About This Course
The goal of this course is to teach you how to use the SOLIDWORKS Simulation software to help you analyze linear and nonlinear dynamic* structural behavior of your SOLIDWORKS part and assembly models.

The focus of this course is on the advanced skills and concepts central to the successful use of SOLIDWORKS Simulation Premium: Dynamics modulus. You should view the training course manual as a supplement to, and not a replacement for, the system documentation and on-line help. Once you have mastered your basic skills and developed a good foundation in advanced skills, you can refer to the on-line help for information on less frequently used command options.

Prerequisites
Students attending this course are expected to have the following:

- Mechanical design experience.
- Experience with the Windows™ operating system.
- Completed the on-line SOLIDWORKS tutorials that are available under Help. You can access the on-line tutorials by clicking Help, Online Tutorial.
- Basic knowledge of SOLIDWORKS Simulation software discussed and practiced during the basic training courses.
- Knowledge of basic concepts in Finite Element Analysis discussed during the basic SOLIDWORKS Simulation training courses.
- Completed the on-line SOLIDWORKS Simulation tutorials (except those relating to nonlinear analysis) that are available under Help. You can access the on-line tutorials by clicking Help,
- Online Tutorial.

Course Design Philosophy
This course is designed around a process- or task-based approach to training. Rather than focusing on individual features and functions, a process-based training course emphasizes processes and procedures you should follow to complete a particular task. By utilizing ease studies to illustrate these processes, you learn the necessary commands, options and menus in the context of completing a design task.

Course Length
The minimum recommended length of this course is two days.
Lesson 1: Vibration of a Pipe
- Objectives
- Problem Description
- Static Analysis
- Frequency Analysis
  - Discussion
- Dynamic Analysis
  - (Slow Force)
    - Linear Dynamic Analysis
  - Discussion
- Dynamic Analysis
  - (Fast Force)
- Summary
- Questions

Lesson 2: Transient Shock Analysis According to MILS-STD-810G
- Objectives
- Problem Description
  - Mass Participation Factor
  - Cumulative Mass Participation Factor.
  - Damping
  - Viscous Damping
  - Time Step
- Model with Remote Mass
  - Remote Mass
- Summary
- Questions

Lesson 3: Harmonic Analysis of a Bracket
- Objectives
- Project Description
  - Harmonic Analysis Basics
  - Single DOF Oscillator
- Harmonic Analysis of a Bracket
  - Harmonic Study Properties
- Summary
- Questions
Lesson 4:
Response Spectrum Analysis

Objectives
Response Spectrum Analysis
Response Spectrum
Response Spectrum Analysis Procedure
Project Description
Response Spectrum Input
Mode Combination Method
Summary
Questions

Lesson 5:
Random Vibration Analysis According to MIL-STD-810G

Objectives
Project Description
Distributed Mass
Random Vibration Analysis
Power Spectral Density Function
Overall Level of Acceleration PSD
Decibels
Random Study Properties
Advanced Options
RMS Results
PSD Results
Is, 2s, 3s, ... Results
Summary
References
Questions
Exercise 1:
Random Vibration Analysis of an Electronics Enclosure
Exercise 2:
Circuit Board Fatigue Estimates

Lesson 6:
Random Vibration Fatigue

Objectives
Project Description
Random Vibration Fatigue
Material Properties, S-N Curve
Random Vibration Fatigue Options
Summary
Lesson 7: Nonlinear Dynamic Analysis of an Electronic Enclosure

Objectives
Project Description
Linear Dynamic Analysis
Nonlinear Dynamic Analysis
  Linear vs. Nonlinear Dynamic Analysis
  Rayleigh Damping
  Time Integration Methods
  Iterative Methods
Discussion
Summary
Questions