Autodesk Revit Structural Essentials

Target Audience

This course is designed for structural engineers, designers, and BIM professionals who are new to Autodesk Revit and want to learn essential tools and workflows for creating, analyzing, and documenting structural designs.

Course Objective

The objective of this course is to provide participants with foundational knowledge of Revit Structure, enabling them to create structural models, analyze design accuracy, and generate detailed construction documentation effectively.

Course Outcome

- Learn to navigate the Revit interface and create structural elements such as beams, columns, foundations, and trusses.
- Understand how to set up and manage levels, grids, and project standards for structural organization.
- Develop skills in creating construction documents, including structural plans, sections, schedules, and annotations.
- Gain an introduction to collaborating with architects and MEP engineers using Revit's worksharing and coordination tools.

Course Outline: The course comprises **40 -hours** of theory and labs and is divided into **10** different chapters. Each chapter will be followed by hands-on lab exercises to reinforce learning and gauge understanding of the topics covered.

Chapter 1. Introduction to Autodesk Revit for Structure

Introduction to Autodesk Revit for Structure
Autodesk Revit as a Building Information Modeler
Basic Concepts and Principles

- Understanding the Parametric Building Modeling Technology
- Terms Used in Autodesk Revit for Structure
- Creating a Structural Model Using Parametric Building Elements
- Visibility/Graphics Overrides, Scale, and Detail Level
- Extracting Project Information
- Creating a Structural Drawing Set
- Creating an Unusual Building Geometry
- Flexibility of Creating Special Elements
- Creating Structural Layouts
- Working on Large Projects
- Working in Large Teams and Coordinating with Consultants

Starting Autodesk Revit
User Interface

- Title Bar
- Ribbon
- Application Frame
- Status Bar
- View Control Bar
- Options Bar
- Type Selector
- Drawing Area

Project Browser

- Keyboard Accelerators
- Properties Palette

Dialog Boxes
Multiple Document Environment
Interoperability of Autodesk Revit
Building Information Modeling and Autodesk Revit
Worksharing Using Revit Server

Autodesk Construction Cloud
Linking Analytical Model for Analysis
Autodesk Revit Help
- Using the Revit Help

Chapter 2. Getting Started with a Structural Project

Introduction
Starting a New Structural Project
Setting Project Units
- Common Unit Type
- Structural Unit Type

Structural Settings 2-9
- Symbolic Representation Settings Tab

Connection Settings
Snaps Tool
- Dimension Snaps Area
- Object Snaps Area
- Temporary Overrides Area

Options Dialog Box
- General Tab
- User Interface Tab
- Graphics Tab
- Hardware Tab
- File Locations Tab
- Rendering Tab
- Check Spelling Tab
- Steering Wheels Tab
- ViewCube Tab
- Macros Tab
- Cloud Model

Saving a Project
- Using the Save As Tool
- Using the Save Tool

Closing a Structural Project
Exiting a Structural Project

Opening an Existing Structural Project
- Opening an Existing Project Using the Open Tool
- Using the Windows Explorer to Open an Existing Project

Chapter 3. Setting up a Structural Project

Project Template
- Creating a Custom Project Template
- Settings for the Project Template
- Setting the Project Location

Using Levels
- Understanding Controls in a Level
- Adding Levels
- Instance and Type Properties of a Level
- Changing the Level Parameters
- Controlling the Visibility of Levels

Grids
- Creating Grids
- Creating Multi-Segmented Grids
- Modifying Grids
- Customizing the Grid Display
- Controlling the Visibility of Grids

Working with Reference Planes

Working with Work Planes
- Setting a Work Plane
- Controlling the Visibility of Work Planes
- Using the Workplane Viewer Window

Working with Project Views
- Viewing a Building Model
- Controlling the Visibility of Elements in Views

Scope Box
- Creating a Scope Box
- Applying a Scope Box to Datum Elements
- Controlling the Visibility of a Scope Box

Chapter 4. Structural Columns and Walls

Structural Columns

- Types of Structural Column
- Loading Structural Column Families
- Adding Structural Columns to a Project
- Creating Openings in Structural Columns
- Modifying the Element Properties of Structural Columns

Architectural Columns

- Adding Structural Column to an Architectural Column

Difference between a Structural Column and an Architectural Column
Structural Walls

- Adding Structural Walls
- Modifying Structural Walls

Chapter 5. Foundations, Beams, Floors, and Open Web Joists

Foundations

- Foundation Wall
- Shallow Foundations

Structural Floors

- Adding Structural Floors
- Modifying Structural Floors
- Adding Openings to a Structural Floor

