Training Content

Scripting in *PowerFactory* with Python

DAY 1

MODULE 1: Fundamentals Python Scripting in *PowerFactory*

Presentation: Fundamentals **1 1/4 h**

Familiarisation with the general handling of the Python programming language in *PowerFactory*, e.g.: Creation of a Python script in *PowerFactory* and access to data by using Python. Presentation of the *PowerFactory* module and comparison between DPL and Python. Presentation of loops, statements, lists and indexing in Python.

Exercise: Hello *PowerFactory* **1/4 h**

Creating a Python script command (ComPython) in *PowerFactory* and displaying different messages in the output window.

Coffee break

MODULE 2: *PowerFactory* Objects access with Python

Presentation: *PowerFactory* object access with Python **1/2 h**

Access to calculation relevant objects of different classes inside of the *PowerFactory* database. Read and modify attributes of objects.

Exercise: Object access with Python **1 h**

Accessing all elements of a specific class in the network. Reading their attributes and working with the values. Using attributes to categorise elements into different groups and modifying attribute values.

Q&A session

DAY 2

MODULE 3: Execution of the *PowerFactory* Commands with Python

Presentation: Execution of *PowerFactory* commands with Python **1/2 h**

Access and execute any type of calculation objects available in *PowerFactory*.

Exercise: Execution of calculation commands **1 h**

Automatic execution of the Load Flow Calculation command, while adapting settings in the command. Reading of calculation results from network elements.

Coffee break

MODULE 4: Navigation through the *PowerFactory* Project

Presentation: Navigation through the *PowerFactory* project **½ h**

Showcase of different methods for accessing objects in *PowerFactory*. Navigation through the project contents and the database.

Exercise: Navigation through the project **1 h**

Applying different methods to access relevant objects in *PowerFactory*. Automatic execution of load flow calculations for multiple study cases. Checking for valid calculation results and reporting critical values.

Q&A session

DAY 3

MODULE 5: Python Functions and Remote Scripts

Presentation: Python functions **½ h**

Introduction of functions in Python. Use of *PowerFactory* methods to obtain descriptions and units for *PowerFactory* attributes. Use of input parameters and remote scripts.

Exercise: Reporting results **1 h**

Creating a generic function for reporting results with descriptions in the output window. Providing input parameters in the script object and executing it as a remote script.

Coffee break

MODULE 6: Create, Delete and Connect Network Elements

Presentation: Create, delete and connect network elements **½ h**

Introduction of the methods to modify a network model. Working with characteristics.

Exercise: Network modifications **1 h**

Creating a new load in a network model and connecting it. Assigning time characteristics to network elements and executing a Quasi-Dynamic Simulation.

Q&A session

DAY 4

MODULE 7: Results File

Presentation: Result Files — 3/4 h

Familiarisation with the Result File element (*ElmRes*) in *PowerFactory*. Read and write a Result File and export its data.

Exercise: Result Files — 1/4 h

Reading data with different methods from an existing Result File and analysing the findings. Exporting results into a csv-file.

MODULE 8: Graphical Representation of Results

Presentation: Plots — 1/2 h

Familiarisation with the anatomy of plots in *PowerFactory*. Automatic creation of plots.

Coffee break

Exercise: Plotting of calculation results — 1/2 h

Creating plots in *PowerFactory* via script.

MODULE 9: Performance

Presentation: Performance — 1/2 h

Introduction to the Environment Functions in *PowerFactory* and best practises for efficient scripting with Python in *PowerFactory*.

MODULE 10: Import and Export of Data

Presentation: Import and export of data — 1/4 h

Introduction of possibilities to import and export data to the *PowerFactory* database via script.

Exercise: Import and export projects — 1/4 h

Preparing a Python script to automatically import a project file into the database and one script for exporting a project to a file.

Q&A session

DAY 5

MODULE 11: Engine Mode

Presentation: Engine Mode — 1/2 h

Start of *PowerFactory* from a Python interpreter.

Exercise: Engine Mode 1/4 h

Working in GUI-less unattended mode.

MODULE 12: Parallelisation

Parallelisation 3/4 h

Options for parallel computation and setting up of the Task Automation command via script.

Coffee break

MODULE 13: User Interaction

Presentation: User interaction 1/4 h

Introduction of different methods for user interaction. Integration of scripts in the *PowerFactory* GUI via User-defined Tools.

Exercise: User Interaction 3/4 h

Implementing user input parameters and verifying the entries. Offering selection browsers and opening command windows for user input during the script execution.

MODULE 14: AddOn Module

Presentation: AddOn Module 1/4 h

Definition of user specific variables via script in *PowerFactory*.

Exercise: AddOn Module 1/4 h

Creating AddOn attributes for a *PowerFactory* object class and writing values onto these attributes.

Q&A session

Time Schedule (Central European Time)

	Time
First 90 minutes block	9:00
Coffee break	10:30
Second 90 minutes block	10:45
Q&A session	12:15
End of the training day	12:30

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