engine cylinder at the proper time. This course provides a basic understanding of the components, operation and strategies used to ensure the correct amount of fuel is delivered to the engine. A brief overview of fuel system component failures and symptoms is included. This course is not engine specific, instead it provides a broad range of information on various Ford systems.

**Topics Include:**

- Diesel and Gasoline Comparison
- Diesel Fuel System Overview
- Low-Pressure Fuel System Components and Operation
- Fuel Quality
- Engine Control Components
- High-Pressure Fuel System Components and Operation
- High-Pressure Fuel System Warnings
- Fuel System Failures and Symptoms

**Technical Content:** Basic

**Learning Objective:** At the conclusion of this course, the student will be able to describe the fundamental principles of diesel fuel system components and operation.

## DIESEL ENGINES (continued)

### Diesel Engine Theory and Operation

Provides a basic overview of diesel engine operation, including low- and high-pressure fuel systems, electronic engine control management system, air intake system, and exhaust and emissions system.

**Topics Include:**

- Engine Operation
- Diesel Four-Stroke Process
- Powertrain Control Systems
- Fuel System
- Intake System
- Emission System
- Inputs
- Outputs
- Modules

**Technical Content:** Basic to Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to understand the fundamentals related to diesel engine operation, electronic engine management and engine subsystems.

### 3.0L Power Stroke® Diesel Components and Operation

This course will describe the 3.0L Power Stroke® Diesel components and operation. This includes turbocharger, low- and high-pressure fuel systems, diesel particulate filter and selective catalytic reduction systems.

**Topics Include:**

- Engine
  - Overview
  - System
  - Maintenance
  - Component Location
  - Cooling System
- Fuel Charging and Controls
  - High-Pressure Fuel System
  - Turbocharging System
  - Glow Plug System
- Emissions Control System
  - Diesel Particulate Filter (DPF)
  - Exhaust
  - Selective Catalytic Reduction (SCR) System
- Networks and Control Modules
- Electronic Engine Controls

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed to service the Ford 3.0L diesel engine.

## DIESEL ENGINES (continued)

### 3.2L Diesel Components, Operation and Service

The 3.2L Duratorq® I-5 diesel engine is an in-line 5-cylinder, common fuel rail, turbocharged diesel engine from Ford, a member of the global Puma engine family. This course helps Service Technicians better understand the engine's components and operation in order to more effectively diagnose and service its systems.

**Topics Include:**

- Engine Overview
- Engine Components
- Cooling System
- Lubrication System
- Air Management System
- Fuel System
- Fuel Management System
- Electrical/Electronics
- Exhaust System

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge that they need to service the Ford 3.2L diesel engine.

### Air Management Systems

Diesel engines require clean and efficient air delivery. This course provides a basic understanding of the components, operation and strategies used to ensure air is delivered to the engine. This includes turbocharger and EGR operation. Although the fundamentals are not diesel engine-specific, examples of the 6.7L and 3.2L air management systems are included.

**Topics Include:**

- Air Management Overview
- Air Inlet System
- Electronic Air Management Control
- Intake Air Management Operation
- Turbocharger
- Turbocharger Configurations
- Exhaust Gas Recirculation
- Air Management Fault Symptoms
- 6.7L Air Management System
- 3.2L Air Management System

**Technical Content:** Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the fundamental principles of diesel air management and delivery components and operation.

## DIESEL ENGINES (continued)

### Diesel Aftertreatment System

The Diesel Aftertreatment System is a series of components that cleans the diesel exhaust emitted by the engine prior to releasing it through the tailpipe and into the atmosphere. Its purpose is to reduce the emission of harmful pollutants into the environment. This course provides the student with fundamental knowledge of system operation and diagnosis. This course is not engine-specific, instead it provides a broad range of information on various Ford systems.

**Topics Include:**

- Diesel Engine Exhaust Gases
- Aftertreatment System Overview
- Diesel Oxidation Catalyst (DOC)
- Diesel Particulate Filter (DPF) System
- Selective Catalyst Reduction (SCR) System
- Aftertreatment System Symptoms
- Cold Weather Aids Overview
- Glow Plug System
- Cold Weather Aid Symptoms
- Aftertreatment Diagnostic Process

**Technical Content:** Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the fundamental principles of diesel air management, and delivery components and operation.

## DIESEL ENGINES (continued)

### Diesel Electronic Engine Control (EEC) System

The Electronic Engine Control (EEC) System provides optimum control of the engine through the PCM. This course provides the fundamental knowledge students need to understand electronic engine control operation. This includes the design and operation of modules, engine input sensors, switches, output devices and communication networks found on Ford diesels.

**Topics Include:**

- Network Overview
- Network Components
- Network Operation
- Modules
- Powertrain Control Module (PCM)
- Glow Plug Control Module (GPCM)
- Reductant Pump Control Module
- NOx Sensor Module
- Inputs
- Temperature Sensors
- Pressure Sensors
- Position Sensors
- Additional Sensors
- Outputs
- Solenoids
- Relays
- Additional Outputs

**Technical Content:** Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the Electronic Engine Control (EEC) System's components and operation.

### 6.0L and 6.4L Diesel Components and Operation

This Motorcraft University training focuses on the Ford 6.0L and 6.4L diesel engines. Technicians will learn how these engines operate, as well as the location and operation of key components.

**Topics Include:**

- Fuel and Lubricants
- Air Management System
- Low-Pressure Fuel System
- 6.0L High-Pressure Oil and Fuel System
- 6.4L High-Pressure Fuel System
- Cooling Systems
- Maintenance

**Technical Content:** Intermediate

**Learning Objective:** Provide Technicians with key knowledge and insights on the location and operation of important aspects of two Ford diesel engines so that they can complete any necessary repairs on these engines.

