



CTI Season Line-up Technician Program

Medford, OR

Location: To Be Determined

Course #	Course Name and Description	Hours	Dates
ENG-4010-4	VARIABLE CAMSHAFT TIMING	4	10/18/2023
<p>With a conventional camshaft, all the variables that determine valve timing, lift, duration and overlap are cast in stone the moment the lobes are ground. Variable Camshaft Timing (VCT) or otherwise known as Variable Valve Timing (VVT) was then developed in order to achieve better overall versatility in a wider RPM range and various operating conditions by phasing the camshaft. Camshaft phasing systems allow the valve timing to be adapted to the respective operating conditions of the engine. With completion of this class technicians can expect to gain a deeper understanding of: - Camshaft foundations and the benefits of Variable Camshaft Timing (VCT) - Design and function of many modern VCT systems - Operation of various phaser styles - Special tooling requirements Variable Displacement oil pump technology - Testing of sensors, actuators and mechanical components of the VCT system - Scan tool data analysis and waveform diagnostics</p>			

Instructor: Adam Robertson

ENG-4011-4	VARIABLE DISPLACEMENT CYLINDER MANAGEMENT	4	10/19/2023
<p>Variable Displacement Cylinder Management has become a part of many modern engine designs. Each manufacture employs cylinder displacement management using different methods, but all have the same end goal, better fuel economy and emissions. In this class the operation and troubleshooting of variable displacement cylinder management will be covered. In addition, examples of testing and diagnostics will be presented. Systems covered include: •GM Variable Valve Lift and Displacement On Demand •BMW Valvetronics •FCA Multi air •FCA Hemi MDS •Honda Vtech</p>			

Instructor: Adam Robertson

ATV-5210-4	HYBRID & ELECTRIC VEHICLE DRIVETRAINS	4	12/14/2023
<p>Worldwide, the focus of automotive laws and regulations is on reducing emissions. One way to achieve this goal is increase the number of zero emission vehicles on the road. California has a zero-emissions mandate and China has also adopted a version of California's plan in its new energy mandate. Battery Electric Vehicle (BEV) production numbers are on the rise and are soon going to be commonplace on our streets. It is now time to start learning about BEVs and preparing for this fundamental shift in automotive technology. This class presents an overview of components, operation and tooling needed to successfully compete in this market. Topics include: •Special tools required •Common components between hybrid and electric vehicle drivetrains •Additional components found only on electrical drivetrains •Battery construction and testing •Gear box power flow •Unique testing procedures</p>			

Instructor: Adam Robertson

DVT-2010-4	ALL WHEEL DRIVE TECNOLOTIES	4	2/21/2024
<p>Today's SUVs, sedans and sports coupes are embracing all-wheel drive to improve vehicle handling and, in some cases, make better use of high torque/high horsepower powerplants. Don't confuse all-wheel drive with four wheel drive. Although some components are shared between the technologies, all-wheel drive utilizes advanced software and controls to precisely control torque vectoring and aid in the stability of the vehicle. Repairing these vehicles requires not only an understanding of the hardware, but also electronics and control strategies. Topics in the course include: Differences between AWD design vs. 4WD, The role of software's role in AWD operation, Common AWD components and how they operate, Proper diagnostic testing procedures, Analysis of vibration issues</p>			

Instructor: Adam Robertson

DVT-2020-4	FOUR WHEEL DRIVE (4X4) TECHNOLOGIES	4	2/22/2024
<p>Four wheel drive (4WD) in itself is not a new concept. Original systems use a mechanically controlled transfer case with the associated driveshafts and axles. Today we see complex hardware design, electronic controls and advanced diagnostic techniques. New systems rely on input sensors, computers, electric motors actuators and data busses to operate. It is crucial to understand the function of all components and how they interact to diagnose problems efficiently. Topics in this course include:</p> <ul style="list-style-type: none"> • Hardware construction and operation • Control systems and sequencing • Diagnostic routines• Component testing • Common failures 			

Instructor: Adam Robertson

Continued on next page

Since man began to build machines for industrial use, and especially since motors have been used to power them, problems of vibration reduction and isolation have engaged engineers. Gradually, as vibration isolation and reduction techniques have become an integral part of machine design, the need for accurate measurement and analysis of mechanical vibration has grown. Over the last 15 or 20 years a whole new technology of vibration measurement has been developed which is suitable for investigating modern highly stressed, high speed machinery. Using piezoelectric accelerometers to convert vibratory motion into understandable data, the process of measurement and analysis is efficiently performed by the versatile abilities of these electronics. This class will show you how to use modern techniques to identify the vibration source, track the transfer path and pinpoint the responding component.

Instructor: Adam Robertson

DVT-3000-8 TRANSMISSION DIAGNOSTICS FOR THE ENGINE TECH 8

6/5/2024 & 6/6/2024

The modern transmission can be very difficult to diagnose properly without an understanding of the wide range of inputs and strategies that make up transmission control. Diagnostic analysis of the transmission must take into consideration the mechanical aspects of the transmission, as well as the electrical, hydraulic and engine control influences. Many transmissions have been unnecessarily replaced when testing routines skip one of these factors and many repeated transmission component failures have occurred when the root cause of mechanical failure was not determined during the initial diagnosis. Some OBD II technicians may say, "That's why I stay away from transmissions, I have enough to worry about with the engine drivability problems." Many transmission technicians would also say the very opposite, however, the engine and transmission inputs and software strategies tend to overlap at a much higher level than ever before to control emissions, torque and driving experience. In order to be successful in either case, the blending of emissions control and driving experience forces both the engine drivability technician and the transmission technician to cross the long-time established border line between the two repair fields.

Instructor: Adam Robertson

EET-6000-4 CONQUERING NETWORK DIAGNOSTICS

4

8/22/2024

This class covers modern vehicle network operation and how to efficiently diagnose them using common tooling. The overwhelming majority of network related issues do not require decoding of individual packets of data. It is important to understand how a network exchanges information, but a deep dive into the bits, bytes, nibbles and ticks of each network is not needed to repair the vehicle. Knowledge of the network type, the expected voltage levels, and the layout of the network wiring to the modules can provide us with enough information to gain diagnostic direction. At that point, we can use our available tooling to determine the root cause of the problem. Topics Include:

- Understanding common automotive networks and where to get help if we don't understand them
- Discuss OE and aftermarket scan tool communication benefits and challenges
- Developing a logical diagnostic approach using service information and our own tooling
- Understanding diagnosis through communication related case studies

Instructor: Adam Robertson

*Times are 6:00 pm to 10:00 for Monday - Thursday classes; 8:00 am to 5:00 pm for Saturday classes.
Check with your local CARQUEST Store for changes and/or updates.*