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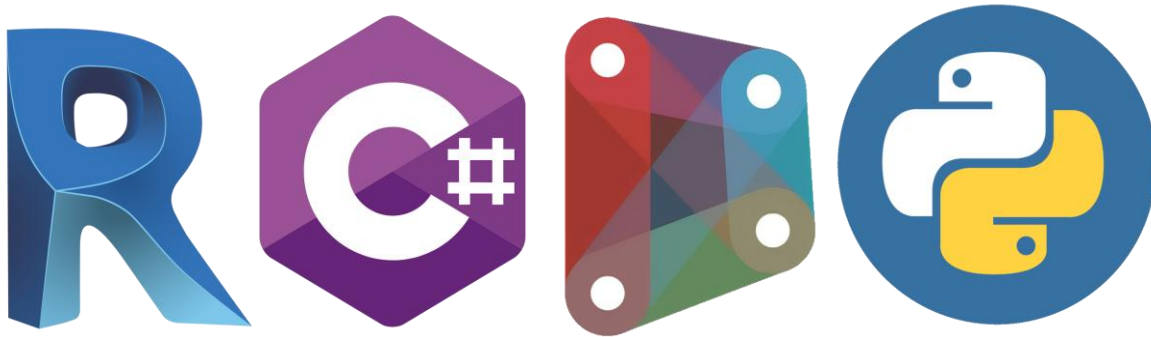
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# Revit API Master Course

using CSharp and Python

Learn

CSharp + Python + Dynamo + ML + AI



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## Training Structure

**Module 1:** CSharp Programming

**Module 2:** Python Programming

**Module 3:** Revit API using CSharp

**Module 4:** Revit API using Python

**Module 5:** Dynamo, ML and AI

## Features:

- ✓ LIVE coaching + recorded videos.
- ✓ Flexible timings.
- ✓ Weekday batches.
- ✓ Weekend batches.
- ✓ Modern Python programming included.
- ✓ Unlimited support after training: at no extra cost!
- ✓ Industry projects.

## Highlights:

- ✓ Daily exercises.
- ✓ Best practices for programming in Revit.
- ✓ Resume Preparation.
- ✓ Interview Preparation.
- ✓ 100 Interview QA.
- ✓ Job referrals in top companies.

## Bonus:

- ✓ Free study material.
- ✓ Free sample programs.
- ✓ Free Dynamo scripts.
- ✓ Free Python scripts.
- ✓ Free plugins.
- ✓ Free Python templates.



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 Visual Studio Community version.
- Setting the default language.
- Customizing the layout.
- Solution Explorer, Toolbox and the Properties windows.

### **2. Introduction to Programming**

- Selecting a project template.
- Setting up user interaction and collecting inputs.
- Variable types - Double, Integer, and String.
- Acquiring user input from textboxes into variables.
- Calculations and display outputs.
- 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.
- 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.

### **4. Arrays and Loops**

- Filling arrays and reading array elements.
- Filling ListBoxes with array elements.
- ForEach loop.

### **5. Functions and Subroutines**

- Arguments.
- Return Types.
- Return Values in Functions.
- Function Overloading.

### **6. Multi-Form Projects**

- Adding Forms to a project.
- Form Constructor and object variables.
- Form objects and invoking Forms.
- Exchanging data between Forms.

## Module 2: Python Programming

### 7. Installation and Basics

- Installing Python.
- Installing Python Editors – PyCharm, IDLE.
- Project Explorer, output and error windows.

### 8. Introduction to programming

- Setting up user interaction and collecting inputs.
- Running Python programs.
- Calculations and output display.
- Arithmetic operators.
- Using the Math library functions.
- Syntax, Comments, User Input, Print results, and control Program Flow.
- Variables: Float, Integer, String, and Boolean.
- String Variables: Find, Replace, Formatting and Slicing operations.
- Datatypes and Typecasting.

### 9. List, Tuples, and Loops

- Lists, Tuples, Dictionaries and Sets.
- List comprehensions.
- List Operations - Slicing and Data Extraction.
- String Operations - Slicing and Manipulations.
- Conditionals: If- Elif and If-Else, Nested If.
- Chaining Comparison Operators.
- Loops: For loop, nested For loops.

### 10. Functions and Modules

- Defining Functions and Arguments.
- Functions: Arguments, Return Statements and values.
- Functions: Optional Arguments.
- Functions: Multiple Return Values.
- Function Help and DocStrings.
- Modules and the Python standard library.
- Importing from modules.
- Creating Aliases.
- Life of variables, global and local variables.
- Errors - syntax, logical and exceptions.
- Exception handling.

## **11. Exception Handling**

- Try Catch Except.
- Debugging Python Functions.
- Adding breakpoints and inspecting values.
- Determine source of error.
- Troubleshooting and fix errors in the code.

## **12. OS Functions**

- Installing 3rd party packages using pip.
- Performing File, Folder, Path and operations.
- Manipulating file paths and extensions.
- Handling Files, File Filters.
- Text files - read, append and write with practical applications.
- Storing and retrieving data.
- Folders and Folder operations.

