



## Essentials of SOLIDWORKS 2015 (4+ Days)

**\* Ve-I Bonus! \* File Management + SimulationXpress**

### Overview

What is SOLIDWORKS?	Provides some background info on the SOLIDWORKS software
Interface Tour	Covers the different areas of the SOLIDWORKS interface
View Manipulation	Shows some basic techniques for working with 3D models in the interface

### Intro to Sketching - Lecture

Starting a Part	Shows how to start a new SOLIDWORKS Part file
Starting a Sketch	Introduces the sketcher and shows how to start a new sketch
Sketch Tools	Shows how to use some of the basic sketch tools
Geometric Relations	Explains how relations can be added to control a sketch
Dimensions	Explains how dimensions are used to define and control a sketch
Extrude Feature	Explains how to extrude a 2D sketch into a 3D part
Editing Geometry	Shows how to edit existing geometry

### Intro to Sketching - Exercises - Hands On

Basic Sketching	Practice using sketch tools and relations to create a fully defined sketch
Basic Extrude	Create a basic extrude feature
Editing Geometry	Open an existing part file to make design changes to both the shape and depth of the part

### Intro to Sketching - Exercises - Walkthrough

Basic Sketching	Walks you through the steps required to complete the Basic Sketching exercise
Basic Extrude	Walks you through the steps required to complete the Basic Extrude exercise
Editing Geometry	Walks you through the steps required to complete the Editing Geometry exercise

## Basic Part Design - Lecture

Overview of Design	Introduces the bracket part that will be designed in this section
Creating the Base Feature	Shows how to create the first feature of the bracket part
The Tab	Shows how to add the tab feature to the bracket
Hole in Tab	Shows how to add the hole to the tab feature
Mirror Feature	Introduces the mirror tool which is used to take advantage of symmetry in a design
Rollback Bar and Order of Features	Shows how the order that features are created in affects a design
Hole Wizard	Introduces the hole wizard which is used to add standard sized holes to a part
Fillets	Shows how to use fillets to round off sharp edges

## Basic Part Design - Exercises - Hands On

Mounting Block	Combine several features to create the mounting block design in this exercise
Bracket	Practice additional sketch tools and features in the bracket design

## Basic Part Design - Exercises - Walkthrough

Mounting Block - Part 1	Walks you through the first few steps required to complete the Mounting Block exercise
Mounting Block - Part 2	Walks you through the steps required to complete the Mounting Block exercise
Mounting Block - Part 3	Walks you through the remaining steps required to complete the Mounting Block exercise
Bracket - Part 1	Walks you through the first few steps required to create the Bracket part
Bracket - Part 2	Walks you through the steps required to create the Bracket part
Bracket - Part 3	Walks you through the remaining steps required to complete the Bracket part

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## Revolve and Pattern - Lecture

Revolve Feature	Shows how to use the revolved boss feature to create a wheel part
Cutout and Circular Pattern	Adds a cutout and patterns it around the wheel

## Assembly Design - Lecture

Assembly Overview	Introduces how parts can be put together to form assemblies
Starting an Assembly	Explains how to begin an assembly file
Inserting Additional Components	Shows various methods to insert components into an assembly
Move Components	Explains how to position parts within an assembly
Mating the Wheel	Shows how to add mates to lock down the wheel's position in an assembly
Mating the Pin	Shows how to mate the pin component in the assembly
Toolbox	Shows how to use the toolbox to add standard hardware to an assembly
Exploded View	Shows how to create an exploded view of the assembly
Working with Sub-Assemblies	Shows how to add an assembly within a larger assembly

## Assembly Design - Exercise - Hands On

Basic Moving Assembly	Use mates to create a basic assembly
Brace Assembly	Use mates and sub-assemblies to create a brace assembly

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## 2015 Core Concepts for Parts and Assemblies

### Introduction

Course Introduction	Introduces Ve-I's approach to instruction
SOLIDWORKS Overview	Overview and definition of how SOLIDWORKS behaves
Interface	Shows various components of the SOLIDWORKS Interface
Task Pane Resources	Shows the resources available in the SOLIDWORKS Task Pane
View Manipulation	Explains how to control the view and orientation of a model

