



TEST & OPTIMISATION LAB

NITW SIEMENS CENTRE OF EXCELLENCE, NIT WARANGAL

Course Name: FE MODEL CORRELATION (Advanced Course)

Course Duration: 30 Hrs.

Course overview:

- Intended Audience:
 - Design engineers and analysts who want to learn the details of how to perform finite element analysis using this software.
- Prerequisites
 - Education: B.E/B.Tech. 2nd year completed in any one of the following streams.
 - Software: NX Basics/Designing Parts in NX/Basics of FEA.
- Course objectives
 - Understand the fundamental concepts of Finite Element (FE) Model Correlation.
 - Learn the pre-test solution process and how to update models accordingly.
 - Gain proficiency in selecting sensors and exciters for pre-test solution processes.
 - Acquire the skills to create test analysis reference solutions and share data effectively.
 - Develop the ability to perform correlation analysis and quantify agreement between different solutions.
- **Course contents**
 1. Introducing FE Model Correlation
Learn fundamental concepts of model correlation, pre-test solution process and model update.

Topics:
 - 1.1 Introducing FE Model Correlation and Updating
 - 1.2 Introduction to Linear Static analysis and Modal Analysis.
 - 1.3 Getting started with Simcenter 3D FE Model Correlation.
 2. Introducing pre-test solution process
Learn pre-test solution process workflow and selection of best sensor and exciter locations.

Topics:
 - 2.1 Introducing pre-test solution process
 - 2.2 Understanding pre-test DOFs
 - 2.3 Selecting sensors
 - 2.4 Creating pre-test solution process and solving sensor configuration



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- 2.5 Selecting exciters
- 2.6 Using a pre-test solution to define exciter locations

- 3. Understanding test analysis reference solution
Learn how to create a test analysis reference solution and share the data with the test engineer.

Topics:

- 3.1 Understanding test analysis reference solution
- 3.2 Sharing sensor and exciter locations with test engineers

- 4. Preparing for correlation analysis
Learn how to prepare a model and results for correlation analysis.

Topics:

- 4.1 Understanding correlation solution process
- 4.2 Creating test and analysis reference solution
- 4.3 Aligning work and reference models
- 4.4 Performing geometrical correlation of work and reference model
- 4.5 Preparing a model for correlation solution process

- 5. Introducing shape correlation
Learn how to quantify the level of agreement between a reference and work solutions with the same type of results.

Topics:

- 5.1 Introducing shape correlation
- 5.2 Managing sensors and working with shape pairs
- 5.3 Introducing quantitative shape correlation
- 5.4 Generating and displaying matrix results
- 5.5 Correlating shapes of symmetric structures
- 5.6 Analyzing the shape correlation of an aircraft engine nacelle

- 6. Introducing FRF correlation
Learn how to quantify the level of agreement between a reference and work FRFs.

Topics:

- 6.1 Introducing FRF analysis solution
- 6.2 Creating analysis solution and output request
- 6.3 Introducing FRF correlation solution process



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- 6.4 Displaying FRF correlation results
- 6.5 Creating FRF correlation and displaying overlay FRFs
- 6.6 Creating FRF correlation
- 6.7 Creating a Synthesized FRF Correlation solution process