

Revit Structure Training Outline

Building Information Modeling (BIM)

- **Overview of BIM**
 - o From AutoCad to Revit
 - o Bidirectional Association
 - o Parametric Relationships
 - o Analytical vs. Physical Models
 - o Three Major Elements (Model/View/Annotation)

Using Autodesk Revit Structure

- **User Interface and Common Tools**
 - o Menu Bar
 - o Tool Bar
 - o Design Bar
 - o Options Bar
 - o Status Bar/Mouse Tool Tips
 - o Type Selector
 - o Ending a Command
 - o Object Snaps
 - o TAB Key
 - o Hot Keys
 - o Editing (Move/Copy/Rotate/Array/Mirror)
- **Viewing the Building Model**
 - o View Window
 - o Project Browser
 - o Close Hidden Windows
 - o Tile Windows
 - o Duplicate a View
 - o Delete a View – Model Elements Remain, Annotation Elements are Deleted
 - o View Properties (VP) – View Specific
 - o View Control Bar – View Specific
 - o Visibility/Graphics (VV or VG) – View Specific
 - o Moving Around in a View
 - o Dynamically Modify View
 - o Selecting Elements
 - o Filter
- **Working with Building Elements**
 - o Element Categories
 - o Element Families
 - o Element Properties (Options Bar)
 - o Type Properties
 - o Instance Properties
 - o Loading Families
 - o Catalog vs. Non-Catalog Family Libraries
 - o Component vs. System Families

Building a Model

- **Project Set-up**
 - Transferring Project Standards
 - Project Information
 - Project Browser Organization

- **Datum Elements**
 - Levels
 - Grids

- **Structural Columns**
 - Type Selector (Load if Necessary)
 - Specify by Height or Depth
 - Place Individually (Space Bar to Rotate)
 - Place by Grid Intersection
 - Place by Architectural Column

- **Floor Framing**
 - Structural Beams
 - Type Selector (Load if Necessary)
 - Geometry Offset (Element Property)
 - Select Work Plane
 - Usage
 - Place Individually (Chain in Options Bar)
 - Place by Grid (Need Structural Columns)
 - Cantilever Moment Symbol (Element Property)
 - Beam Systems
 - Useful for Placing Multiple Beams in a Bay
 - Properties (Layout Rule, Spacing, Justification)
 - Pick Supports vs. Lines
 - Beam Direction
 - Reset Structural Beams System

- **Steel Frames**
 - Moment Frames
 - Add a Moment Symbol to the End of Beam
 - Modify Graphics in Structural Settings.
 - Brace Frames
 - Framing Elevation
 - Bracing Members (Snap to Work Points)
 - Symbolic Plan Representation

- **Creating Floor Decks and Slabs**
 - Floor Properties
 - Creating Floor Types
 - Pick Support vs. Lines
 - Changing Span Direction (Span Direction Symbol)
 - Add Openings
 - Sloping Slabs (Mono-Slope Only) – Define Slope vs. Sloped Arrow

- **Slope Framing**
 - Attaching Framing Members
 - Rotating Framing Members Back to Vertical
 - Define Elevation at Ends of Beam
 - Attach Top/Bottom of Columns

- **Copy Framing to Other Levels**
 - Copy to Clipboard (Edit>Copy to Clip Board or Ctrl+C)
 - Paste Align to Other Levels (Edit>Paste Aligned>Select Level by Name...)

- **Creating Walls**
 - Wall Types
 - Wall Categories
 - Wall Usage
 - Creating Wall Types
 - Options Bar
 - Location Line for Placement and Editing
 - Modify Wall Profile
 - Add Openings
 - Attach Top/Bottom of Wall

- **Creating Foundations**
 - Continuous Footings and Pilasters
 - Isolated Footings and Grade Beam

- **Slab-on-Grade**
 - Edge Condition

- **Creating an Elevator Pit**
 - Using Wall and Foundation Slab
 - Elevator Pit (Solid/Void Extrusion)

Architectural Elements

- **Roofs**
 - Roof Properties (No Analytical Properties)
 - Multi-Slope Roof
 - Attach Framing Members
 - Create Roofs by Extrusion
 - Merge Roof Tool

- **Stairs**
 - Stair Properties
 - Placing by Run Line (Landings are Automatically Placed)
 - Placing by Boundary and Riser Lines
 - Railings are Hosted

- **Ramps**
 - Ramp Properties
 - Placing by Run Line (Use Reference Lines to Guide Placement)