### Introduction to Sketching

The Sketcher	Explains how to begin a two dimensional sketch
Lines	Shows how to use the line tool within a sketch
Centerlines and Midpoint Lines	Shows how to use the Centerline and Midpoint Line tools within a sketch
Rectangles	Shows how to use the rectangle tool within a sketch
Circles & Arcs	Explains how to use the circle and the arc sketch tools
Automatic Relations	Explains how automatic relations are used to control a sketch
Geometric Relations	Explains how manual geometric relations can be added to control a sketch
Dimensions	Shows how to use the Smart Dimension tool to define sketch entities
Numeric Sketch Input	Shows how to add dimensions on the fly using numeric sketch input
Fully Defined Sketches	Explains how to define a sketch using dimensions and relations
Over Defined Sketches	Explains the difference between driving and driven dimensions

### Sketch Tools

Sketch Fillets	Explains how to add a fillet to sharp sketch segments
Offset Entities	Explains how to create an offset copy of another entity
Convert Entities	Explains how to use the Convert Entities command
Trim Tools	Explains how to trim and extend lines in a sketch
Sketch Mirroring	Explains how to create a symmetrical copy of sketch entities
Sketch Patterns	Shows how to create both linear and circular patterns of sketch entities
Sketches on Faces	Introduces how to create a 2-D sketch on a face of the model

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Rapid Sketch	Introduces the rapid sketch tool
Sketched Text	Shows how to add text to a sketch

### Sketched Features

Sketched Features Introduction	Overview
Extruded Boss	Explains how to extrude a 2-D sketch into a 3-D part
Extruded Cut	Explains how to remove material from a part
Contours & Thin Features	Explains how to extrude a selected portion of a sketch
Revolved Boss	Explains how to revolve a 2-D profile to create 3-D geometry
Revolved Cut	Explains how to remove material using a revolved cut
Sweep	Explains how to create 3-D geometry by using a profile and a path
Loft	Explains how to loft two profiles together to create 3-D geometry
Ribs	Explains how to create Rib Features on a part

### Applied Features

Applied Features Introduction	Applied Features Overview
Fillets	Explains how to use fillets to round off 3-D parts
Chamfers	Explains how to break sharp edges on 3-D parts
Shell	Explains how to take solid geometry and make it hollow
Hole Wizard	Explains how to create holes in parts used for fasteners
Draft	Shows how to add a draft angle to a face

### Reference Geometry

Planes 1	Shows how to create a reference plane
Creating Axes	Explains how to manually create axes on a 3-D body
Planes 2	Shows several ways to create a plane

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## Patterns and Mirroring

Linear Patterns	Shows how to create multiple instances of a feature in a linear fashion
Circular Patterns	Shows how to create multiple instances of a feature in a circular fashion
Vary Pattern Instances	Shows how to vary the dimensions of pattern instances
3D Mirroring	Shows how to symmetrically replicate features on a part
Mirroring Bodies	Shows how to replicate geometry about a plane

## Introduction to Part Modeling

Introducing Parts	Introduction to Part Design
Starting a Part	Explains how to begin designing a part
Picking a Plane	Explains how to decide on which plane to start a part
Design Intent	Explains how a part will behave when making design changes
Symmetry A	Explains how to use symmetry in a part
Symmetry B	Explains how to use symmetry in a part

## Editing Parts and Design Changes

Editing Parts	Explains how to edit a part
Parent Child Relations	Explains how some features are dependent upon one another
Instant 3D	Explains how to modify a part dynamically using Instant 3D

## Analyzing Part Properties

Measure	Shows how to use the measure tool
Materials	Shows how apply a material with properties to a part
Mass Properties	Shows how check the mass and other properties of a part
Custom Properties	Shows how add custom properties to a part

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## Configurations

Configurations - Introduction	Introduces how different configurations can be used on a part
Configurations - Dimension Changes	Explains how to create different configurations for a part
Configurations - Feature Suppression	Explains how to create different configurations for a part
Configurations - Table	Explains how to create different configurations for a part

## Design Tables

Design Tables - Intro	Explains how design tables can be used to control configurations
Design Tables - Renaming Dimensions	Explains how to manage design tables by renaming dimensions
Design Tables - Creating	Explains how to create a design table
Design Tables for Features	Explains how to add features to a design table

