

# Training Contents

## ANSYS Workbench & CFD

### Part I – Structure Analysis and Parametric Study

MODULES	DURATION
<b>Module 1: Introduction to ANSYS and FEM Modeling</b> <ul style="list-style-type: none"><li>• Introduction to FEM Techniques</li><li>• Introduction to ANSYS Workbench</li><li>• Graphical User Interface</li><li>• Analysis procedure</li><li>• ANSYS Design Modeler - I<ul style="list-style-type: none"><li>- Introduction to Design Modeler</li><li>- GUI of Design Modeler</li><li>- Creation of Line and surfaces Bodies</li></ul></li><li>• Static structural Analysis</li><li>• Introduction to Static Structural Analysis</li><li>• Loads and Supports systems</li><li>• 1-D Analysis</li><li>• Viewing Results</li><li>• SFD &amp; BMD</li><li>• 2-D Analysis</li></ul>	5 Hrs
<b>Module 2: Structural Analysis</b> <ul style="list-style-type: none"><li>• ANSYS Design Modeler - II<ul style="list-style-type: none"><li>- Sketching and 3D Modelling</li><li>- 3D Features to create solids</li><li>- Patterns and Symmetricity</li><li>- Planes and sketches</li><li>- Boolean operations</li><li>- Body transformations</li></ul></li><li>• Static structural Analysis<ul style="list-style-type: none"><li>- Hydrostatic pressure</li><li>- Remote Force</li><li>- Applying Moments</li><li>- Support Types</li><li>- Factor of Safety and SN Curve</li></ul></li></ul>	5 Hrs
<b>Module 3: Mesh Generation &amp; Thermal Analysis</b> <ul style="list-style-type: none"><li>• Meshing or Grid Generation - I<ul style="list-style-type: none"><li>- Refinement &amp; Global Sizing</li></ul></li></ul>	5 Hrs

- Relevance Number and Centre
- Steady State Thermal
- Conduction, Convection and Radiation
- Heat flux
- Internal heat generation
- Functional boundary condition
- Thermo-Structure Coupling

#### **Module 4: Engineering Data and Modal (Vibration) Analysis**

**5 Hrs**

- Engineering Data
  - ANSYS Engineering Data source library
  - Assigning new material & Importing Material
  - Creating user material
  - Adding new material in current library
- Modal (Vibration Analysis)
  - Basics of free vibration
  - Natural frequency & Number of mode shapes
  - Modal Results
  - Oscillation Motion

#### **Module 5: Linear Buckling Analysis**

**3 Hrs**

- Linear Buckling
  - One end fixed – Other end is Free
  - One end fixed – Other end at pinned support
  - Both ends are pivoted
  - Both ends are fixed
  - Calculation of different mode shapes of buckling

#### **Module 6: Rigid Dynamics Analysis**

**2 Hrs**

- Rigid Dynamics Solver
  - Creation of automatic and manual contact
  - Creation of Joints – Fixed, Cylindrical, Revolute and Translational
  - Applying the Joint Loads

#### **Module 7: Parametric Study, Design & Topology Optimization**

**7 Hrs**

- Parametric Study
  - Creation of Input and Output Parameters
- Design of Experiment (DOE) using Direct Optimization
  - Screening Method to optimize design

## Part II – Thermal and Fluid Analysis (ANSYS CFD)

### Module 8: Introduction to ANSYS CFD (Fluent)

5 Hrs

- Modeling of Fluid or Solid Bodies
- Aerodynamics Study of Car Body and Aero-foil
- Applying the energy boundary conditions
- Evaluation of flow characteristics through hollow cylindrical pipe

### Module 9: Thermal or Energy Modeling

5 Hrs

- Modeling of Fluid or Solid Bodies
- Modeling of Concentric Heat Exchangers
- Modeling and calculation of flow characteristics

### Module 10: Radiation Modeling

5 Days

- Applying Roseland Radiation Model
- Modeling of Solar Air Heater
- Modeling and calculation of flow characteristics

### Module 11: Multiphase Modeling

5 Days

- Applying Multiphase model
- Modeling of Solar Still for Water Distillation
- Modeling and calculation of flow characteristics

40-60 Minutes for Doubt & Practice Sessions after completion of each Module