Structural Analysis

- **Structural Analysis Overview**
 - Physical Model vs. Analytical Model
 - Physical and Analytical Views
 - Elemental Analytical Models (Beams, Braces, Columns, Walls and Slabs)
- **Structural Analytical Properties**
 - Analytical Projection Planes
 - Release Conditions (Pinned by Default)
 - Rigid Links (Property of Columns)
 - Materials
- **Editing the Analytical Model**
 - Adjust Analytical Model Tool (Tools>Adjust Analytical Model - AA)
 - Reset Analytical Model Tool (Tools>Reset Analytical Model - RA)
- **Analytical**
 - Member Support Checks (Tools>Analytical Model)
 - Analytical/Physical Model Consistency Checks (Tools>Analytical Model)
- **Adding Loads**
 - Load Cases
 - Load Combinations
 - Modeling Loads (Point, Line and Area)
 - Hosted Loads
 - Align and Load Loads
- **Analyzing and Updating the Model**
 - Sending the Model to External Analysis Tools (ETABS, RISA, RoboBAT, RAM)
 - Updating the Model

Creating Views

- **More View Properties**
 - View Range
 - Underlay
 - Visibility Graphics vs. Object Styles
- **Creating Floor Plans**
 - Creating Enlarged Plans (Duplicate/Crop Box)
 - Duplicate with Detailing vs. Duplicate (Annotation is View Specific)
- **Creating Elevations and Sections**
 - Creating Elevations
 - Building vs. Framing Elevations
 - Far Clip Plane
 - Appearance of Elevation Symbol (Circle or Square)
 - Creating Sections
 - Building vs. Wall vs. Detail Sections
 - Section Symbol Options
 - Split Segment (Options Bar)
 - Splitting Sections Horizontally
 - Splitting Sections Vertically

- Reference a Similar Section (Options Bar)
 - Appearance of Section Head/Tail (Customizable)
- **Creating Callouts**
 - Enlarge a Floor Plan (Annotation is View Specific)
 - Rotate a Callout
 - Enlarge a Detail
 - Appearance of Callout Head (Customizable)
- **3D View**
 - Section Box (View Property)
 - Orient to Other View (View>Orient>To Other View)
 - Camera Perspective (Set-up Camera in Plan View; View>New>Camera)
 - Changing Material Properties
- **Creating and Assembling Sheet Views**
 - Drag and drop views.
 - Viewports and View Titles
 - Activating Views and working on the sheets

Documentation

- **Component Tags**
 - Adding Tags Individually (Drafting Menu Bar)
 - Adding Leader with Free End (Options Bar)
 - Tag All Not Tagged (Drafting Menu Bar)
 - Creating New Tags (Family Based – Edit Family in Options Bar)
- **Dimensions, Elevation Symbols, and Text**
 - Creating New Dimension Types
 - Placing by Individual Reference (Options Bar)
 - Placing by Entire Wall (Options Bar)
 - Edit Witness Line Location
 - Aligned vs. Linear
 - Temporary Dimension Settings (Settings>Temporary Dimensions)
 - Spot Elevation Symbols (Drafting>Spot Dimension)
 - Creating New Text Type
 - Add/Remove Leader (Options Bar)
- **Legends**
 - Create New (View>Legend)
 - Symbols vs. Legend Components (Set Scale Based on Legend Components)
- **Schedules/Quantities**
 - Type vs. Instance Schedules
 - Create New (View>New>Schedule/Quantities)
 - Schedule Properties (Fields, Filter, Sorting/Grouping, Formatting, Appearance)
 - Calculating Values and Adding Parameters
 - Changes Made in the Schedule are Reflected in the Model
 - Exporting the Schedule
 - Graphical Column Schedule (View>New>Graphical Column Schedule)
 - Graphical Column Schedule Properties

Detailing

- **Typical Detail**
 - Drafting View
 - Detail Component (2D)
 - Repeating Detail Tool
 - Fill Region

- **Steel Detail**
 - Coping a Beam
 - Line Work Tool
 - Grouping 2D Elements
 - 2D Connection Component Families

- **Concrete Detail**
 - Adding Rebar (Modeling>Structural>Rebar)
 - Placing Rebar (Modeling>Structural>Rebar)
 - Area Reinforcement (Modeling>Structural>Rebar)
 - Adding a Shear Key (Tools>Edit Cut Profile)

Publishing Drawing Sets

- Create a Titleblock
- Printing Sheets
- Exporting to CAD
- Revisions

Additional Topics

- **Referencing Architectural Files**
 - Importing CAD
 - Linking Revit Models and Copy/Monitor

- **Multi-User Environment**
 - Creating, working and managing a multi-user environment
 - Central File (Resides on the Network)
 - Local Files (Reside on each User's Hard Drive)
 - Worksets

Creating Content

- **Creating In-place Families**
 - Stepped Footing (Solid Extrusion)
 - Column with Capital (Solid Revolve)
 - Curved Beam (Solid Sweep)
 - Slanted Wall (Solid Blend)
 - Elevator Pit (Solid/Void Extrusion)

- **Create an External Family Component**
 - Identify insertion point
 - Place reference planes
 - Add parameters
 - Add extrusions and attach to reference planes
 - Add symbolic lines
 - Load into project