**Recommended Prior Knowledge:** Take this course PRIOR to attending 6.0L Diesel Advanced Diagnosis and Testing or 6.4L Diesel Advanced Diagnosis and Testing courses.

## DIESEL ENGINES (continued)

### 6.7L Power Stroke® Diesel Components and Operation

The Ford 6.7L diesel engine is found on a wide variety of Ford heavy-duty vehicles. This popular engine has evolved over the years, and is now in its 3rd generation to meet the demands of the medium duty truck industry. This course focuses on expanding Technician knowledge and skills to effectively service these powerplants.

**Topics Include:**

- Engine Components and Specifications
- Fuel and Lubricants
- Air Inlet and Turbocharger
- EGR System Operation
- Diesel Particulate Filter (DPF) Operation
- Selective Catalytic Reduction (SCR) Operation
- Low-/High-Pressure Fuel Systems
- Engine Electronic Input and Output Operation, Diagnosis and Service
- Primary and Secondary Cooling Systems
- Vehicle Maintenance Procedures

**Technical Content:** Basic to Intermediate

**Learning Objective:** Be able to demonstrate the knowledge that Technicians need to service the Ford 6.7L diesel engine.

### 6.7L Turbocharger Operation, Diagnosis and Service

Turbocharged engines burn more fuel and air by providing large amounts of air into the engine cylinders, thus creating greater power. This course explains turbocharger operation, diagnosis and service. The course specifically describes the 6.7L Power Stroke® turbocharger systems, including both the Single Sequential Turbocharger (SST) and DualBoost Turbocharger.

**Topics Include:**

- Intake Air Management System
- Turbocharger Fundamentals
- 6.7L Turbocharger Configurations
- 6.7L Turbocharger System Components
- Exhaust Gas Recirculation
- Exhaust System
- Electronic Air Management Control
- Turbocharger System Operation
- Air Management Fault Symptoms
- Turbocharger System Diagnosis
- General Service Procedures

**Technical Content:** Intermediate

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.7L Power Stroke® Single Sequential Turbocharger (SST) and DualBoost Turbocharger components, operation, diagnosis and service.

## DIESEL ENGINES (continued)

### 3.0L Power Stroke® Common-Rail Fuel System

The common-rail diesel engine delivers more power to the vehicle while consuming less fuel and producing fewer emissions than previous systems. This course provides a detailed look at the 3.0L Power Stroke® fuel system. The course includes specific information on the 3.0L common-rail fuel system components, operation, electronic control strategies, and diagnosis and service.

**Topics Include:**

- Fuel Quality
- Low-Pressure Fuel System Components and Operation
- Optimizing Fuel System Performance
- Low-Pressure Fuel System Service
- High-Pressure Fuel System Components and Operation
- Piezo Fuel Injectors Operation and Service
- Fuel System Diagnosis and Service
- High-Pressure Fuel System Warnings

**Technical Content:** Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 3.0L Power Stroke® common-rail fuel system components, electronic control strategies, operation, diagnosis and service.

### 3.2L Fuel, Air and Exhaust Systems

The diesel fuel, air and exhaust systems are the backbone of unique diesel engine operation. This course provides the students with a detailed look at the 3.2L Power Stroke® fuel, air and exhaust systems. Included is key information from each system regarding operation, diagnosis and service.

**Topics Include:**

- Diesel/Gas Engine Similarities and Differences
- 3.2L Fuel Supply System
- 3.2L High-Pressure Fuel System
- 3.2L Fuel Injectors
- Air Management System
- Turbocharger
- Exhaust Gas Recirculation (EGR)
- Electronic Air Management Control
- Air Management System Operation
- Diesel Engine Exhaust Gases
- 3.2L Exhaust System Components
- DPF Regeneration
- Exhaust System Diagnosis
- 3.2L Service Procedures
- Air Management Fault Symptoms
- Turbocharger System Diagnosis

**Technical Content:** Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 3.2L Power Stroke® high-pressure fuel system, air management system, and EGR and exhaust system components, operation, diagnosis and service.

## DIESEL ENGINES (continued)

### 6.4L Fuel, Air and Exhaust Systems

The diesel fuel, air and exhaust systems are the backbone of unique diesel engine operation. This course provides the students with a detailed look at the 6.4L Power Stroke® fuel, air and exhaust systems. Included is key information from each system regarding operation, diagnosis and service.

**Topics Include:**

- Diesel/Gas Engine Similarities and Differences
- 6.4L Fuel Supply System
- 6.4L High-Pressure Fuel System
- 6.4L Fuel Injectors
- Air Management System
- Turbocharger
- Exhaust Gas Recirculation (EGR)
- Electronic Air Management Control
- Air Management System Operation
- Diesel Engine Exhaust Gases
- 6.4L Exhaust System Components
- DPF Regeneration
- Exhaust System Diagnosis
- 6.4L Service Procedures
- Air Management Fault Symptoms
- Turbocharger System Diagnosis

**Technical Content:** Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.4L Power Stroke® high-pressure fuel system, air management system, and EGR and exhaust system components, operation, diagnosis and service.

### 6.7L Power Stroke® Common-Rail Fuel System

The common-rail diesel engine delivers more power to the vehicle while consuming less fuel and producing fewer emissions than previous systems. This course provides a detailed look at the 6.7L Power Stroke® fuel system. The course includes specific information on the 6.7L common-rail fuel system components, operation, electronic control strategies, diagnosis and service.

**Topics Include:**

- Fuel Quality
- Low-Pressure Fuel System Components and Operation
- Optimizing Fuel System Performance
- Low-Pressure Fuel System Service
- High-Pressure Fuel System Components and Operation
- Piezo Fuel Injectors Operation and Service
- High-Pressure Fuel System Warnings
- Fuel System Diagnosis and Service

**Technical Content:** Intermediate to Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.7L Power Stroke® common-rail fuel system components, operation, diagnosis and service.

