This entire course is designed for those from corporate and individual engineers who want to have a comprehensive exposure of GT-POWER, GEM-3D & GT-POST software for 1D system level modeling and simulation of Engine performance. The course content includes basic & advanced topics, and few case studies that cover different aspects of engine development. Participants will get good amount of time for practice of software.

The participants are expected to have good knowledge of internal combustion engines (ICE).

This course would add high end value to the participants and help them to build career in this niche field. We consider your candidature for placement when there are requirements from our customers.

- Duration - 6 days; 1/2 sessions; 8 hrs per day
- Trainer industrial experience - Over 16 years

**Basic Engine Performance Analysis:**

- Fundamentals of Internal Combustion Engines (ICE)
- Concept of 1D system level engine performance simulation
- Modeling of each component of an ICE including flow circuit, airfilter, turbocharger, supercharger, heat exchanger, EGR system, manifold, port, valve, fuel injection system, cylinder, cranktrain, controller, and exhaust system devices
- Subassemblies - Internal, external, and encryption
- Solver basics of flow, heat transfer, combustion, and emissions model
- Data required to build and calibrate engine model
- Model setup - Initialization, parameter sweeps & convergence
- Burn rate calculation from measured cylinder pressure trace
- Engine model calibration using non-predictive combustion models
- Post-processing using GT-POST
- Direct optimization technique
- DOE optimization technique
- Engine performance prediction & sensitivity study

**Advanced Engine Performance Analysis:**

- Advanced features of engine modeling, model setup, and solver basics
- Advanced topics in turbocharger modeling
- Measured data quality checklist
- Burn rate calculation from three pressure trace analysis
- Use of controller
- Engine model calibration using semi-predictive combustion model
- Engine model calibration using predictive combustion model for SI and CI engines
- Engine emissions modeling
- Engine knock modeling
- Neural network approach

**Case Studies:**

Participants will get exposure to and do practice of real projects related to different aspects of engine development through case studies including but not limited to the followings.

- Power upgradation
- Power deration
- Camshaft optimization
- Load step simulation of genset engine