

## Course Name: Reliability & Operational Performance of Electric Power Systems

Reference Code: ELEC 107

### About the course:

#### This training course will feature:

- State of the art knowledge of the available computational methods
- Efficient computational methods that can be applied for the analysis of the respective reliability problems (analytical techniques, simulation approaches)
- Description of the appropriate sets of reliability indices that need to be calculated
- Presentation of application examples by using practical power systems and case studies
- Important conclusions concerning the necessary procedures and practices for the planning and operation of Power Systems in the competitive market environment

### Course Objective:

#### By the end of this training course, participants will be able to:

- Determine the most important areas of power systems that need probabilistic modeling and evaluation assessment
- Understand the main features of the computational methods that are available for the reliability modeling
- Understand the main reliability indices that need be calculated for the quantification of load point and system performance
- Carry out practical reliability assessment studies
- Compare and justify alternative schemes for power system reinforcement

### Who Should attend?.

This training course is suitable to a wide range of professionals that need to have an intermediate level of knowledge for power system analysis and probabilistic theory. These include:

- Professionals of Electric Power Utilities, System Operators (Independent System Operators – ISOs, Regional Transmission Operators – RTOs, Transmission System Operators - TSOs)
- Professionals of Regulation Authorities
- Professionals of Large Industrial and Commercial Companies
- Power System Consultants
- Researchers and Post-Graduate Students of Universities

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### Course Methodology:

This training course is designed to be a hands-on, stimulating experience. The training course is highly interactive with many discussion and practice sessions.

- ☐ Relevant computer simulations and videos .
- ☐ Copies of all presentation material.
- ☐ Variety of Learning Methods.
- ☐ Pre-test and final test.
- ☐ Case Study
- ☐ Training Groups.
- ☐ Presentation.
- ☐ Lectures

### Course Outline:

#### Day One: General Aspects

- Introduction
- Basic principles of probabilistic modeling and reliability evaluation methods
- Power system challenges and main issues for planning purposes
- Analytical computational techniques
- Simulation computational approaches
- Reliability criteria and indices
- Reliability parameters for power system components

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## Day Two: Transmission System Assessment

- Reliability modeling of power transmission systems
- Application of analytical computational techniques
- Total and partial loss of continuity criteria
- Reliability indices of load points and system performance indices
- Reliability cost assessment
- Application of simulation computational approaches

## Day Three: Generation System Assessment

- Reliability modeling of power generation systems
- Modeling of various generating units (thermal, hydroelectric, etc) and load demand requirements
- Frequency and duration method
- Application of analytical computational techniques
- System reliability indices
- Application of simulation approaches

## Day Four: Assessment of Composite Generation and Transmission Systems

- Reliability modeling of composite generation and transmission systems
- Application of analytical computational techniques
- Reliability indices of load points and system performance indices
- Reliability cost assessment
- Application of simulation computational approaches

## Day Five: Distribution System Assessment

- Reliability modeling of power distribution systems
- Application of analytical computational techniques
- Reliability indices of load points and customers

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- System performance indices
- Reliability cost assessment
- Application of simulation computational approaches

**Time: 08:00 AM -03:00 PM Numbers of hours: 35 Hours**

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