## DIESEL ENGINES (continued)

### 6.0L Diesel Hydraulic Electronic Unit Injector (HEUI) Fuel System

The Hydraulic Electronic Unit Injector (HEUI) fuel system creates high-pressure fuel injection from pressurized engine oil. This course specifically describes the 6.0L HEUI fuel system components, operation and diagnosis. It's worth noting that although the information contains 6.0L specifics, a large portion the information can be applied to the 7.3L HEUI fuel system as well.

**Topics Include:**

- High-Pressure Oil System Components and Operation
- Fuel System Components and Operation
- 6.0L Hydraulic Electronic Unit Injectors (HEUI)
- 6.0L Fuel Management System
- Fuel Injection Control Module (FICM)
- High-Pressure Fuel System Testing
- Fuel Quality
- Fuel System Diagnosis
- High-Pressure Oil System Diagnosis

**Technical Content:** Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.0L Power Stroke® Hydraulic Electronic Unit Injector (HEUI) fuel system components, operation, diagnosis and service.

### 6.0L Power Stroke® Diesel Advanced Diagnosis and Testing

This training offers insight and information on in-depth diagnostic and testing for the 6.0L diesel engine. The course delivers on one of the most common requests for this powerplant and offers a way for Technicians to boost profit opportunities.

**Topics Include:**

- Preliminary Diagnostic Procedures
- Fuel System Tests
- High-Pressure Oil System Tests
- EGR Testing
- Hard-Start/No-Start Tests
- Engine Performance Tests
- Additional Tests

**Technical Content:** Advanced

**Learning Objective:** Technicians who successfully complete this course will better understand proper diagnosis and testing for the Ford 6.0L diesel engine so that they can complete any necessary repairs on this engine.

**Recommended Prior Knowledge:** 6.0L and 6.4L Diesel Components and Operation course.

## DIESEL ENGINES (continued)

### 6.4L Power Stroke® Diesel Advanced Diagnosis and Testing

Many aftermarket facilities are beginning to see an increase in 6.4L-equipped Ford vehicles. This course provides in-depth diagnostic methods for this engine.

**Topics Include:**

- Preliminary Information
- Hard-Start/No-Start Tests
- Diesel Particulate Filter (DPF) Testing and Diagnosis
- Engine Performance Tests
- Additional Tests

**Technical Content:** Advanced

**Learning Objective:** Be able to understand advanced, in-depth diagnostic methods for the Ford 6.4L diesel engine.

**Recommended Prior Knowledge:** 6.0L and 6.4L Diesel Components and Operation course.

### 6.7L EGR and Exhaust System Operation and Service

The Diesel Aftertreatment System is a series of components that cleans the diesel exhaust emitted by the engine prior to releasing it through the tailpipe and into the atmosphere. Its purpose is to reduce the emission of harmful pollutants into the environment. This course includes 6.7L EGR, DPF and SCR systems components, operation, diagnosis and service.

**Topics Include:**

- Diesel/Gas Engine Similarities and Differences
- Exhaust Gas Recirculation (EGR) System Components
- EGR-Related Sensors
- EGR System Operation
- Diesel Engine Exhaust Gases
- Aftertreatment System Components
- Diesel Particulate Filter (DPF) Regeneration
- DPF Service
- Selective Catalyst Reduction (SCR) Components
- Diesel Exhaust Fluid (DEF)
- SCR Sensors and Modules
- SCR Operation
- SCR Service
- Exhaust System Symptoms
- Cold Weather Aid Components and Symptoms

**Technical Content:** Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 6.7L Power Stroke® EGR and exhaust system components, operation, diagnosis and service.

## DIESEL ENGINES (continued)

### 6.7L Power Stroke® Diesel Advanced Diagnosis and Service

The 6.7L Power Stroke® diesel has raised the bar for power, durability and economy for modern diesel-powered vehicles. This course will use diagnostic tools and Service Publications to diagnose concerns on its high-pressure fuel system, Diesel Particulate System (DPF), Selective Catalyst Reduction (SCR) and Diesel Exhaust Fluid (DEF) system.

**Topics Include:**

- Fuel Control System
- Fuel Delivery Systems
- Selective Catalytic Reduction (SCR) System
- Exhaust Gas Recirculation (EGR) System
- High-Pressure Fuel System
- Engine Misfires
- NOx System and Networks

**Technical Content:** Advanced

**Learning Objective:** Provide Technicians with key knowledge on the diagnostic processes that will enable them to more quickly and effectively diagnose and repair the 6.7L Power Stroke® Diesel engine.

### 7.3L and 6.0L Diesel Engine Repair

This course explains the unique design features of the 7.3L and 6.0L diesel engines. Throughout the course, both 7.3L and 6.0L engine component measurements, service and repair procedures are explained.

**Topics Include:**

- Diesel Engine Overview
- 7.3L Diesel Engine Short Block
- 7.3L Cylinder Head and Related Components
- 7.3L High- and Low-Pressure Oil Systems
- 7.3L Diagnosis
- 6.0L Diesel Engine Short Block
- 6.0L Cylinder Head and Related Components
- 6.0L Cooling System
- 6.0L Engine Lubrication

**Technical Content:** Advanced

**Learning Objective:** At the conclusion of this course, the student will be able to describe the 7.3L and 6.0L diesel engines service and repair procedures.

## ELECTRICAL/ELECTRONICS

### Automotive Electronics Operation and Diagnosis

This course presents Technicians who wish to expand or refresh their knowledge and skills with the latest information on modern automotive electrical and electronic components and systems.

