This training module is designed for corporate and individual engineers who are interested in acquiring the skill and knowledge of various aspects of engine cooling systems and vehicle thermal management using GT-COOL. This includes areas such as engine cooling systems, underhood cooling systems (UHCS), and few case studies. Participants will get good amount of time for practice of software at basic and advanced level. Participants will get good amount of time for practice of software.

The participants are expected to have good knowledge of automotive cooling systems and basic knowledge of ICE working. At the end of the session, participants will be in a position to model and simulate various aspects of engine cooling systems using GT-COOL.

- **Duration - 3 days; 1 Session; 8 hrs per day**
- **Trainer industrial experience - Over 16 years**

**Fundamentals of GT-COOL:**
- Concept of 3D system level simulation
- Modeling pipes in GEM-3D
- Subassemblies - internal, external, and junction
- Solver basic of fluid flow and heat transfer model for the pipe, heat exchanger, and mechanical components (pump & fan)
- Implicit and explicit solver
- Model setup - Initialization, parameter sweeps, convergence, etc
- Post-processing using GT-POST
- Optimization techniques - Direct/ design of experiments (DOE)

**Engine Cooling System Modeling:**
- Modeling full engine cooling system including components coolant flow circuit, heat exchanger (aftercooler, intercooler, radiator, and EGR cooler), pump, thermostat, etc
- Cooling system calibration
- Sensitivity study of cooling system variables
- Optimization of cooling system variables to meet cooling system heat load requirement

**Underhood Cooling System Modeling:**
- Modeling complete vehicle underhood cooling (UHC) system in Quasi-3D environment. Major components include grills, radiator, condenser, CAC, fan, shroud, and blockage
- UHC system calibration
- Sensitivity study of UHC system variables
- Optimization of UHC system components (e.g. sizing & positions of radiator, CAC, condenser, fan; number of fans; HEX scaling, etc) for desired heat load requirement