The training introduces the participant to the tools and techniques commonly used in practice for stability studies. Single-machine and Multi-machine power system models are studied, using steady state, time-domain and frequency-domain techniques.

This two-day course provides a comprehensive overview about the dynamic models of elements and all the stability types:

- Transient Stability
- Oscillatory Stability
- Voltage Stability
- Frequency Stability

Each topic above includes a theoretical background and a practical part where participants acquire hands-on experience in the use of PowerFactory.

**WHO SHOULD ATTEND:**
- Utility engineers
- Power system operators
- Project developers
- Manufacturers
- Consultants
- Electrical engineers in general

Participants should be familiar with PowerFactory basics and should have some experience with PowerFactory’s time domain simulation functions or have attended the introductory courses: “Time Domain Simulation in PowerFactory” / “Load Flow and Short Circuit Calculation”.

**PRICE PER PARTICIPANT:**
- $1,312.40 (with valid maintenance contract)
- $1,480.00 (without valid maintenance contract)
- $444.00 (with valid student identification)

* Prices do not include GST.

Central Standard Time (UTC-06:00)

### Training schedule

#### DAY 1

9:00  Introduction to Power System Stability
- Fundamentals of power system stability. Classification according to IEEE: rotor angle, voltage and frequency stability. Synchronous machine model.

10:00  Transient Stability

10:30  Coffee break

11:00  Exercise: Transient Stability in a SMIB

11:45  Exercise: Transient Stability in a Multi-Machine Network
- Critical clearing time calculation using a DPL script. Effect of the inertia and the impedance of the system on the transient stability problems. Calculation of the breaker times.

12:30  Lunch break

13:30  Oscillatory Stability (small-signal)

14:30  Exercise: Oscillatory Stability in a SMIB
- Identification of the local mode of a single machine connected to an infinite bus. Analysis done in time and frequency-domain analysis. Impact of the AVR and PSS.

15:00  Coffee break

15:30  Exercise: Oscillatory Stability in a Multi-Machine Network

17:00  End of the first day

#### DAY 2

9:00  Voltage Stability

10:00  Exercise: Steady State Voltage Stability
- Calculation of busbars sensitivities, PV & QV curves considering contingencies, effect of modifying the load size and power factor.

10:30  Coffee break

11:00  Exercise: Dynamic Voltage Stability
- Study of voltage stability by time domain analysis, RMS simulation. Effect of the load modeling, motors contribution and AVR dynamic response.

12:30  Lunch break

13:30  Frequency Stability
- Fundamentals. Definition of the different stages of the frequency stability analysis and factors contributing in each stage: power system configuration and primary reserve, under-frequency load shedding.

15:00  Coffee break

15:30  Exercise: Frequency Stability in a Multi-Machine Network
- Frequency stability during disturbances. Critical clearing time of power system and load modeling, inertia, area separation and load shedding. Comparison between different methods to improve frequency stability.

17:00  End of the training course