**Topics Include:**

- Electronic Switching
- Electromechanical Devices
- Electrical Circuit Testing
- Diagnostic Processes and Procedures
- Wiring Diagram Utilization and Interpretation
- Module Control of Circuits
- Control Module Strategies and Module Diagnostic Capabilities
- Electronic Signals
- Sensor Operation and Diagnosis
- Input/Output Device Operation, Diagnosis and Testing
- Scan Tool Testing
- Electrical Management System Operation
- Charging System Operation and Diagnosis
- Intermittent Electrical/Electronics Diagnosis

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with essential, current information on automotive electrical/electronics components and systems.

### Ford Diagnostic and Repair System (FDRS) and VCMM Operation

Starting in 2018, Ford Motor Company began introducing vehicles that require the use of a new, more sophisticated diagnostic scan tool software. This program, Ford Diagnostic and Repair System (FDRS), introduces many new features and offers many unique benefits over IDS. This course will describe the use of this program.

**Topics Include:**

- Introduction to Ford FDRS
- FDRS Setup, Login and Settings
- FDRS Toolbox
- FDRS Self-Tests
- DTC Types and Interpretation
- FDRS PIDs and Data Recordings
- FDRS System and PID Information
- FDRS Datalogger
- Views, Recordings, Control, File Manager, Output State Control
- Other Tests and Service Functions
- Network Monitor, Power Balance, Relative Compression, Misfire Monitor
- Programmable Module Installation (PMI)
- FDRS Service Functions

**Optional Topics of This Course Include:**

- VCMM Setup and Connections
- VCMM Oscilloscope Operation and Usage
- VCMM Signal Generator Monitor Tools

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed for the FDRS Program and VCMM Tool.

## ELECTRICAL/ELECTRONICS (continued)

### Ford Explorer and Lincoln Aviator Hybrid Vehicle Components and Operation

This course will describe the all new Explorer and Aviator hybrid systems. This will include the Modular 10-speed automatic transmission, 3.0L and 3.3L engines and their systems, new All-Wheel-Drive System and new Electric Brake Booster.

**Topics Include:**

- Overview of Explorer/Aviator Hybrid Vehicles
- Vehicle Operating Modes
- Gasoline Engine Operation
- Vehicle Service Safety
- High-Voltage System Components and Operation
- High-Voltage System Diagnosis
- Low-Voltage System Components and Operation
- Electronic Cooling System
- Gasoline Engine Components and Operation
- Braking Systems
- AWD System

**Technical Content:** Basic to Intermediate

**Learning Objective:** Expand Technicians' knowledge needed to service the latest hybrid systems from Ford.

### Integrated Diagnostic Software (IDS) Operation and Utilization

This training provides insight on how to get the most from your investment in Ford's IDS Scan Tool software. You will learn the most effective use of IDS for day-to-day shop operation.

**Topics Include:**

- IDS Components
- IDS Preferences
- IDS Vehicle Identification
- Self-Tests
- Datalogger and Parameter IDs (PIDs)
- Data Recording and Playback
- Module Configuration and Programming
- Module Replacement
- System Diagnostics

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with key knowledge for the use of the Ford Rotunda Integrated Diagnostic Software (IDS) Scan Tool for optimal utilization.

## ELECTRICAL/ELECTRONICS (continued)

### Body and Chassis Electrical/Electronics Diagnosis and Service

Body and chassis electronics found on modern vehicles are constantly evolving. This training provides the knowledge and skills essential for Technicians to stay on top of the operation, diagnosis and service of these systems.

**Topics Include:**

- Using Ford Wiring Diagrams
- Intelligent Access (IA) System
- Push-Button-Start Systems
- Remote Starting Systems
- Auto Start-Stop Systems
- Body Power Opening Systems
- Diagnosis of Body Systems Using Wiring Diagrams
- Saddle Fuel Tanks
- Conventional Speed Control
- Adaptive Cruise Control
- Blind Spot (BLIS) and Cross-Traffic (CTA) Systems
- Adaptive Headlamps
- Active Grille Shutters (AGS)

**Technical Content:** Intermediate

**Learning Objective:** Enhance Technician ability to effectively diagnose and service vehicle electrical/electronics systems.

**Recommended Prior Knowledge:**
Working knowledge of vehicle electrical/electronics systems.

## ELECTRICAL/ELECTRONICS (continued)

### Ford High-Voltage Vehicles Components and Operation

This course includes safety as well as detailed information on hybrids and an introduction to Electric Vehicles. Throughout the course, students learn about the components and operation of both hybrid and Electric Vehicles. High-voltage vehicle technology has become a large part of future service opportunities.

**Topics Include:**

- Overview of Electric Vehicle (EV) Operation
- Driving a Ford High-Voltage Vehicle
- High-Voltage Vehicle Safety
- Regenerative Braking Operation
- Hybrid Gasoline Engine Operation
- Hybrid Drivetrain
- EV Powertrain
- High-Voltage Electrical System
- Low-Voltage (LV) Systems
- Regenerative Braking System
- Climate Control System
- Warning Lights and Displays

**Technical Content:** Basic

**Learning Objective:** Provide Technicians with essential, current information on automotive electrical/electronics components and systems.

**Recommended Prior Knowledge:** Electrical and electronic system operation.

### Networks and Control Module Operation, Diagnosis and Service

Modern vehicles depend on networks and control modules for almost every system. From the wheels to the engine and everything in between, Service Technicians must understand the operation, diagnosis and service of these systems. This course includes the latest information on electronic automotive networking systems.

