



## CADVertex Solutions

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# NX Open Advanced with AI & ML

Language: **VB.NET** or **CSharp** or **Python**

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## Training Structure

**Module 1:** BlockUI Styler, uFunc and Knowledge Fusion

**Module 2:** Machine Learning, AI and integration.

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## Features:

- ✓ Personal coaching - no recorded videos.
- ✓ Flexible timings.
- ✓ Weekday batches.
- ✓ Weekend batches.
- ✓ CSharp or VB.Net programming - indepth training included.
- ✓ Unlimited support after training - at no extra cost!
- ✓ 5 industry projects – listed on next page.
- ✓ Resume Preparation.
- ✓ Interview Preparation.
- ✓ Job referrals.

## 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

## List of Projects

1. Geometric Calculator.
2. Batch Processor.
3. Automatic Drawing Views.
4. Parametric Shaft.
5. Assembly Cost Estimation.

## Module 1: BlockUI Styler, uFunc and Knowledge Fusion

### 1. Architecture of the Block UI

- ❖ What is a Block UI?
- ❖ What is Block UI Styler.
- ❖ Which language does a Block UI use.
- ❖ How to use the Block UI dialogs in NX.

### 2. Block UI Styler Basics

- ❖ Where and how to use Visual Studio.
- ❖ Using the Block UI Values in NXOpen.
- ❖ Label and Bitmap blocks.
- ❖ Double, Integer inputs and the String block.
- ❖ Toggles and Enums.
- ❖ Radio button and dropdown lists.
- ❖ Point picker and folder selector.
- ❖ Listbox Flooding.

### 3. Drawing in 2D using the Block UI

- ❖ Create 2D shapes using points, lines, and arcs.
- ❖ Absolute and relative points.
- ❖ Create single line and multiline text or notes.
- ❖ Set note position and lettering style.

### 4. NX Parametric Parts using Block UI

- ❖ Create and control parametric part in NX.
- ❖ Expression table.
- ❖ Searching expressions by name and extracting values.
- ❖ **Industry Project** - Update parametric shaft with keyway.

### 5. NX Assemblies using Block UI

- ❖ Traverse the NX assembly structure.
- ❖ Creating NX assembly alias.
- ❖ Root component and children components.
- ❖ Extracting the name and cost of assembly components.
- ❖ **Industry Project** - Assembly Cost Estimation.

### 6. uFunc File Handling

- ❖ Part Tag identifiers.
- ❖ Create new NX files.
- ❖ Open, Close, Save and SaveAs NX files.
- ❖ Ask parts and active part in the session.
- ❖ Activate files in the session.
- ❖ Close all files in the session.

## **7. uFunc Drawing Automation**

- ❖ Create 2D shapes using points, lines, and arcs.
- ❖ Absolute and relative points.

## **8. uFunc Part Automation**

- ❖ Create 3D Objects, Sketching and Extrusion.
- ❖ Mass Properties Calculation.

## **9. Knowledge Fusion**

- ❖ Knowledge Fusion Architecture.
- ❖ Setting Knowledge Fusion preferences.
- ❖ DFA Manager and search path.
- ❖ DFA File sorting and filtering.
- ❖ DFA File syntax checking and loading.

## **10. Writing Knowledge Fusion Programs**

- ❖ DFA File format.
- ❖ DFA File header.
- ❖ Define a class.
- ❖ Points and lines.
- ❖ Creating 2D shapes.

## **11. Creating 2D Geometry with Knowledge Fusion**

- ❖ Number parameters.
- ❖ Adding properties to geometry.
- ❖ 2D Vectors.
- ❖ Arc - directions, and angles.

## **12. Creating 3D objects in Knowledge Fusion**

- ❖ Simple block using frame and vectors.
- ❖ Redefine origin and vector directions.
- ❖ Block using frame and points.
- ❖ More primitives – cylinders, cones, and spheres.
- ❖ Boolean operations, defining tools and targets.

## **13. Lists in Knowledge Fusion**

- ❖ Creating composite lists.
- ❖ Print values and demand values.
- ❖ Named and positional members.
- ❖ Flattening lists, min, max, check empty lists.
- ❖ List operations, sort, reverse, and join lists.

## **14. Parametric Parts using Knowledge Fusion**

- ❖ Reading and modifying NX expressions.
- ❖ **Industry Project** – Create a parametric shaft with keyway using KF.

## **Module 2: Machine Learning and AI**

### **15. Python and IDE Installation**

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

### **16. Python 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, and String.
- String Variables: Find, Replace, Formatting and Slicing operations.
- Datatypes and Typecasting.

### **17. List, Tuples, and Loops**

- Lists, Tuples, Dictionaries and Sets.
- 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.

### **18. Functions and Modules**

- Defining Functions and Arguments.
- Functions: Arguments, Return Statements and values.
- Functions: Multiple Return Values.
- Function Help and DocStrings.
- Modules and the Python standard library.
- Importing from modules.
- Creating Aliases.

## **19. Exception Handling**

- Errors - syntax, logical and exceptions.
- Exception handling.
- Try Catch Except.
- Debugging Python Functions.
- Adding breakpoints and inspecting values.
- Determine source of error.
- Troubleshooting and fixing errors in the code.

## **20. 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.

## **21. Machine Learning - NumPy**

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

## **22. Machine Learning - Pandas**

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

## **23. 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.

## 24. Decision Trees

- Decision Tree Classifiers.
- 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 and Predicting results.

## 25. 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.

## 26. K-Means Clustering

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

## 27. 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.

## 28. Integrate AI and ML in Automation

- ❖ **Capstone Project** Integrate Automation with Machine Learning to create AI-enabled apps.

### 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
  
- ❖ Fast track course in Python with Machine Learning for CSharp experts

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