List of Courses

COURSE- ELECTRIC VEHICLE STANDARD & TESTING (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar walks through the 3 different light-duty Electric Vehicle standards (E-bicycles, E-mopeds, E-motorcycles and Mini Cars). Topics include general compliance rules, safety, performance tests and specs, testing and failures.

COVERED TOPICS INCLUDE:

1) Electric Vehicle Introduction
* Technologies
*Market
* Comparisons to ICEs
2) Classes of EVs
3) Nominative references
4) Safety and Labeling
5) Battery Level Testing
* UNR136
*Battery Life Cycle Testing
6) Vehicle Performance Testing
*Speed, Range, Hill Climb
*Environmental: Flood, Rain, Shock and Vibe
7) EMI/EMC
8) Vehicle Type Approval Testing Process
9) Tricks to help you get through VTA smoothly

List of Courses

COURSE - INTERNAL COMBUSTION ENGINES (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar serves as a comprehensive overview of modern two-and four-stroke spark ignited and diesel engines. During this course we explain all of the major engine components and their function. Combustion chemistry, heat transfer and thermodynamics are covered in depth to allow calculation of engine power, emissions and fuel consumption. Special emphasis is given to engine efficiency, friction combustion efficiency and pumping losses. In-cylinder air flow is investigated for its effect on mixture formation and flame propagation. Valve timing and VVT mechanisms are studies I relationship to engine performance. Finally special consideration is given to various alternative fuels.

COVERED TOPICS INCLUDE:

- Engine geometry
- Combustion Chemistry
- Engine Thermodynamics
- Air/Fuel ratio and Exhaust Emissions
- Engine Power calculation
- Spark Ignition Systems
- Fuel Delivery Systems
- Gas Exchange Process
- Bulk Flow and Flame propagation
- Abnormal combustion
- Alternative Fuels
- Electronic Engine Controls

List of Courses

COURSE - AIR / FUEL RATIO MEASUREMENT & CONTROL (CARBURATED & EFI ENGINES) (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar serves as a comprehensive overview of Oxygen sensors as used to measure the Air/Fuel ratio in modern engines. During this course we explain the basic AFR control techniques used in both carbureted (butterfly and slide valve types) and fuel injected SI engines. Overall vehicle target AFR is also explained with respect to vehicle performance, emissions and engine longevity. The various O2 sensors (narrow band and wide band) are then covered in depth. Sample measurements are analyzed to give incite into the engine's operation. O2 sensor control strategies in fuel injected engines are explained in detail. Finally we will conclude with a number of important limitations and considerations when using O2 sensors for AFR measurement.

COVERED TOPICS INCLUDE:

1) Carburettors
2) EFI Systems
3) Overall Target AFR for SI Engines
4) Narrow Band O2 Sensors
5) Wide Band O2 Sensors
6) Sample Measurements
7) O2 Control Strategies
8) Limitations and Considerations for O2 Sensors

* Physical Placement
*Warm-Up
*Misfire

List of Courses

COURSE - ELECTRONIC FUEL TUNING SYSTEM (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar serves as a comprehensive overview of modern Electronic Fuel Injection systems. During this course we explain the basic operation of various sensors (TPS, MAP, MAT, Temperature, CPS, O2…) and their signals. The various actuators (Ignition, Fuel Injector, Idle Speed Control Valve, O2 Heater…) are covered in depth as well. The basic control strategies (N-alpha, Speed-Density and Mass Air Flow) are explained in detail, enumerating calculation of the fuel injection duration to achieve the required air/fuel ratio. Emissions are explained based on combustion chemistry along with how to control emissions with ignition timing, injection and catalyst effects taken into consideration. Finally we will conclude with a number of compensations made based on altitude, temperature acceleration/deceleration and for cold starting.

COVERED TOPICS INCLUDE:

- Sensors and their signals
- Actuators and their control
- Optimizing Injector Spray
- EFI Control: N-Alpha, Speed Density, MAF
- EFI system Mapping
- Emissions Controls
- Acceleration/Deceleration
- Temperature Effects
- Ignition timing, torque and emissions
- Cold starting
- Altitude Effects

List of Courses

COURSE - DYNAMOMETRY & ENGINE TESTING (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar will cover Dynamometry and Engine Testing technologies. Emphasis is on the various kinds of dynamometers, how measurements are made and how this is related with actual usage.