Adding a Slab Edge to a Structural Floor
Beams

- Adding Beams
- Modifying Beams
- Adding a Structural Beam System

Open Web Steel Joists

- Adding K Series Joist System

Chapter 6. Editing Tools

Selecting Elements

- Selecting a Single Element
- Selecting Multiple Elements
- Selecting Elements Using the Advanced Selection Tools
- Restoring a Selection
- Selecting Elements Using the Filter Tool

- The Filter Icon

Moving Structural Elements
- Moving Elements by Changing Temporary Dimensions
- Moving Elements By Dragging
- Dragging End-joined Components
- Moving Elements Using the Move Tool

Copying Structural Elements
- Copying Elements Using the CTRL Key
- Copying Elements Using the Copy Tool
- Using the Create Similar Tool
- Copying Elements Using the Clipboard

Rotating Structural Elements

Mirroring Structural Elements
- Mirror - Pick Axis Tool
- Mirror - Draw Axis Tool

Arraying Structural Elements
- Linear Tool
- Radial Tool

Resizing Elements

Pinning Elements

Aligning Elements

Steel Element Cutting Tools
- Corner Cut
- Cope Skew
- Shorten
- Contour Cut

Structural Steel Connections
- Cope
- Miter
- Saw Cut - Flange
- Saw Cut - Web
- Cut Through
- Cut By

Matching Type Properties

Trimming and Extending Elements
- Trim/Extend to Corner Tool
- Trim/Extend Single Element Tool
- Trim/Extend Multiple Elements Tool

Offsetting Elements

Deleting Elements
Grouping Elements
- Creating Groups by Selecting Elements
- Creating Groups Using the Group Editor
- Creating a Detail Group
- Placing Groups
- Modifying Groups
- Excluding Elements from a Group

- Saving and Loading Groups

Editing Elements
- Applying and Removing Coping
- Joining and Unjoining Elements

Splitting a Face

Chapter 7. Documenting Models and Creating Families

Dimensioning
- Types of Dimensions
- Using Temporary Dimensions
- Entities in a Dimension
- Adding Permanent Dimensions
- Modifying Dimension Parameters
- Locking Permanent Dimensions
- Converting Temporary Dimensions into Permanent Dimensions

Text Notes
- Adding Text Notes
- Editing Text Notes

Adding Tags
- Tagging Elements by Category
- Tagging all Elements in a View
- Beam Annotations

Creating Families
- Creating In-Place Families
- Creating a Family Geometry in the Family Editor
- Editing a Family Geometry in the Family Editor
- Creating Cuts in a Family Geometry by Using the Family Editor

Chapter 8. Standard Views, Details, and Schedules

Elevation Views
- Creating a Building Elevation View
- Creating a Framing Elevation View

Section Views
- Creating a Section View

Callout Views
- Creating a Callout using the Rectangle Tool
- Creating a Callout Using the Sketch Tool
- Displaying a Callout View
- Modifying the Properties of a Callout View
- Creating Details in a Callout View

Drafting Details
- Creating a Drafting View
- Drafting a Detail

Duplicate Views
- Creating a Duplicate View as a Dependent View

Graphical Column Schedules
- Creating Graphical Column Schedule

Using Schedules in a Project
- Generating a Schedule
- Editing a Schedule

Generating the Material Takeoff Schedule

Chapter 9. 3D Views, Sheets, Analysis, and Reinforcements

Three-Dimensional (3D) Views
- Creating Orthographic 3D Views
- Creating Perspective Views
- Creating 3D Section Views

Generating Shadows
- Solar Study

Sheets
- Adding a Drawing Sheet to a Project
- Adding Views to a Drawing Sheet
- Modifying a Building Model in Sheets
- Adding Schedules to a Drawing Sheet

Structural Analytical Models

- Applying Analytical Automation
- Adding Analytical Members and Panels
- Adding Analytical Link
- Parameters for Analytical Member
- Applying Loads in Analytical Model
- Setting Boundary Conditions

Adding Reinforcements

- Place Rebar Parallel to the Work Plane Tool
- Place Rebar Perpendicular to the Cover Tool
- Cover Tool
- Area Tool
- Path Tool
- Free Form Rebar Tool
- Fabric Area Tool
- Fabric Sheet Tool
- Rebar Coupler Tool
- Bending Detail Tool

Linking Building Models and Sharing Coordinates

- Linking or Importing Models

Introduction to Massing
Understanding Massing Concepts
Creating the Massing Geometry

Chapter 10. Linking Revit Model with Robot Structural Analysis

Installing Robot Structural Analysis Professional
Structural Analysis Interoperability

- Linking the Analytical Model for Analysis and Code Check

Structural Analysis in Autodesk Robot Structural Analysis Professional

- Linking Revit Files to Robot
- Setting Job Preferences in Robot
- Analysis in Robot
- Viewing Results in Robot
- Updating the Model in Revit