**Topics Include:**

- Overview of Modern Vehicle Networks
- Network Components, Strategies, Symptoms, Diagnosis and Testing
- Identification of Direct and Indirect Inputs and Outputs
- Specialty Modules and Network Circuitry
- Multiple Controller Area Network (CAN) Testing, Operation, Diagnosis and Service
- Network Data Transmission, Commands and Status Messages
- Resolving Scan Tool Communication Issues
- Diagnosing Networks with Digital MultiMeter and Oscilloscope
- Using Network Tests to Determine Location of a Network Fault
- Intermittent Network Faults
- Control Module Programming Using Scan Tools
- Module Calibration, Initialization, Parameter Reset, Replacement, Programming and Reprogramming (Using J2534 Devices)
- Automatically and Manually Entering As-Built Data

**Technical Content:** Intermediate

**Learning Objective:** Deliver current information to Technicians on electronic networking systems, including components, strategies, symptoms, diagnosis and testing, so that they can properly repair Ford network and control module issues.

**Recommended Prior Knowledge:** Working knowledge of vehicle electrical/electronics systems.

## ELECTRICAL/ELECTRONICS (continued)

### Ford F-150 Lightning Operation, Diagnosis and Service – NEW

This course includes the knowledge needed to service the Ford F-150 Lightning safely and accurately. Throughout the course, students learn about components and operation of the latest generation of Electric Vehicles. Students are also introduced to the strategies used to diagnose and repair the high-voltage and low-voltage systems found on the F-150 Lightning.

**Topics Include:**

- History of Ford Electric Vehicles
- High-Voltage Charging
- High-Voltage Components and Operation
- High-Voltage Diagnosis and Service Procedures
- High-Voltage Personal and Shop Safety
- Networks and Over-the-Air Updates
- Diagnostic and Service Methods for Low-Voltage Vehicle Systems
- Regenerative Braking

**Technical Content:** Intermediate to Advanced

**Learning Objective:** This course provides Technicians with the fundamentals needed to understand high-voltage operation, and the knowledge required to service the Ford F-150 Lightning safely and accurately.

**Recommended Prior Knowledge:** Electrical and electronic system operation.

### Electrical Theory and Testing – NEW

To service any system on today's vehicles, a Technician must understand electrical operation, wiring diagram interpretation and electrical testing. This course is designed to provide the fundamental skills and knowledge needed to perform electrical testing.

**Topics Include:**

- Electrical Theory
- Circuit Operation and Arrangements
- Wiring Diagrams and Current Flow
- Using a Digital Multi-Meter (DMM)
- Electrical Testing
- Abnormal Circuit Conditions
- Understanding Circuit Testing
- Wire Repair

**Technical Content:** Basic

**Learning Objective:** Provide Technicians with the foundational information needed to perform electrical testing during diagnosis.

## ENGINE PERFORMANCE AND DRIVEABILITY

### Ford EcoBoost® Engine Operation, Diagnosis and Service

The Ford EcoBoost® engine is a prolific, compact and powerful engine found on many modern Ford vehicles, using the latest technology to enhance performance. Understanding how this engine and its systems work is a crucial skill for Technicians who must service them.

**Topics Include:**

- Benefits of Direct Injection
- Benefits of Turbocharging
- Overview of Gasoline Turbocharged Direct Injection (GTDI) Engine Components
- GTDI and Gasoline Direct Injection (GDI) Operation Overview and Engine Variations
- Low-/High-Pressure Fuel Systems
- Fuel Systems Diagnosis and Testing
- High-Pressure Injector Service
- Turbocharger Components, Operation, Diagnosis and Service
- Intake System
- Speed Density System
- Emissions Systems

**Technical Content:** Basic

**Learning Objective:** Technicians will be able to understand how Ford EcoBoost® engine technologies and systems operate so that Technicians can service these popular Ford engines.

### Emission Control Relationships for Driveability Diagnosis

Emission-related on-board tests are the basis for OBD II technology. Every Technician that conducts driveability diagnosis must understand how these systems operate, their enabling criteria and how they prioritize testing.

**Topics Include:**

- Vehicle Modes of Operation
- Symptoms of Inaccurate/Degraded Input Signals on Vehicle Operation
- Purpose and Operation of OBD II Monitors
- OBD II Operating Parameters and Limitations
- Function and Operation of Continuous Monitors
- Function and Operation of Non-Continuous Monitors
- New OBD II Monitored Systems
- Enabling Criteria of OBD II Monitors
- Diagnosis of OBD II Monitor Malfunctions

**Technical Content:** Intermediate

**Learning Objective:** Technicians will be able to identify symptoms that can occur in modern engine on-board tests based on system and operating configuration.

## ENGINE PERFORMANCE AND DRIVEABILITY (continued)

### Gasoline Engine Performance and Driveability

Driveability is as much art as science. As vehicles evolve, Technicians that perform this service must also adapt and learn the new technology that impacts vehicle performance. This course will enhance Technician knowledge for diagnosing engine performance and driveability concerns on modern vehicles and systems.

**Topics Include:**

- Introduction to Driveability
- Diagnosis and Testing Strategy and Process
- Navigation and Utilization of Service Publications
- Diagnostic Trouble Code (DTC) Actuation, Purpose and Category
- Engine Performance Input Device Function, Operation, Testing and Diagnosis
- Fuel System Components, Operation and Strategies
- Oxygen Sensor Types, Operation and Interpretation for Diagnosis
- Fuel Trim Function, Operation and Interpretation for Diagnosis
- DTC Diagnostics for Components and Systems
- Utilizing Wiring Diagrams for Diagnosis of Engine Performance Concerns
- Misfire Symptoms and Diagnosis
- Variable Cam Timing (VCT) Operation, Diagnosis and Service
- Output Device Diagnostic Techniques
- Intermittent Malfunction Diagnostic Techniques

**Technical Content:** Intermediate

**Learning Objective:** Technicians will be able to describe driveability symptoms, diagnostic techniques and corrective actions for vehicle performance and driveability concerns.

