IFS ACADEMY

Training For The Future!!

Advanced Finite Element Analysis using ANSYS Mechanical APDL

Course Curriculum (Duration: 80 Hrs.)

Chapter 1: Overview of ANSYS Mechanical APDL

a. Exercises on Static Structural Analysis
b. Exercises on Modal Analysis
c. Coupling and Constraint Equations
d. Coupled Field Analysis
   - Sequential Method
   - Direct Method
e. Macro Basics
   - Creating a Macro
   - Macro with Arguments
   - Branching
   - Looping
   - General Guidelines
f. Workshops

Chapter 2: Non Linear Analysis

a. What is Nonlinear Behavior?
   - What is Nonlinear Behavior
   - Nonlinear Solution Using Linear Solvers
   - Three Types of Nonlinearities
   - Nonlinear FEA Issues
   - General Nonlinear Analysis Procedure
b. Obtaining the Solution
   - Basic Concepts
   - Automatic Solution Control
   - Results File Options
   - Solution Options
   - Nonlinear Options
   - Advanced Nonlinear Options
   - Transient Options
   - Nonlinear Diagnostics
c. Postprocessing
   - Checking for Convergence
   - The General Postprocessor
   - The Results Viewer
   - The Time-History Postprocessor
   - Verification
d. Geometric Non Linearities
   - Overview
   - Three Kinds of geometric Nonlinearities

- Consistent Tangent Stiffness Matrix
- Building the Model
- Obtaining the Solution
- Postprocessing

e. Plasticity
- Overview
- Building the Model
- Obtaining the Solution
- Postprocessing

f. Workshops

Chapter 3: Contact and Fasteners

a. Contact overview
- Typical Applications
- Contact Classifications
- Review General Procedures
- Contact Manager
- Advanced Options

b. Contact Properties –Options
- Algorithms
- Stiffness
- Penetration Tolerance
- Pinball Region
- Surface Behaviors
- Contact Detection

c. Friction
- What is Friction?
- Coulomb Model
- Coefficient of Friction
- Defining the Parameters
- Special Considerations

d. Contact Properties: Advanced Options

e. Multi-Point Constraints
- Background
- Solid-to-Solid MPC Bonded Contact
- Shell-to-Shell MPC Bonded Contact
- Shell-to-Solid MPC Bonded Contact
- Beam to Shell/Solid MPC Contact
- MPC Surface Based Constraints

f. Bolt Pretension

g. Workshops

Chapter 4: Dynamic Analysis

a. Introductory to Dynamic Analysis
- Definition and purpose
- Types of Dynamic Analysis
- Basic concepts and terminology
- Variable Viewer

b. Modal Analysis: Overview

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

d. Transient Dynamic Analysis
- Definition & Purpose
- Terminology & Concepts

- Procedure

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

f. Workshops

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