

Online  
Training



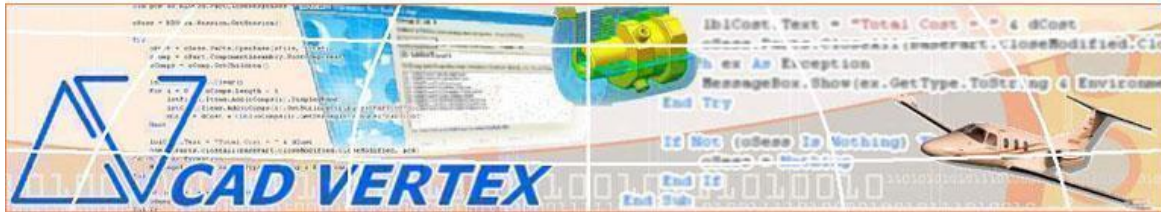
# Revit API



with  
**Dynamo**

- Flexible timings.
- CSharp programming included.
- Personal coaching, no videos.
- Weekend batches available.

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**10 pages**



## CADVertex Solutions

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# Revit API + Dynamo

## Language: CSharp

### Training Structure

Module 1: **CSharp Programming** - Indepth with OOPs.  
Module 2: **Revit API** - Deep Dive and Advanced Techniques.  
Module 3: **Revit API + Dynamo** Integrations and Industry Practices.

**Fees** Check website: <https://www.cadvertex.com/training.htm>

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### Features:

- ✓ Personal coaching - no recorded videos.
- ✓ Flexible timings, weekend batches are also conducted.
- ✓ CSharp programming – indepth training included.
- ✓ Unlimited support after training - at no extra cost!

### Training Highlights



Online Training



Flexible Timings



Trainer: 25 yrs Exp.



Duration: 6 Wks



1 Hour Daily



Basic to Advanced



10 Industry Projs



Certificate



Support after Training



CuttingEdge Tech

## **Module 1: CSharp Programming**

### **1. Installing Visual Studio**

- Installing an older version.
- Setting the default language.
- Setting the environment and preferences.
- Customizing the layout.
- Solution Explorer, output and error windows.

### **2. Console applications and introduction to programming**

- Selecting a project template.
- Setting up user interaction and collecting inputs.
- Calculations and output display.
- Using the .Net Math library functions.
- Various files and their meaning in the project structure.
- Separating source code from the executable.

### **3. Creating a Windows Forms Application**

- Setting dialog box properties.
- Toolbox and the Properties window.
- Adding controls: Button, TextBox, Label, Checkbox, RadioButton.
- Adding images to PictureBox and other controls.
- Aligning text and images on controls.
- Composite controls: ListBox and ComboBox.
- Adjusting various properties for each type of control.
- Variable types - Double, Integer, String and Boolean.
- Acquiring user input from various controls into variables.

### **4. File Open dialog and File Save dialogs**

- Creating basic, compound and composite file filters.
- Dialog properties and startup paths.
- Reading single and multiple files from a file dialog.
- Opening various type of files using a file dialog.

### **5. Folder Selection Dialog**

- Getting files from folder.
- Filtering file types in a folder dialog.
- IO.Directory functions.
- Anchoring controls to the Form.

## **6. Message Boxes**

- Configuring single line and multiline messages.
- Button and icon selection.
- Using If-Then-Else statements.
- Checking message box responses.

## **7. Arrays**

- Filling arrays and reading array elements.
- Filling ListBoxes with array elements.
- For Loop and ForEach loop.
- ArrayLists and Lists - advantages and limitations.

## **8. Functions and Subroutines**

- Arguments, return types and return values in functions.
- ref and out clauses.
- Enums and constants.
- Errors - syntax, logical and exceptions.
- Exception handling.
- Post-build events.
- Runtime update.
- LINQ – Language Integrated Queries, and Lambda functions.  
Select, FindAll, Take, TakeWhile, Skip, SkipWhile, First queries.

## **9. Object Oriented Programming**

- Creating a class.
- Adding member functions.
- Static and non-static methods.
- Class constructor and object variables.
- Public and Private methods.
- Adding member variables.
- Derived class.
- Inheritance and Interfaces.
- Encapsulation.
- Polymorphism and function overloading.
- DLL and EXE, differences and usage.
- Casting – traditional and modern methods.
- Class Attributes.

## **10. Multi-Form Projects**

- Adding Forms to a project.
- Adding Forms to a console application.
- Form objects and invoking Forms.
- Default constructor and modified constructor.
- Exchanging data between Forms.
- Default values in forms.
- Storing and retrieving data.
- Events and Event Handling.

## **Module 2 : Revit API**

### **11. Creating a Plugin**

- The Revit API.
- Viewing the Revit API.
- Setting up Visual Studio.
- Add classes and implement interface.
- The IExternalCommand.
- Creating a command.
- Task dialog.
- Task dialog builder.
- Invoking the application in Revit.

