



IFS ACADEMY

Training For The Future!!

IFS Academy Career Program in ANSYS (ANSYS Mechanical APDL & Workbench)

Course Curriculum (Duration: 150 Hrs.)

Before we start using ANSYS: -

1. Introduction to Strength of Materials (SOM)
 - Introduction to stress and strain
 - Principal stress and strain
 - SFD and BMD
 - Theory of Bending (Euler *Bernoulli*)
 - Theory of Torsion
 - Theories of failure
 - Introduction to plate theory
 - Material behavior
2. Introduction to vibration
 - Basics of vibration
 - Type of vibrations
 - Equation of motion
 - Forced, damped, undamped vibration
 - Resonance
3. Introduction to fatigue
 - Fatigue basics
 - Types of fatigue failure
 - Endurance limit
 - Notch sensitivity
 - S-N Curve
 - Goodmans Curve
 - Soderberg equation
 - Gerbers criteria
 - Modified goodman curve

Introduction to Finite Element Analysis

- What is Finite Element Analysis?
- History of FEA
- Analytical and numerical FEA
- Necessity of FEA
- Advantages and Limitation
- Discretization and other approximation in FEA
- Necessity of meshing
- Convergence and mesh Refinement
- Human Error, Sources and detection, common mistake,
- Mesh Refinement, Mesh Convergence, Mesh Transition

ANSYS Mechanical APDL and Workbench

- a. Static Structural Analysis
 - Definition & Purpose
 - Terminology & Concepts
 - Procedure
 - Workshop - Static Analysis

- b. Modal Analysis
 - What is modal analysis
 - Need of modal analysis
 - Free free run
 - Post processing technique
 - Presentation preparation based on result

- c. Harmonic Analysis
 - Definition & Purpose
 - Terminology & Concepts
 - Procedure
 - Workshop - Harmonic Analysis

- d. Random Vibration Analysis
 - Definition & Purpose
 - Terminology & Concepts
 - Procedure
 - Workshop - Harmonic Analysis

- e. Spectrum Analysis
 - Definition & Purpose
 - Terminology & Concepts
 - Procedure
 - Spectrum Analysis Guidelines
 - Workshop – Response Spectrum
 - Workshop – Random Vibration

- f. Transient Dynamic Analysis
 - Definition & Purpose
 - Terminology & Concepts
 - Procedure
 - Workshop - Harmonic Analysis

- g. Modal Analysis (Advanced Topics)
 - Prestressed Modal Analysis
 - Workshop – Pre-Stressed Modal
 - Modal Cyclic Symmetry
 - Workshop – Modal Cyclic Symmetry
 - Large Deflection Modal Analysis
 - Workshop – Component Mode Synthesis

Fatigue Analysis

- a. High cycle Fatigue.
- b. Low cycle Fatigue.

Non-Linear Analysis

- a. What is Nonlinear Behavior?
- b. What is Nonlinear Behavior
- c. Nonlinear Solution Using Linear Solvers
- d. Three Types of Nonlinearities
- e. Nonlinear FEA Issues
- f. General Nonlinear Analysis Procedure
- g. Nonlinear Controls
- h. Output Controls
- i. Postprocessing

Sealing Analysis

- Definition & Purpose
- Terminology & Concepts
- Procedure
- Workshop – Sealing Analysis

ANSYS Mechanical APDL using TUI (TEXT USER INTERFACE)

- a. Modeling using TUI
- b. Geometry clean-up using TUI
- c. Component Creation using TUI
- d. Element type selection
- e. Material property creation
- f. Assigning material properties
- g. Meshing control, sizing, map mesh, free mesh using TUI
- h. Creating weld using TUI
- i. Applying boundary condition using TUI
- j. Solver setting using TUI
- k. Post processing result using TUI
- l. Macro Basics
 - Creating a Macro
 - Macro with Arguments
 - Branching
 - Looping
 - General guidelines
 - Workshop

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