**Recommended Prior Knowledge:** Working knowledge of engine operation, OBD II systems and Scan Tool utilization.

## MAINTENANCE AND LIGHT REPAIR

### Maintenance and Light Repair (MLR) Procedures, Inspections and Service

No matter what new technology is introduced by auto manufacturers, vehicles will always need maintenance and service. And regardless of which company makes the car, they all have similar systems that do specific things: wheels, suspension, brakes and fluids.

**Topics Include:**

- MLR Technician Skills
- Using MLR Checklists
- Safety, Tools and Service Publications
- MLR Inspection Procedures
- Interior and Underhood Checks
- Tire Inspections
- Brake Inspections
- Under Vehicle Inspections
- Gasoline and Diesel Engine Oil Changes
- Engine Lubrication and Oils
- Tire Service and Repair
- TPMS Service and Repair

**Technical Content:** Basic

**Learning Objective:** Provide Technicians with key knowledge in identifying the Maintenance and Light Repair (MLR) tasks and guidelines for several common vehicle systems.

### Noise, Vibration and Harshness Diagnosis and Service

Noise, vibration and harshness (NVH) concerns are tricky to diagnose because they represent a customer's perception of an abnormal condition. And causes can range from tires to driveline to wind to suspensions, and more!

This course is designed to teach you about different NVH symptoms, their characteristics and their causes. It will also introduce you to the available tools that Technicians have to pinpoint and correct these issues.

**Topics Include:**

- NVH Theory and Terminology
- Causes of NVH Symptoms
  - Wheels and Tires
  - Engine
  - Driveline
  - Suspension
  - Brakes
  - Wind Noise
- NVH Diagnostic Process
- Diagnosing NVH Symptoms
- NVH Diagnostic Tools
  - Noise Detectors
  - Vibration Analyzers
  - Vehicle Measurement System (VMS) Tools

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed to service NVH issues on Ford vehicles.

## MAINTENANCE AND LIGHT REPAIR (continued)

### Ford Medium Duty Truck Brakes Systems – NEW

Ford Medium Duty trucks can be equipped with several types of brake systems. These include Hydro-Boost™, Hydro-Max™ or air brakes. These systems vary from traditional hydraulic brake systems. An understanding of each system is critical to properly perform service. This course provides knowledge on the components, operation and diagnosis of all three systems.

**Topics Include:**

- Hydro-Boost™ Components
- Operation
- Diagnosis
- Service
- Hydro-Max™ Components and Operation
- Electrical Operating Systems
- Hydro-Max™ Diagnosis
- Air Brake Components and Operation
- Air Brake Anti-Lock Brake System (ABS)
- Air Brake System Diagnosis

**Technical Content:** Basic to Intermediate

**Learning Objective:** Describe the components, operation, and diagnosis of Ford Medium Duty truck brake systems.

## POWERTRAIN

### Gasoline Engine Diagnosis and Repair

This course focuses on the diagnosis and repair of late-model Ford gasoline engines and their systems.

**Topics Include:**

- Scan Tool Engine Testing
- Engine Testing with Gauges
- Engine Pressure Testing
- Engine Leak Testing
- Variable Cam Timing (VCT)
- VCT Operation
- VCT Diagnosis
- VCT Service
- VCT Phaser Replacement
- Noise Testing
- Setting Cam Timing
- Sprocket to Block Cam Timing
- Reference Link Cam Timing

**Technical Content:** Basic

**Learning Objective:** Provide Technicians with core diagnosis and repair information related to Ford naturally aspirated gasoline engines.

### Automatic Transmission Operation, Diagnosis and In-Vehicle Service

Ford automatic transmissions and transaxles are reliable, durable and designed to handle the stress of all types of consumer and commercial operation.

It's important for Service Technicians to know about automatic transmission basic components, operation and diagnostics to help determine the best course of action in diagnosing and servicing Ford vehicles.

**Topics Include:**

- Automatic Transmission Operation Overview
- Typical Transmission Components
- Torque Converter
- Hydraulic Components and Operation
- Automatic Transmission Electronics
- Solenoid Operation
- Scan Tool Utilization for Diagnosis and Service
- Automatic Transmission Diagnostic Process
- Automatic Transmission In-Vehicle Service
- Fluid Service
- Cooling Systems

**Technical Content:** Intermediate

**Learning Objective:** Provide Technicians with automatic transmission basic operation and diagnostics that may be needed when servicing Ford vehicles.

## POWERTRAIN (continued)

### Four-Wheel-Drive (4x4) and All-Wheel-Drive (AWD) Operation, Diagnosis and Service

Ford began offering four-wheel drive in the 1959 F-250 pickup truck. Since that time, it has been refining and improving four-wheel-drive systems. Today's Ford vehicles use a variety of drivelines to transfer power to the road.

**This course will cover two Ford drive systems:**

- All-wheel drive (AWD), which uses a Power Transfer Unit (PTU) to transfer torque to the rear wheels
- Four-wheel drive (4WD), with a transfer case that sends torque to a front differential

**Topics Include:**

- Overview of Four-Wheel Drive
- Introduction to All-Wheel Drive (AWD) and Torque Vectoring
- All-Wheel-Drive Components
- Power Transfer Units
- Rear-Wheel-Based AWD System
- Active Torque Coupling (ATC) Control Strategies
- AWD Symptoms, Diagnosis and Service
- Hub Lock Types and Operation
- Wheel Drive Axles
- Transfer Case Components and Operation
- Electronic Four-Wheel-Drive Controls
- Diagnosis and Testing of Four-Wheel-Drive Systems
- Transfer Case Service

**Technical Content:** Basic to Intermediate

**Learning Objective:** Provide Technicians with the knowledge needed to service the four-wheel-drive (4x4) and all-wheel-drive (AWD) systems on Ford vehicles.

