

Technical Education Services

Autodesk Nastran In-CAD Essentials

Course Length: 2 days

The Autodesk Nastran In-CAD Essentials training course instructs students in the use of the Autodesk® Nastran® In-CAD software. This training course was written using the 2019.1.0.200 build of the Autodesk® Nastran® In-CAD software. The software is a finite element analysis (FEA) tool that is embedded directly in the Autodesk® Inventor® software as an Add-In. It is powered by the Autodesk Nastran solver and offers simulation capabilities specifically tailored for designers and analysts as a tool for predicting the physical behavior of parts or assemblies under various boundary conditions. Through a hands-on, practice-intensive curriculum, students acquire the knowledge required to work in the Autodesk Nastran In-CAD environment to setup and conduct FEA analyzes on part and assembly models.

Topics Covered

- Activate and navigate the Autodesk Nastran In-CAD environment to conduct FEA analyzes on part and assembly models.
- Create, edit, and assign idealizations and materials (linear and nonlinear) for use in an analysis (including composites).
- Manage the creation, setup, and modification of analyses and subcases that are used to analyze both static and dynamic models. Specific analyses types that are covered in this learning guide include:
 - Linear Static
 - Nonlinear Static
 - Nonlinear Transient Response
 - Normal Modes
 - Direct Frequency Response
 - Modal Frequency Response
 - Direct Transient Response
 - Modal Transient Response
 - Random Response
 - Shock/Response Spectrum
- Create constraints with the required degrees of freedom and assign them to entities in the model.
- Create loads that accurately represent the magnitude and location of the loads the model will experience in the working environment.
- Create Connector elements to simulate how a physical connector such as a rod, cable, spring, rigid body, or bolt will affect the model.
- Create Surface Contact elements to define contact between interacting components in an assembly.
- Assign global and local mesh settings.
- Run an Autodesk Nastran In-CAD analysis.
- Review and create result plots for analyzing the results of an Autodesk Nastran In-CAD analysis.

Course description shown for Autodesk Nastran In-CAD 2019. Topics, curriculum, and/or prerequisites may change depending on software version.



Prerequisites

This training course assumes that a student has Finite Element Analysis (FEA) knowledge, can interpret results, and in general, knows how a model should be setup for an analysis. The main goal of this training course is to teach a user that is new to the Autodesk® Nastran® In-CAD software how to navigate the interface to successfully analyze a model.

This learning guide was written using the 2019.1.0.200 build of the Autodesk® Nastran® In-CAD software. The software user-interface and workflow may vary if older or newer versions of the software are being used.

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Training Guide Contents

Chapter 1: Getting Started

- Lesson: Autodesk Digital Prototyping
- Lesson: Introduction to FEA
- Lesson: Introduction to Autodesk Nastran In-CAD
- Lesson: Working in Autodesk Nastran In-CAD
- Exercise: Cantilever Beam Exercise

Chapter 2: Working with the Default Analysis

- Lesson: Analysis & Subcases
- Lesson: Idealizations & Materials
- Lesson: Constraints & Loads
- Lesson: Connectors
- Exercise: Cast Lever Boundary Conditions I
- Exercise: Cast Lever Boundary Conditions II

Chapter 3: Working with the Mesh and Result Plots

- Lesson: Meshing Basics
- Lesson: Generating & Reviewing the Mesh
- Lesson: Customizing the Mesh
- Lesson: Loading Analysis Results
- Lesson: Visualizing Result Plots
- Lesson: Visualizing XY Plot Results
- Exercise: Refining the Mesh
- Exercise: Working with Line Elements

Chapter 4: Surface Contacts

- Lesson: Surface Contacts
- Exercise: Contacts & Symmetry in an Assembly Model

Chapter 5: Working with Composites

- Lesson: Working with Composites
- Exercise: Using Composite Materials in a Bike Frame

Chapter 6: Nonlinear Static Analysis

- Lesson: Basics of a Nonlinear Analysis
- Lesson: Creating a Nonlinear Static Analysis
- Exercise: Flat Walled Tank

Chapter 7: Nonlinear Materials

- Lesson: Working with Nonlinear Materials
- Exercise: Flexural Test Fixture

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Chapter 8: Nonlinear Transient Response Analysis

- Lesson: Creating a Nonlinear Transient Response Analysis
- Exercise: Ball Impact

Chapter 9: Normal Modes Analysis

- Lesson: Basics of a Dynamic Analysis
- Lesson: Creating a Normal Modes Analysis
- Exercise: Muffler I - Determining Natural Frequencies
- Exercise: Muffler II - Modal Avoidance

Chapter 10: Frequency Response Analysis

- Lesson: Creating a Frequency Response Analysis
- Exercise: Muffler III - Frequency Response

Chapter 11: Transient Response Analyzes

- Lesson: Creating Direct & Modal Transient Response Analysis
- Exercise: Wing

Chapter 12: Random Response Analysis

- Lesson: Creating a Random Response Analysis
- Exercise: Muffler IV - Random Response

Chapter 13: Shock/Response Spectrum Analysis

- Lesson: Creating a Shock/Response Spectrum Analysis
- Exercise: Multi-Story Building

Appendix A: Dynamic Analysis Theory

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Cancellation Policy

The following cancellation policy shall apply to all training engagements, Live Online, Consulting Services and Dedicated/Custom Training:

- Company reserves the right to reschedule or cancel the date, time and location of its class at any time. In the event that a Training Class is cancelled by Company, Customer is entitled to a full refund. Company shall not be responsible for any other loss incurred by Customer as a result of a cancellation or reschedule.
- For Customer cancellations when written notice is received (i) at least ten (10) business days in advance of the class, the Customer is entitled to a full refund of its payment or reschedule enrollment, (ii) less than ten (10) business days, Customer shall not be entitled to a refund, but shall receive a class credit to be used within three (3) months of the date of the original class.
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- For all Training orders, cancellation notices must be submitted to trainingcoordinator@rand.com. Company is not responsible for any error in the delivery of the email notice. In the event of any reschedule of Consulting Services and/or Dedicated/Custom Training by Customer, Company will invoice Customer for all non-cancellable travel expenses.

To request more information or to see training locations, visit www.imaginit.com/contact-us.

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