POWERFACTORY

Programming in PowerFactory (Python)

Course Content

DIgSILENT Buyisa (Pty) Ltd

POWER SYSTEM SOLUTIONS
MADE IN GERMANY

Programming in PowerFactory (Python)

2 Day Course

Objective:

To Enable advanced users to create Python scripts in PowerFactory for automation and advanced use of PowerFactory.

Python is a programming language, which can be used to control PowerFactory. It is commonly used to automate the execution of time-consuming simulations - however, its application extends far beyond that. Python may also be used to process results, or to implement a routine that applies sequential changes to a network and calls PowerFactory's analysis functions in each step.

This training course provides a compact and efficient introduction to the fundamental aspects of writing scripts inside of *PowerFactory* by using Python. The course includes basic concepts, syntax, accessing and modification of objects from within the code, automation of a series of calculations and presentation of the results etc.

Within the context of the training course numerous scripts will be created, which are supposed to encourage own ideas, or which can be adapted to suit particular requirements.

Pre-requisites:

- **MUST have attended the PowerFactory Basic Course**
- Should have a good working knowledge of Python.

No of participants:

In-house at Customer premises: Minimum: 6; Maximum: 12.
At DIgSILENT Buyisa Training Centre: Minimum: 10; Maximum: 16.
Online: Minimum 6; Maximum: 16.

ECSA CPD Accredited and Points:

- The course is fully accredited with the Engineering Council of South Africa (ECSA).
- 2 CPD points for completion.

Who Should Attend:

The course is intended for:

- Utility engineers
- Power system operators
- Project Developers
- Manufacturers
- Consultants and electrical engineers

Participants should be familiar with the basic handling of DIgSILENT PowerFactory. Experience with PowerFactory DPL, Python itself, as well as C++, C, Java or other scripting languages is not needed but is an advantage.

Price per participant:

- For course pricing, kindly visit our website at: https://digsilent.co.za/training-courses/
- For in house prices at customer premises: contact DIgSILENT for a quote via email info@digsilent.co.za or Telephonically (+27) 087 351 6159.

  - ❖ Prices are exclusive of VAT
  - ❖ Please note that cost excludes your Company's internal administrative costs.
  - ❖ All prices may change without prior notice - please contact DIgSILENT Buyisa for the latest prices before booking.
  - ❖ **DISCOUNT** is offered if a company sends more than one delegate per course.
  - ❖ Trainings held at DIgSILENT Buyisa Training Centre includes light breakfast snack, lunch and refreshments.

Training schedule

DAY 1

08:30 **Basic Python Scripting in PowerFactory**
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
Creating a Python script command (ComPython) in *PowerFactory* and displaying different messages in the output window.

10:30 **Tea/Coffee break**

11:00 **PowerFactory Objects access with Python**
Access to calculation relevant objects of different classes inside of the *PowerFactory* database. Read and modify attributes of objects.

Exercise: Object access with Python
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

12:30 **Lunch break**

13:30 **Execution of PowerFactory commands with Python**
Access and execute any type of calculation objects available in *PowerFactory.*

Exercise: Execution of calculations commands with Python
Automatic execution of the Load Flow Calculation command, while adapting settings in the command. Reading of calculation results from network elements.

15:00 **Tea/Coffee break**

15:30 **Navigation through the PowerFactory Project**
Showcase of different methods for accessing objects in *PowerFactory*. Navigation through the project contents and the database.

Exercise: Navigation through the PowerFactory project
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

16:30 **End of the first day**

DAY 2

08:30 **Report Results, Subroutines, Functions and Modules**
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.

Exercise: Report Results
Access to project and load flow calculation. Reporting, whether a load flow
09:00 calculation has been executed successfully.

Exercise: Subroutines and Module
Creating subroutines and importing them in the main script. Creating readable reports and preparing them for the export. Introduction of the lambda function and some advanced Python topics.

10:30 **Tea/Coffee break**

11:00 **Results File**
Familiarisation with the Result File element (ElmRes) in *PowerFactory*. Read and write a Result File and export its data.

Exercise: Results File
Reading data with different methods from an existing Result File and analysing the findings. Executing multiple short circuit calculations and saving the results in a result file.

12:30 **Lunch break**

13:30 **Graphical Representation**
Familiarisation with graphical representations in *PowerFactory*. Automatic creation of plots.

14:00 **Add-on Module, Creating Objects and User Communication**
Defining user specific variables via script in *PowerFactory*. Creating new objects. Make a script easy to operate for other users.

15:00 **Coffee break**

15:30 **Additional Exercises**

Engine Mode
Start of PowerFactory from a Python interpreter.
Working in GUI-less unattended mode.

Exporting/Importing Data
Export and import data from and to Power-Factory from external csv-files via script.

Graphical Interface
Advanced Python Topics and Discussion: Creation of a graphical interface.

Q&A Session

16:30 **End of the second day**