# ACRONYMS AND DEFINITIONS

This acronyms and definitions listing contain technical terms applicable to Ford Motor Company products. It is not intended to be an all-inclusive dictionary of components and their functions.

**AAT:** Ambient Air Temperature

**ABS:** Anti-Lock Brake System

**AC:** 1. Air Conditioning
2. Alternating Current

**ACC:** 1. Adaptive Cruise Control
2. Air Conditioning Clutch

**ACCM:** 1. Air Compressor Control Module
2. Air Conditioning Control Module

**A/D:** Analog-to-Digital Signal Conversion

**ADAS:** Advanced Driver Assistance Systems

**AEB:** Automatic Emergency Braking

**APA:** Active Park Assist

**API:** American Petroleum Institute

**APIM:** SYNC Module

**APP:** Accelerator Pedal Position

**ARC:** Automatic Ride Control

**A/T:** Automatic Transmission

**ATF:** Automatic Transmission Fluid

**ATM:** Ancillary Translator Module

**AWD:** All-Wheel Drive

**BARO:** Barometric Pressure

**BCCM:** Battery Charger Control Module

**BCM:** Body Control Module

**BECM:** Battery Energy Control Module

**BJB:** Battery Junction Box

**BLIS®:** Blind Spot Information System

**BOO:** Brake On/Off Switch

**BPA:** Brake Pedal Applied

**BPP:** Brake Pedal Position

**BTDC:** Before Top Dead Center

**CAC:** Charge Air Cooler

**CAN:** Controller Area Network

**CARB:** California Air Resources Board

**CCM:** 1. Comprehensive Component Monitor
2. Cruise Control Module

**Cetane:** Additive in Diesel Fuel to Enhance Fuel Burn

**CF:** Cooling Fan

**CHT:** Cylinder Head Temperature

**CJB:** Central Junction Box

**CKP:** Crankshaft Position

**CL:** Closed-Loop

**CMP:** Camshaft Position

**CO:** Carbon Monoxide

**$CO_2$:** Carbon Dioxide

**COP:** Coil-on-Plug

**CPP:** Clutch Pedal Position

**CPU:** Central Processing Unit

**CSI:** Charge Status Indicator

**CTA:** Cross-Traffic Alert

**CTO:** Clean Tach Output

**DATC:** Dual-Zone Automatic Temperature Control

**DC:** 1. Direct Current
2. Duty Cycle

**DDM:** Driver Door Module

**DEPM:** Diesel Engine Power Monitor

**DFI:** Direct Fuel Injection

**DFSO:** Deceleration Fuel Shutoff

**DLC:** Data Link Connector

**DMM:** Digital Multi-Meter

**DOT:** Department of Transportation

**DTC:** Diagnostic Trouble Code

**E10:** Fuel Containing 10% Ethanol

**E100:** Fuel Containing 100% Ethanol

**E85:** Fuel Containing 85% Ethanol

**ECT:** Engine Coolant Temperature

**EEC:** Electronic Engine Control

**EEGR:** Electric Exhaust Gas Recirculation

**EEPROM:** Electrically Erasable Programmable Read-Only Memory

**EGR:** Exhaust Gas Recirculation

**EGRT:** Exhaust Gas Recirculation Temperature

**EI:** Electronic Ignition

**EMD:** Engine Manufacturers Diagnostics

**EMI:** Electromagnetic Interference

**EONV:** Engine Off Natural Vacuum

**EOT:** Engine Oil Temperature

**EP:** Exhaust Pressure

**EPAS:** Electronic Power-Assisted Steering

**EPS:** Exhaust Phase Shifting

**ERFS:** Electronic Returnless Fuel System

**ESC:** Electronic Stability Control

**ESOF:** Electronic Shift-on-the-Fly

**ETB:** Electronic Throttle Body

**ETBTACM:** Electronic Throttle Body Throttle Actuator Control Motor

**ETBTPS:** Electronic Throttle Body Throttle Position Sensor

**ETC:** Electronic Throttle Control

**EVAP:** Evaporative Emission

**EVAPCP:** Evaporative Emission Canister Purge Valve

**EVSE:** Electric Vehicle Supply Equipment

**FAOS:** Fore-Aft Oxygen Sensor

**FD-CAN:** Flexible Data Rate Controller Area Network

**FDRS:** Ford Diagnostic and Repair System

**FEPS:** Flash EEPROM Programming Signal

**FFV:** Flexible Fuel Vehicle

**FLI:** Fuel Level Input

**FMEM:** Failure Mode Effects Management

**FP:** Fuel Pump

**FPDM:** Fuel Pump Driver Module

**FPM:** Fuel Pump Monitor

**FRP:** Fuel Rail Pressure

**FRPT:** Fuel Rail Pressure Temperature

**FSS:** Fan Speed Sensor

**FTP:** Fuel Tank Pressure

**FWD:** Front-Wheel Drive

**GFM:** Generic Function Module

**GPCM:** Glow Plug Control Module

**GPIL:** Glow Plug Indicator Lamp

**GPM:**
1. Grams per Mile
2. Gallons per Minute
3. Glow Plug Monitor

**GSM:** Gear Shift Module

**GTDI:** Gasoline Turbocharged Direct Injection

**GVWR:** Gross Vehicle Weight Rating

**GWM:** Gateway Module

**H:** Hydrogen

**HC:**
1. Hydrocarbon
2. High Compression

**HCU:** Hydraulic Control Unit

**HDR:** High Data Rate

**$HO_2S$:** Heated Oxygen Sensor

**HSCAN:** High-Speed CAN

**HV:** High Voltage

**HVBP:** High-Voltage Battery Pack

**HVIL:** High-Voltage Interlock

## ACRONYMS AND DEFINITIONS

| | |