## Assembly Modeling

Introducing Assemblies	Explains what assembly files are used for
Starting an Assembly	Explains how to begin an assembly file
Inserting Components	Explains how to insert components into an assembly
Positioning Parts	Explains how to position a part in an assembly file
Adding Mates	Explains how to add mates to a part
Coincident Mate	Explains how to use the coincident mate function
Tangent Mate	Explains how to use the tangent mate function
Concentric Mate	Explains how to use the concentric mate function
Distance Mate	Explains how to use distance mates
Smart Mates	Explains how smart mates can simplify assembly files
Multiple Mate Mode	Shows how to mate several components to one common reference
Assembly Appearances	Shows how to control the appearances of components in an assembly
Hide/Show Components	Shows how to hide and show components, and also adjust transparency in an assembly

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## Analyzing Assemblies

Interference Detection	Explains how to detect interferences between components
Dynamic Clearance	Explains how to detect the amount of clearance between components
Collision Detection	Explains how to detect collisions with moving components
Exploding Assemblies	Explains how to create an exploded view of an assembly

## Hands-On Exercise: Door Latch Parts

Handle 1	Instructions to create the handle for the Door Latch Exercise
Handle 2	Instructions to create the second handle for the Door Latch Exercise
Rose Cover 1	Instructions to create the rose cover for the Door Latch Exercise
Rose Cover 2	Instructions to create the second rose cover for the Door Latch Exercise
Lock Mechanism	Instructions to create the lock mechanism for the Door Latch Exercise
Latch Plate	Instructions to create the latch plate for the Door Latch Exercise
Face Plate	Instructions to create the face plate for the Door Latch Exercise
Latch	Instructions to create the latch for the Door Latch Exercise

## Hands-On Walkthrough: Door Latch Parts

Door Latch Introduction	Introduces the Case Study and shows a preview of the finished assembly
Handle 1	Walks you through the steps required to complete the exercise
Handle 2	Walks you through the steps required to complete the exercise
Rose Cover 1	Walks you through the steps required to complete the exercise
Rose Cover 2	Walks you through the steps required to complete the exercise
Lock Mechanism	Walks you through the steps required to complete the exercise
Latch Plate	Walks you through the steps required to complete the exercise
Face Plate	Walks you through the steps required to complete the exercise
Latch	Walks you through the steps required to complete the exercise

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### **Hands-On Exercise: Door Latch Assembly**

Latch Sub-Assembly	Instructions to create the latch sub-assembly
Final Assembly	Instructions to create the final assembly

### **Hands-On Walkthrough: Door Latch Assembly**

Latch Sub Assembly	Walks you through the steps required to complete the exercise
Final Assembly	Walks you through the steps required to complete the exercise

### **Section Test**

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## **File Management**

### **File Management**

File Relationships	Shows how assembly references can be lost
References	Shows how you can view all assembly references and their locations
Renaming Parts - Save As	Shows how to Rename a component while maintaining references
Renaming Parts - SOLIDWORKS Explorer	Shows how to Rename a component while maintaining references
Document Revisions - Part A	Shows how to create copies of components to make new revisions
Reloading and Replacing	Shows how to reload and replace components with revised or different components

### **Section Test**

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## SimulationXpress (1 Day)

### SimulationXpress

Overview  
FEA, why use Xpress?

Introduces SimulationXpress and discusses how and why it should be used. This course teaches you everything you need to know to begin validating designs using SolidWorks SimulationXpress. This course features everything from full step by step instructions for setting up and running a study, to optimizing a part to meet design criteria, and even includes exercises for you to try on your own.

Assumptions	Explains cases when Xpress should and should not be used
Starting an Analysis	Explains an analysis problem and shows how to get started
Units	Shows how to change the units displayed in Xpress results
Applying Fixtures	Shows how to apply a fixed restraint to simulate how the part will be held
Applying Loads	Shows how to apply a load to simulate a force or pressure acting on a part
Applying a Material	Shows how to define the material used in the Xpress study
Running the Simulation	Shows how to control mesh size and run the test
Interpreting Results - Stress and Displacement	Shows how to view and interpret results
Factor of Safety	Explains how to interpret Factor of Safety results from Xpress
Output and Reports	Shows how to output results into HTML reports and eDrawings
Optimizing a Design	Shows how Xpress can optimize a dimension with respect to the part's weight to achieve a design goal
Summary	Concludes the SimulationXpress test

### Hands-On Exercises

Crankshaft	Use SimulationXpress to simulate the forces on the Crankshaft Part
Pipe Reducer	Use SimulationXpress to simulate the pressure inside the Pipe Reducer part

### Appendix

Custom Materials

Shows how to add custom materials to be used in SimulationXpress

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Split Line

Shows how to split a single face into multiple faces for loads and restraints to be applied