

Python for Excel Automation with xlwings

Workbook integration, data analysis, charts and Windows UDFs

FA-0748 · 3 days

Data & Analytics · Automation, RPA & Power Platform · Software Development

Introduction

Use local Python and xlwings to automate desktop Excel and build a small data-analysis tool. This intensive course combines Python foundations with pandas/NumPy examples, workbook read/write operations, charts and Windows user-defined functions.

The course teaches xlwings integration, not the separate Microsoft cloud-based Python in Excel feature. Selected automation and analysis patterns are practised over three days; it does not provide complete Python, VBA replacement or machine-learning coverage.

Learning outcomes

- Write simple Python expressions, collections, conditions, loops and functions.
- Use selected pandas/NumPy operations and plotting examples.
- Connect to a workbook and exchange scalar, row/column and tabular data.
- Run selected Python routines from Excel with xlwings integration.
- Create/update plots or Excel charts in a workbook.
- Implement a Windows UDF with appropriate argument/return conversions and arrays.
- Build and test a small workbook automation/dashboard example, including a supplied permitted API-data input.

Prerequisites

- Basic Excel and Windows file-system experience, plus elementary mathematics.
- A compatible supported Windows environment with desktop Excel for the complete UDF track.
- A compatible local Python/xlwings environment and approved permission to install/configure the selected dependencies/add-in; unrestricted administrator access is not inherently required.
- Internet access where required for installation or the permitted API demonstration.

Training outline

1. Day 1 – Python Foundations and Data Analysis

- Brief Python background, supported versions, local installation, IDEs, environment configuration and documentation.
- Hello world and interactive/script programming modes.
- Numbers, lists, tuples, dictionaries, sets, copying, strings and formatting; regular-expression overview.
- Arithmetic, comparison, assignment, logical/membership operators and precedence.
- if/else, for/while, break and continue.
- Functions, parameters, documentation, collections, variable arguments and scope; map, filter and lambda awareness.
- Introduce NumPy and pandas Series/DataFrames, missing data, grouping and selected merge/join/concatenation operations.
- Common data operations, input/output and a supplied data-analysis exercise.

2. Day 2 – Workbook Integration and Visualisation

- Matplotlib, line/scatter plots and selected Seaborn/pandas time-series visualisations.
- Connect xlwings to a workbook and read/write single values.
- Named ranges, range shortcuts, rows/columns, one-/two-dimensional structures and vertical output.
- expand, indexing/slicing and reducing unnecessary cell-by-cell calls.
- Run main and RunPython; the minimal VBA bridge and how the approaches differ.
- Insert/update a Matplotlib or Seaborn plot and control its size/position.
- Create an Excel chart with Python; import a small permitted API response through a supplied routine.

3. Day 3 – UDFs and Applied Workbook Tool

- Windows UDF setup, approved Excel/add-in configuration and a first function.
- Python module names/locations, UDF execution behaviour and troubleshooting.

- Argument conversions with `@xw.arg` and suitable return options.
- NumPy/pandas UDFs, array formulas and docstrings.
- Use native Excel dynamic arrays where supported; compare legacy xlwings expansion and its overwrite risks without applying obsolete decorators unnecessarily.
- Build a small case-study workbook with Python calculations, data output and a chart/dashboard view.
- Assessment and review of results, limitations and further practice.