### **12. Plugin Usage**

- Registering add-ins.
- Compiling the code.
- Creating a manifest file.
- Lookup and Snoop techniques.

### **13. Selections in Revit**

- Element Selection.
- Retrieving properties of selected elements.
- Selection Filter.
- Filters Basic.
- Get an element using filters.
- Logical Filters.
- Filtering using LINQ techniques.
- Querying the FilteredElementCollector.
- Retrieve Elements and element ids.

### **14. Working with Revit Elements**

- Classifying elements.
- Retrieving element information.
- Filtered Element Collector.
- Creating a collector.

## 15. Transactions

- Start, commit and rollback transactions.
- Modifying elements.
- Creating families.
  
- Creating line-based elements.
- Creating loop elements.

## 16. Parameters

- Parameter Object Hierarchy
- Retrieve Parameter Value
- Set Parameter Value

## 17. Element Creation

- **Project:** Creating walls.
- Single Wall Creation
- Multiple Wall Creation
- Floor Creation
- Element locations.
- Point locations and location curves.
- Editing methods.
- Single Transaction.
- Group Transactions.

## Module 3 : Revit API Advanced Techniques

### 18: Revit Family

- Load Family into Project.
- Activate a symbol.
- Place family into project.

### 19. Element Geometry and Vectors

- Intersecting geometry.
- Vectors and projecting rays.
- Finding shortest distance and interference.

### 20. Automating Drafting and Drawing

- Tagging elements.
- Creating automatic element tags.
- Creating sheets.
- Placing views.
- Creating a Plan View.

## 21. External applications

- Creating an IExternalApplication.
- Customizing the user interface.
- Adding ribbon tabs and ribbon panels.
- Adding buttons with icons.
- Invoking plugins from ribbon buttons.

## 22. Debugging Techniques

- Debugging techniques in Revit apps.
- Adding breakpoints and inspecting values.
- Determine source of error.
- Troubleshooting and fix errors in the code.

## 23. Excel Automation and Integration

- Integrating Revit API with Excel.
- Reading data from Excel and creating objects in Revit.
- Writing out Revit model data to Excel sheets.
- Invoking Excel from CSharp.
- Creating new workbook.
- Connecting to Excel.
- Connecting to existing worksheets.
- Accessing range and cells.
- Writing and reading values from cells.
- Formulas and results.
- Formatting cells - font and layout.
- Excel Macro recording and integration.

- ❖ **Project** - Writing Revit Information to Excel.
- ❖ **Project** - Reading from Excel into Revit.

## 24. Dynamo

- What is Dynamo.
- What is Visual Programming.
- Getting Started with Dynamo.
- The Building Blocks of Dynamo.
- Code Vs. Nodes.
- Node Anatomy.
- Searching, browsing and adding nodes.
- Node wiring and data flow.
- Unwiring nodes.
- Grouping and ungrouping.
- Duplicating and renaming nodes.
- Input, output and previews.
- Watching node output.
- Code blocks.
- DesignScript language.

- Numerical inputs and Sliders.
- Graph view and background view.
- Zoom , Pan and rotate graphs.

## **25. Using Dynamo in Revit**

- Creating geometry - point, lines.
- Creating Revit geometry.
- Lists and Ranges.
- Grids and matrix.
- Lacing techniques.
- Visualizing parameter data.
- Selecting elements in Excel.
- Create, Action, Query nodes.
- Filter list by element type.
- Automating repetitive tasks.
- How to create column grids.
- Working with data in Excel.
- Family types and instances.
- Creating custom nodes.
- Using the Dynamo player in Revit.
- Installing packages.
- Using the Package Manager.
- Useful Dynamo resources.
- Resume building and interview preparation.



## Other eBooks and Training Programs from CADVertex:

- ❖ CATIA Automation: VB.Net or CSharp or Python
- ❖ SolidWorks Automation: VB.Net or CSharp or Python
- ❖ Solid Edge Automation: VB.Net or CSharp or Python
- ❖ Inventor Automation: VB.Net or CSharp or Python
  
- ❖ NX Open: VB.Net or CSharp with Win Forms
- ❖ NX Open: VB.Net or CSharp with Block UI Styler
- ❖ Knowledge Fusion
- ❖ Knowledge Fusion with Block UI Styler
  
- ❖ [Revit Automation using CSharp.Net + \*\*Dynamo\*\*](#)
- ❖ [Tekla Automation using CSharp.Net](#)
  
- ❖ cMayoCAD: Learn to build a new CAD program from scratch using a Geometric Modeling Kernel and CSharp
  
- ❖ CATIA Automation with Python and Machine Learning
- ❖ Solid Edge Automation with Python + Machine Learning
- ❖ SolidWorks Automation with Python + Machine Learning
- ❖ Inventor Automation with Python + Machine Learning

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