

ENGINE ACOUSTICS

INTRODUCTION

Two-day Course
6 Participants

DATES AND TIMES

Flexible

PREREQUISITIES

Engineers or PhD Assistances who work in
Automotive or NVH Field

LEARNING OBJECTIVES

- ✓ Articulate the basic NVH principles
- ✓ Understand the sound excitation mechanism of internal combustion engine
- ✓ Dedication of Base Engine Acoustical Design
- ✓ Identify the key sub-components of Engine NVH
- ✓ Overlook for passive sound optimization measures

TRAINING CONTENT

- **Fundamentals of Acoustics**
 - Definition of NVH Terms
 - Characteristics of Sound Waves
 - Perception of Humans
- **Measurement & Analysis Techniques**
 - Measurement Methods and Environment
 - Measurement Equipment
 - FFT, Overall and 1/3 Octave Level, Campbell Diagrams
- **Acoustic Evaluation of Engine Concepts**
 - Combustion Noise
 - Direct Combustion Noise
 - Indirect Combustion Noise
 - Flow Noise
 - Mechanical Noise
 - Orifice Noise
 - Air-Intake
 - Exhaust
- **NVH Design Criteria of Combustion Engines**
 - Engine Block
 - Crankshaft
 - Piston
 - Valve Train
 - Chain Drive
 - Oil Pan
- **Basics of Simulation Techniques**
 - Finite Element Methods
 - Boundary Element Methods
 - Multi Body Dynamics
- **Passive Optimization Measures**