

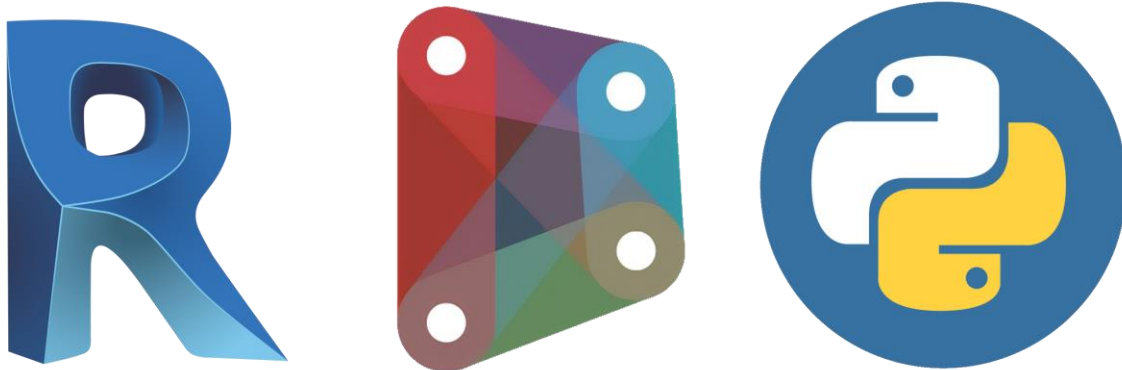
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Create AI-Powered Plugins for Revit Create AI-Powered Dynamo Scripts

using

Revit API + **Dynamo** + **Python** + **Machine Learning**



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Training Structure

Module 1: Python Programming including LINQ and OOPs.

Module 2: Revit API using Python and Dynamo: Deep Dive and Advanced Techniques.

Module 3: Dynamo with Python + Machine Learning + AI + PyRevit, Python Revit Shell.

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 and review quiz.
- ✓ 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.

Unique:

- ✓ PyRevit.
- ✓ AI with Machine Learning.
- ✓ Revit Python Shell.
- ✓ CPython3 and IronPython.
- ✓ PyCharm.



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: Python Programming

1. Installation and Basics

- Installing Python.
- Installing Python Editor.
- Project Explorer, output and error windows.

2. Introduction to programming

- Setting up user interaction and collecting inputs.
- Calculations and output display.
- Using the Math library functions.
- Running Python programs.
- 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, Typecasting and Validations.
- Arithmetic Operations.

3. List and Loops

- Lists, Tuples, Dictionaries and Sets.
- List comprehensions.
- List Operations - Slicing and Data Extraction.
- String Operations - Slicing and Manipulations.

- Conditionals : If and Elif.
- Chaining Comparison Operators.
- Loops: For Loop and While Loop.

4. 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.
- Lambda functions.

- Errors - syntax, logical and exceptions.
- Exception handling.
- LINQ – Language Integrated Queries, and Lambda functions.

5. Exception Handling

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

6. Object Oriented Programming

- Creating Classes and objects.
- Methods and Properties.
- `__init__()` Function.
- `__str__()` Function.
- The self Parameter.
- Modify Object Properties.
- Inheritance.
- Creating a Parent Class.
- Create a Child or Derived Class.
- Add Properties and Methods.
- Polymorphism.

7. 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.

8. Tkinter GUI Programming

- Geometry and mainloop.
- Project** - Geometric calculator.
- Setting dialog box properties, title, icon, size and location.
- Adding widgets and adjusting their properties and placement.
- Tkinter Datatypes - Double, Integer, Strings, and Boolean.
- Data Type Conversion - tkinter variables and python variables.
- Labels - static and dynamic.
- Entry Textboxes - storing user input from textboxes into variables.
- Setting default values and last used values in text boxes.
- Button widget - formatting and calling functions.
- Check boxes and radio buttons.

8. Advanced GUI Programming

- Listboxes - single selection and multiple selections.
- Listboxes - adding items static and dynamic.
- Listbox selection event binding.
- Listbox display total count and selection count.
- Listbox, remove selected item and remove all items.
- Listbox - add items from textbox.

- Scrollbar - adding scrollbar to a listbox.
- Spinner widget - setting range and layout.
- Scale widget - setting range and layout.

- Images - displaying images in a dialog box.

- File selection dialog.
- Single and multiple files.
- Adding file filters.
- Folder selection dialog.
- Selecting all files from folder dialog.
- Adding file filters for folder dialog.
- Opening files in associated application.

- Message boxes - information, query and warning .
- Configuring single line and multiline messages.
- Button configurations and icon synchronizing.
- Checking message box responses against button configurations.

- Option menu, add and remove items.
- Handling multiple dialogs.
- Adding pulldown menus, adding menu items.
- Cascading menus and adding commands to menu items.

Module 2 : Dynamo and Revit API using Python

09. Creating a Plugin

- Element Selection.
- Retrieve Elements and element ids.
- Retrieving properties of selected elements.

