



Autodesk Inventor Nastran: FEA Fundamentals

Course Length: 1 Day

This course instructs you in the use of the Autodesk® Inventor® Nastran® software. This training course was written using the 2021.1.0.407 build of the 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 Inventor Nastran environment to set up and conduct FEA on part and assembly models.

Topics Covered:

- Activate and navigate the Autodesk Inventor Nastran environment to conduct FEA.
- Create, edit, and assign idealizations and materials (linear, nonlinear, and 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 Analysis.
- Create constraints with the required degrees of freedom and assign them to entities.
- 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.
- Assign global and local mesh settings.
- Run an Autodesk Inventor Nastran analysis.
- Review and create result plots for analyzing the results.

Course description shown for Autodesk Inventor 2021. Topics, curriculum, and/or prerequisites may change depending on software version.

Prerequisites:

- This training course assumes that you have Finite Element Analysis (FEA) knowledge, can interpret results, and in general, knows how a model should be setup for an analysis.
- This training course was written using the 2021.1.0.407 build of the software. The user-interface and workflow may vary if older or newer versions of the software are being used.

Learning Guide Contents

Chapter 1: Getting Started

- Lesson: Autodesk Digital Prototyping
- Lesson: Introduction to FEA
- Lesson: Introduction to Autodesk Inventor Nastran
- Lesson: Working in Autodesk Inventor Nastran
- 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

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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

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