Paladin DesignBase 6.0
DB-313 Training Program

Description

This 3-day course covers programs designed to study the behavior of a power system under steady-state, transient and nonlinear conditions. The programs covered are: Power Flow, Motor Starting, Transient Stability and Harmonic Analysis. Participants, led by experienced instructors, will learn step-by-step how to create accurate models, analyze & discuss every aspect of the process and conduct meaningful studies using the latest tools available in the Paladin DesignBase platform.

Itemized Objectives

The Power Flow Program:	Review of the objectives of a Power Flow Analysis. Review concepts of PV, PQ & Slack busses. Learn how to model loads and sources. Learn how to use Transformers & Capacitors as means of voltage control. Learn how to define and set up scenarios. Learn how to run a Power Flow analysis and generate output reports. Learn how to set up and run a Time-Series Power Flow Analysis.
The Motor Starting Program:	Basic review of motor speed vs. torque characteristics. Learn how to enter motor & load characteristics. Learn how to model different types of motor starters. Learn how to run a Power Flow based motor starting analysis. Learn how to run a Dynamic motor starting analysis. Learn how to create output reports.
The Transient Stability Program:	Review of the objectives of a Transient Stability Study. Learn how to prepare a subject file for a Transient Stability Analysis. Learn how to create dynamic models for different generating sources. Lear how to add Governors and AVR's to generators. Learn how to create dynamic models for motors and static loads. Learn how to enter dynamic models for protective devices. Learn how to run simulations and create output reports.
The Harmonics Program:	Basic review of the topology of a Sine Wave. Review concepts of Linear and Nonlinear Loads. Review of typical nonlinear load harmonic spectra. Learn how to conduct frequency scans. Learn how to identify resonant conditions. Learn how to add harmonic sources and filters to a network. Learn how to run a harmonic analysis. Learn how to conduct an IEEE 519 compliance analysis.

Pre-Requisites

- DB-103 Training
- Knowledge of how to create a single line diagram in DesignBase 6.0.
- Knowledge of Power Systems Analysis.
- Technical exposure to the subject matter covered in the training.
- PE or working as a consultant is a plus.
- Participants should have their own laptop computers with the latest version of Paladin DesignBase

Program Contents

1.0 The Power Flow Program – Day 1/2

- The Power Flow program tools & interface
- Different Power Flow analytical options
- The Power Flow "Options" interface
- Defining loads and sources.
- Defining operational scenarios.
- Running the Power Flow analysis and reviewing the results.
- Voltage control using Transformer Taps, Generator Excitation and Static Capacitors.
- Time Series based Power Flow Analysis.
- Generating output reports.

2.0 The Motor Starting Program – Day 2

- Dynamic and static modelling of starting motors.
- Entering speed vs. torque characteristics for motors and loads
- Setting motors in the "starting state".
- Selecting different types of motor starters.
- Running power flow based vs. dynamic motor starting.
- Generating output reports

3.0 The Transient Stability Program– Day 2

- Preparing the subject file for a viable Transient Analysis
- Modelling utility and generators (Dynamic Data).
- Selecting and adding Governors and AVR's to generators.
- Modelling motors for starting and running analyses.
- Defining sequence of events & case studies.
- Simulation capabilities: disturbances & control devices.
- Running the Transient Stability analysis
- Sample Study 1: Utility Tripping Off-Line.
- Sample Study 2: Generator tripping offline.

- Sample Study 3: Single Motor Startup in cogeneration and generator only conditions.
- Sample Study 4: Sequential Motor Startup in cogeneration and generator only conditions.
- Sample Study 5: Voltage Sag Simulation and its effects on motor operation.
- Sample Study 6: Re-closure operation and its effects on motor operation.
- Sample Study 7: Three-Phase faults and subsequent breaker relay operation.
- Sample Study 8: Load Shedding and Load Restoration.

4.0 The Harmonics Analysis Program – Day 3

- Harmonics & Waveform Distortion
- Linear Loads vs. Nonlinear Loads
- Typical Harmonic Spectra of Single Phase and Three Phase Rectified Loads
- Harmonic Distortion Indices as Applied to Voltage & Current (THD and TDD)
- Harmonics & Symmetrical Components
- Voltage Distortion Caused by Nonlinear Loads
- Capacitors & Resonance
- The Harmonics Analysis Program Interface
- Harmonics Components Catalog
- Harmonic Current Sources
- Frequency Scans & Frequency Response Profiles
- Adding Harmonic Loads to the Network
- Text and Graphical Output Reports
- Adding Harmonic Filters to the Network
- Using Phase Shifting Transformers
- IEEE 519-2014 Compliance Analysis.

Daily Program

08:00 - 10:00 DesignBase Training
10:00 - 10:15 Break
10:15 - 12:00 DesignBase Training
12:00 - 1:00 Lunch & Break
1:00 - 3:30 DesignBase Training
3:30 - 3:45 Break
3:45 - 4:45 DesignBase Training