1.0 Introduction

Simulation plays an important role in the analysis of power systems. It is required for the design, evaluation of power system components and diagnosis of problems. A number of software packages are available to simulate a variety of transients in a power system. These range from fast phenomena (electromagnetic transients) to the relatively slower electro-mechanical transients.

While simulation tools have become more powerful and incorporate increasingly sophisticated models, using these tools appropriately is a skill which has to be acquired. This requires an understanding of the underlying theory of the phenomena to be studied, and the typical range of the values of the relevant physical parameters. One may also need to know the characteristics of the models and numerical algorithms to understand the input parameters required by the software. The correct interpretation of results and the correlation with real-life measurements is another important aspect of such studies.

The objective of this course is to introduce all these aspects to users by means of simple examples.

2.0 Course Content

Power System Transient Spectrum: Fast and Slow Transient Phenomena.
Simulation Tools for Power System Analysis: EMTP type and Transient Stability Type programs.
Examples of Transient Phenomena and Simulations:
• Capacitor Switching Transients
• Transmission Line (frequency dependent) Models
• Short Circuit Analysis of a Synchronous Generator
• Stability of Synchronous Generators
• Torsional Transients – Multi-Mass modeling
• Induction Machine Bus Transfer
• Lightning and Switching Transients on Transmission Lines

In addition to lecture-demonstrations, hands-on sessions are planned.