|---|---|
| **IAC:** | Idle Air Control |
| **IAT:** | Intake Air Temperature |
| **IC:** | 1. Instrument Cluster<br>2. Integrated Circuit |
| **ICP:** | Injection Control Pressure |
| **IDM:** | Injection Driver Module |
| **IFS:** | Inertia Fuel Shutoff |
| **I/M:** | Inspection/Maintenance |
| **IMRC:** | Intake Manifold Runner Control |
| **IMTV:** | Intake Manifold Tuning Valve |
| **IPC:** | Independent Plausibility Checker |
| **IPMA:** | Image Processing Module A |
| **IPR:** | Injection Control Pressure |
| **IPS:** | Intake Phase Shifting |
| **ISC:** | Inverter System Controller |
| **ISO:** | International Standards Organization |
| **KAM:** | Keep Alive Memory |
| **KAPWR:** | Keep Alive Power |
| **K/PH:** | Kilometers per Hour |
| **KOEO:** | Key On Engine Off |
| **KOER:** | Key On Engine Running |
| **kPa:** | Kilopascal |
| **KS:** | Knock Sensor |
| **kW:** | Kilowatts |
| **lb.-ft.:** | Pounds per Foot |
| **LCA:** | Lane Centering Assist |
| **LDR:** | Low Data Rate |
| **LIN:** | Local Integrated Network |
| **LKS:** | Lane-Keeping System |
| **LONGFT:** | Long-Term Fuel Trim |
| **MAF:** | Mass Airflow |
| **MAP:** | Manifold Absolute Pressure |
| **MAP/IAT2:** | Manifold Absolute Pressure/<br>Intake Air Temperature 2 |
| **MECS:** | Motor Electronics Cooling System |
| **MFF:** | Misfire Freeze Frame |
| **MIL:** | Malfunction Indicator Lamp |
| **mm:** | Millimeter |
| **MPH:** | Miles per Hour |
| **MRFS:** | Mechanical Returnless Fuel System |
| **MSCAN:** | Medium Speed CAN |
| **MSOF:** | Manual Shift-on-the-Fly |
| **M/T:** | Manual Transmission |
| **NOX:** | Nitrogen Oxides |
| **NVM:** | Non-Volatile Memory |
| **NVRAM:** | Non-Volatile Random Access Memory |
| **OASIS:** | Online Automotive Service<br>Information System |
| **OBD:** | On-Board Diagnostic |
| **OL:** | Open Loop |
| **ORVR:** | On-Board Refueling Vapor Recovery |
| **OSC:** | Output State Control |
| **OSR:** | On-Board System Readiness |
| **OSS:** | Output Shaft Speed |
| **PACM:** | Pedestrian Alert Control Module |
| **PAG:** | Polyalkylene Glycol |
| **PAM:** | Parking Aid Module |
| **PATS:** | Passive Anti-Theft System |
| **PCM:** | Powertrain Control Module |
| **PCV:** | Positive Crankcase Ventilation |
| **Pd:** | Palladium |
| **PDM:** | Passenger Door Module |
| **PID:** | Parameter Identification |
| **PIP:** | Profile Ignition Pickup |
| **POE:** | Polyolester |
| **PPM:** | Parts per Million |
| **PSCM:** | Power Steering Control Module |
| **PSI:** | Pounds per Square Inch |
| **PSP:** | Power Steering Pressure |

**Pt:** Platinum
**PTC:** Positive Temperature Coefficient
**PTS:** Professional Technician System
**PWM:** Pulse-Width Modulation
**PZEV:** Partial Zero Emissions Vehicle
**RAM:** Random Access Memory
**RFA:** Remote Function Actuator
**RKE:** Remote Keyless Entry
**ROM:** Read-Only Memory
**RPM:** Revolutions per Minute
**RWD:** Rear-Wheel Drive
**SAE:** Society of Automotive Engineers
**SCCM:** Steering Column Control Module
**SFI:** Sequential Multiport Fuel Injection
**SHRTFT:** Short-Term Fuel Trim
**SIGRTN:** Signal Return
**SOBDMC:** Secondary On-Board Diagnostic Module C
**SODL:** Side Obstacle Detection Left
**SODR:** Side Obstacle Detection Right
**TAC:** Throttle Actuator Control
**TACM:** Throttle Actuator Control Motor
**TC:** Turbocharger
**TCBP/CACT:** Turbocharger Boost Pressure/ Charge Air Cooler Temperature
**TCBY:** Turbocharger Bypass
**TCIPT:** Turbocharger Intake Pressure and Temperature
**TCM:** Transmission Control Module
**TCS:** Transmission Control Switch
**TCU:** Telematic Control Unit Module
**TDC:** Top Dead Center
**TFT:** Transmission Fluid Temperature
**TIVCT:** Twin Independent Variable Camshaft Timing
**TP:** Throttle Position
**TPPC:** Throttle Plate Position Controller
**TR:** Transmission Range
**TSB:** Technical Service Bulletin
**TSS:** Turbine Shaft Speed Sensor
**TWC:** Three-Way Catalytic Converter
**VAPS:** Variable-Assist Power Steering
**VBAT:** Vehicle Battery Voltage
**VCT:** Variable Camshaft Timing
**VECI:** Vehicle Emission Control Information
**VGT:** Variable Geometry Turbocharger
**VID:** Vehicle Identification
**VIN:** Vehicle Identification Number
**VR:** Variable Reluctance
**VREF:** Vehicle Reference Voltage
**VSS:** Vehicle Speed Sensor
**WIF:** Water in Fuel
**WOT:** Wide Open Throttle
**WSM:** Workshop Manual