

## Matlab, Simulink for Automotive Applications

### Day 1 of 3

#### Introduction

- A quick overview of MATLAB computing environment

#### Matlab Editor & Script file

- The MATLAB Editor
- Script M-files
- The MATLAB path
- Function M-files
- Sub-functions and nested functions
- Debugging
- Best script file writing tactics

#### Building your first Simulink model

- Modeling example
- Creating an empty model
- Browsing the SimuLink block library
- Adding blocks
- Connecting the blocks
- Configuring the model
- Setting simulation preferences
- Running the model
- Visualizing and retrieving simulation results
- Generating a model report
- Annotating diagrams

#### Developing hierarchical models

- Creating subsystems
- Navigating the subsystem models
- Controlling access to subsystems
- Creating conditionally executed subsystems
- Enabled subsystem
- Triggered subsystem
- Function call subsystem
- Referencing models

#### Simulink debugger

- Introduction
- Using the debugger GUI
- Using the debugger command
- Starting the debugger
- Starting a simulation in debug mode
- Running a model step-by-step
- Setting break points

**Day 2 of 3**

**Introducing S-functions**

- S-function overview
- S-function requirements
- Using S-functions in models
- Simulation procedure of generic systems
- Working of an S-function
- Interaction between an S-function and SimuLink solver

**Implementing S-functions**

- Writing M-file S-function
- Program structure of M-file S-function
- Integrating the M-file S-function into a SimuLink model using the S-function block
- Using the template implementation
- M-file S-function examples
- Creating M-file S-function with parameters
- Creating M-file S-function with discrete and continuous states

**Using the S-function builder**

- S-function builder concepts
- Building C-file S-function automatically
- Integrating an S-function into a model using S-function builder block

**State Transition diagram**

- Writing state transition diagrams

**Day 3 of 3**

**Building Automotive models (demo)**

- Developing simulink models for automotive applications
- Anti brake system
- Automotive engine model with speed control
- Power window

**Building automotive models (Hands on)**

Developing automotive models (here the participants will develop models with the help of trainers)