## **Module 3: Revit API**

### **13. Object Oriented Programming**

- Creating a class.
- Adding member functions.
- Static and non-static methods.
- Public and Private methods.
- Adding member variables.
- Inheritance - Base & Derived class.
- Abstraction and Interfaces.
- Encapsulation.
- Polymorphism.

### **14. Advanced Topics for Revit API**

- Enums and constants.
- Casting – traditional and modern methods.
- Class Attributes.
- Post-build events.
- Runtime update.
- LINQ – Language Integrated Query.

### **15. Creating a Plugin**

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

## **16. Plugin Usage**

- Registering add-ins.
- Compiling the code.
- Creating a manifest file.

## **17. Selections in Revit**

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

## **18. Working with Revit Elements**

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

## **19. Transactions**

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

## **20. Parameters**

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

## **21. Element Creation**

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

## **22 Revit Family**

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

## **23. Automating Drafting and Drawing**

- Tagging elements.
- Creating automatic element tags.
- Creating sheets.

## **24. External applications**

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

## **25. Debugging Techniques**

- Errors - syntax, logical and exceptions.
- Exception handling.
- Debugging techniques in Revit apps.
- Adding breakpoints and inspecting values.
- Determine source of error.
- Troubleshooting and fixing errors in the code.

## **Module 4: Revit API using Python**

### **26. Creating a Plugin**

- Element Selection.
- Retrieve Elements and element ids.
- Retrieving properties of selected elements.
- Task Dialogs.
- Configuring Task Dialogs.
- Title, instructions, and contents.
- Command buttons and cancellation.
- Selection Filter.
- Filters basics.
- Get an element using filters.
- Filtered Element Collector.
- Built In Categories.
- Filtering elements.
- Querying the Filtered Element Collector.

## **27. Parameters Handling**

- Working with Parameters.
- Reading and Writing Parameters.
- Getting parameters from Revit elements.
- Getting parameter by Name.
- Getting the value from a parameter.
- Setting a Parameter value.

## **28. Working with Transactions**

- Start, commit and rollback transactions.
- Element Creation.
- Project: Creating walls.
- Single Wall Creation.
- Multiple Wall Creation.
- Element locations.
- Point locations.

Project: Adding View Tags.

Project: Adding Sheets in Revit.

## **Module 5: Machine Learning, AI Programming and Dynamo**

### **29. Machine Learning - NumPy**

- Arrays.
- One Dimensional Array.
- Multidimensional Array.
- Create Arrays from Data.
- Create array from Ranges.
- Shape.
- Array Intersection.
- Array Difference.
- Sum.
- Slicing Array.

### **30. Machine Learning - Pandas**

- Series.
- DataFrames.
- Dataframe Indexing.
- Dataframe Head, Tail.
- Dataframe Shape.
- Read DataFrame from CSV.



### **31. Matplotlib Visualization**

- Line Plots.
- Sub Plots.
- Plot Properties - Color, Style.
- Grid, xLabel, yLabel.
- Bar Plots.
- Bar SubPlots and Orientation.
- Scatter Plots and Subplots.
- Mixed Plots and Overlapping.
- Markers and LineWidth.
- Exporting Plots.
- Pie Charts.

### **32. Decision Trees**

- Decision Tree Classifiers.
- Dataframe.
- Extracting Features & Labels from a Dataframe.
- Fitting Features & Labels into a decision algorithm.
- Predicting values based on classification.
- Dual Classification and Multiclass classification.
- Reading CSV data into Dataframes.
- Separating input and output.
- Dropping frames from dataframes.
- Label Encoders.
- Fit Transforms.
- Predicting results.

### **33. Linear Regression Analysis**

- Reading a CSV data file.
- Create Linear regression model.
- Fit data columns directly to the algorithm.
- Determine coefficient and intercept.
- Reading inputs data from CSV.
- Predicting output for entire column.
- Exporting output dataframes to CSV.
- Create a scatter plot of the data.

### **34. K-Means Clustering**

- Importing data.
- Determining clusters.
- Determining the cluster to which a point belongs.
- Visualize cluster using scatter plots.
- Visualize cluster centers.

### **35. Revit Python Shell**

- Installation and configuration.
- CPython3 and IronPython.
- Similarity and differences.
- Features and advantages.
- Understanding ByteCode.

### **36. PyCharm Editor**

- How to install and configure.
- Environments and configuration.
- Keyboard shortcuts.
- pip install libraries.

### **37. Revit API Docs - How to use?**

- Exploring Samples.
- How to convert .Net samples to Python.

### **38. How to use ChatGPT for API Development**

- Creating smart queries.
- Enhancing queries for best results.
- Refining queries for exploring more APIs.
- ChatGPT Code cleanup and adaptation.

### **39. 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.

#### 40. Using Dynamo in Revit

- Creating geometry - point, lines.
- Creating Revit geometry.
- Lists and Ranges.
- Visualizing parameter data.
- Create, Action, Query nodes.
- Filter list by element type.
- Automating repetitive tasks.
- Creating custom nodes.
- Using the Dynamo player in Revit.

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