COVERED TOPICS INCLUDE:

Part 1. Dynamometry Bascis

What is Dynamometer?

Why do we need to Dyno test engines?

Dynamometer Designs

Part 2. Measurements

Measurements: Cycle Averaged vs. Crank Angle Resolved

Instrumentation Issues

Testing: Steady State vs. Transient Controllers

Dyno Dynamics

Maintenance

Part 3. Drive Cycles Analysis

Drive Cycles

Determination of testing points

Testing and Weighing of data

Part 4. Dynamometry Case Studies

USA

List of Courses

Philippians

Malaysia

COURSE - ENGINE PERFORMANCE TUNING (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar serves as a comprehensive overview of Motorcycle Engine Performance Tuning. It begins with carbureted AFR tuning, and AFR measurements via wide-band O2 sensors. Compression ratio measurement and calculation is enumerated.

The difference between “fast” and “slow” combustion chambers is covered. Overall power equation is explained with ramifications of each parameter independently. Intake and Exhaust Tuning fundamentals are explained followed by ignition timing and knock. Finally Valve timing and Bulk Motion are explained in terms of their effect on engine power.

COVERED TOPICS INCLUDE:

- AFR control of Carbureted Systems
- Basic Engine Geometry
- Power Equation
- Volumetric Efficiency
- Intake – Exhaust Tuning
- Spark Timing Optimization
- Valve Flows
- Bulk charge motion

List of Courses

COURSE - "HYPERMILEAGE" VEHICLE OPTIMIZATION (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar gives an overview of vehicle dynamics as related to power consumption based on our history of "hypermileage" competition successes. Engine performance data from a wide variety of internal combustion engines, as well as electric motors is presented and matched to the vehicle model to determine the ultimate energy consumption in km/liter of fuel or km/kWh of electrical energy.

Vehicle design parameters are adjusted to stimulate improvements in mass, rolling resistance, size and aerodynamic drag, with resulting implications on fuel efficiency. Various driving techniques, including both cruise and "pulse and glide" are explained and analyzed for efficiency improvements.

COVERED TOPICS INCLUDE:

- Vehicle Dynamics
- Drag Coefficient and Frontal Area
- Rolling Resistance
- Parasitic Losses
- Engine Efficiency: BSFC Map
- Engine Tuning for Efficiency
- Engine Design for Maximized Efficiency
- Overall Vehicle Fuel consumption estimation

List of Courses

COURSE - DIESEL ELECTRONIC INJECTION & DIESEL DUAL FUEL SYSTEM (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

This seminar covers Diesel Electronic Fuel Injection systems, and Diesel Dual-Fuel (DDF) systems. Diesel EFI is controlled by three main factors: Injection timing, injection duration and injection pressure. When used as the pilot ignition source in a DDF system, the injection timing must be adjusted carefully to maximize efficiency, while maintaining a reasonable level of "knock".

COVERED TOPICS INCLUDE:

1) Diesel Injection Basics

* Fuel vaporization, mixing and combustion
* Mechanical Injection vs. Electronically controlled injection
*Pressure and Pulse Width
*Injection timings, performance, knock and soot
* Ignition delay and Premixed combustion
* Single vs. Multiple injections

2) Diesel Dual Fuel systems

*Alternative Fuels, fuel control
*Combustion Analysis of DDF systems

*Injection Timing Effects

* DDF Fuel Costing

*Dangers of over fuelling

COURSE - ENGINE MODELING WITH RICARDO'S WAVE (100% HRDF CLAIMABLE)

COURSE SYNOPSIS

"Wave" is an engine simulation software from Ricardo Engineering. It is a 1-dimentional fluid dynamics model in which all gaseous passages are modeled as pipes of various lengths. The model includes a combustion model, a combustion chamber mixing model (for ERG), as well as various thermal conductivity and friction models and emissions models. It does not do a detailed 3-dimensional analysis of gaseous flow, or combustion, but instead uses "lumped parameter" models (such as a 2-zone combustion model). This makes it exceptionally easy to set up, and quick to run. Running various scenarios on a given engine typically takes only a few seconds, where as a 3-D model might take hours or days.

COVERED TOPICS INCLUDE:

- Critical Engine Parameters
- Engine Model Physical Input Data
- Operational input parameters
- Cycle averaged model output
- Instantaneous model output
- Engine Optimization Techniques
- Model to experimental correlation