- Task Dialogs.
- Configuring Task Dialogs.
- Title, instructions, contents, Header and Footer.
- Command buttons, cancellation, Command buttons.
- Links and Display actions.

- Selection Filter.
- Filters Basic.
- Get an element using filters.
- Filtered Element Collector.
- Inspect Elements inside the collection.
- Built In Categories.
- Filtering using LINQ techniques.
- Querying the Filtered Element Collector.

Project: Adding View Tags.

Project: Move Room Tag to Center.

Project: Adding Sheets in Revit.

- 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.
- Family Parameters.
- Built-In Parameters.

- Working with transaction.
- Start, commit and rollback transactions.
- Single Transaction.
- Group Transactions.

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

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

10. Dynamo

- What is Dynamo.
- What is Visual Programming.
- Getting Started with Dynamo.
- The Building Blocks of Dynamo.
- Automatic Manual Execution.
- Parts of a Node.
- Node Types: Create, Action, and Query.
- Searching, browsing and adding nodes.
- Quick Nodes.
- Node wiring and data flow.
- Unwiring nodes.
- Grouping and ungrouping.
- Duplicating and renaming nodes.
- Input, output and previews.
- Watching node output.
- DesignScript Language in detail.
- Code blocks.
- Numerical inputs and Sliders.
- Code Vs. Nodes.
- Using Variables in nodes.
- Statements and values.
- Lists and List Slicing.
- Arithmetic and logical Operators.
- Built Functions.
- Custom Functions.
- List Range and indices.
- Graph view and background view.
- Zoom , Pan and rotate graphs.
- Mouse and keyboard shortcuts.
- Creating Custom Nodes.
- Custom Nodes – Computational.
- Custom Nodes – Geometrical.
- Store and Distribute Dynamo Scripts.
- Save and Share Dynamo Custom Notes.

11. Programming Python Nodes in Dynamo

- Input and output wiring.
- Arguments, Arrays and Lists.
- Coupling Output of Python Script to nodes.
- Performing Arithmetic operations in Python nodes.
- Performing Geometrical operations in Python nodes.
- Using Proto Geometry.
- Variables.
- Points and Coordinates.
- List and List Slicing.
- For Loop.
- For Loop with If.
- While Loop.
- Break and Continue.
- Shorthand for Loops.
- Node Lacing and Nested Loops.
- Functions and Arguments.
- Create and Use Python Modules.
- Use Built-in Modules.

12. Using Dynamo with Revit

- Creating geometry - point, lines.
- Creating Revit geometry.
- Lists and Ranges.
- Grids and matrix.
- Lacing techniques.
- Visualizing parameter data.
- 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.
- Boolean Expressions in DesignScript
- Generating Number Range using DesignScript
- Generating Lists Using DesignScript
- Generating multiple geometry Using DesignScript

Project: Working with data in Excel.

Project: Create column grids.

- Using the Dynamo player in Revit

13. Using Python Nodes in Dynamo with Revit API

- Modules and Libraries.
- Using the Revit node library.
- Layout of Python nodes in Dynamo.
- Extracting information from Revit using Python.
- Creating Elements in Revit.
- Revit Objects Vs .Dynamo Objects.
- Convert between Dynamo Geometry and Revit Geometry.

Project 1: Stair Paths.

Project 2: Room Finishes.

Module 3 : Create AI-Powered Revit Plugins and AI-Powered Dynamo Nodes

14. Machine Learning and AI

NumPy - Numerical and Scientific Processing

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

Pandas - Big Data Processing

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

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.

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

Linear Regression Analysis

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

K-Means Clustering

- Project Clustering Symbol Errors based on Drawing Sheet Zones
- Importing data
- Determining clusters
- Determining the cluster to which a point belongs
- Visualize cluster using scatter plots
- Visualize cluster centers

Project: Integrating Machine Learning Models into Revit Plugins: with Project

Project: Integrating Machine Learning Models into Dynamo Nodes: with Project

14.Revit Lookup

- Download and installation.
- Exploring, Revit objects and values.
- Analyzing current data state.
- Snooping Revit Document.
- Snooping current selection.
- Inspecting Edges, Faces and Linked Elements.
- Manipulating Revit Values and Parameters.

15. Revit Python Shell

- Installation and configuration
- CPython3 and IronPython
- Similarity and differences
- Features and advantages
- Understanding ByteCode
- Create Revit Plugins
- Deploy Plugins using the RpsAddin

16. PyCharm Editor

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

17. PyRevit

- What is PyRevit?
- How to install?
- Benefits and utilities.
- How to create Plugins using PyRevit.

18. Revit API Docs - How to use?

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

19. How to use ChatGPT for Revit API Development

20. Useful Dynamo resources

- Best practices for programming in Revit.
- Resume Preparation.
- Interview Preparation.
- 100 Interview QA.

- Free study material.
- Free sample programs.
- Free projects.
- Free Python scripts.
- Free plugins.
- Free Python Templates.

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
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