



IFS ACADEMY

Training For The Future!!

Finite Element Analysis using ANSYS 12.0

Course Curriculum

Day I

Finite Element Analysis

- a. Introduction to the Finite Element Method, What is FEA? History, Need
- b. General Steps of the Finite Element Method
- c. Brief explanation of 1D, 2D and 3D Elements with examples of ANSYS Elements
- d. Enlisting different FEM methods and detailed explanation of any one
- e. Derivation of stiffness matrix equation
- f. Types of analysis that can be done using ANSYS
- g. Advantages and Limitations of the Finite Element Method
- h. About ANSYS Inc.
- i. ANSYS Family of products with their capabilities
- j. Types of analysis that can be done with ANSYS.
- k. Introduction to the Ansys GUI
- l. Operation Modes of Ansys
- m. Product Launcher
- n. Launcher Tasks
- o. Use Custom Memory Settings
- p. Launcher Menu Options
- q. The ANSYS GUI
- r. The Icon Toolbar Menu
- s. Quitting Ansys

Selection Logic

- a. Plotting
- b. Pan-Zoom-Rotate
- c. Picking
- d. Coordinate Systems
- e. Select Logic

Importing of 3D Models

Workshops

Day II

Solid Modeling

- a. An Overview of Solid Modeling Operations
- b. Types of Symmetries
- c. Working Plane
- d. Coordinate Systems
- e. Top down and bottom up approach
- f. 2D & 3D primitives
- g. Working with Boolean operations
- h. Additional modeling features

Workshops

Day III

Meshing

- a. Study of 1D, 2D and 3D elements
- b. Free meshing or Mapped meshing
- c. Setting Element Attributes
- d. Selecting Element Type
- e. Shape Function
- f. Defining Element Types
- g. Real Constants
- h. Defining Section Properties
- i. Assigning Element Attributes before meshing
- j. Mesh Controls
- k. The ANSYS MeshTool
- l. Smartsizing
- m. Meshing
- n. Free Meshing
- o. Mapped Meshing
- p. Hybrid meshing
- q. Mesh Extrusion
- r. Volume Sweeping

Workshops

Material Properties

- a. Material Library
- b. Specifying properties

Day IV

Loading & Boundary Conditions

- a. Types of Loads
- b. Applying loads

Solvers

- a. Types of Solvers
- b. Solver Setup
- c. Load Step Options
- d. Solving Multiple Load Steps

Static Structural Analysis Workshops

Day V

Post-processing

- a. Contour Plot Viewing
- b. Path Operations
- c. Estimating Solution Error
- d. Time History Postprocessor (POST26)
- e. Report Generator

Exercises

Thermal Analysis

Modal Analysis

Workshops

Day VI

- **Exercises**
- **Introduction to Non-Linear Analysis**

Tips & Tricks

- a. Using the Toolbar & Creating Abbreviations
- b. Introduction to APDL
- c. Using Parameters
- d. Using the Start File
- e. Using the Session Editor
- f. Using Input Files

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Phone: +91-20-6400 7296, Mob. No.: +91-98228 49628, Email: training@infinitesolutionsindia.com,

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