

## **Course 1. Power System Protection (Web Course)**

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### **Course Overview**

Reliability of electrical energy systems to a large extent is a consequence of the reliability of its protection system. Basic building blocks of the protection system are fuses, over current and distance relays and differential protection schemes. In this course, we will introduce their principles and applications to apparatus and system protection. Technology of relaying has changed significantly in last century. The first generations of relays were electromechanical devices. The second generation involved solid state relays. The present generations of numerical relays are realized by digital signal processing. In this course, we will also introduce both theory and practice of the numerical relays. The course can be used as a first course in power system protection. It should be also useful to graduate students, practicing engineers as well as the research community.

### **Objectives**

In this course, we plan to teach the following:

1. Fundamental principles of fuse and over current protection and application to feeder and motor protection.
2. Fundamental principles of distance relaying and application to transmission system protection.
3. Fundamental principles of differential protection and application to transformer, bus bar and generator armature winding protection.
4. Role of Current and Voltage transformers in power system protection.
5. Relay co-ordination in transmission and distribution system.
6. Introduction to Numerical relaying. DSP fundamentals like aliasing, sampling theorem, Discrete Fourier Transform and application to current and voltage phasor estimation.
7. Numerical relaying algorithms for over current, distance and differential protection with application to transmission system, transformer and bus bar protection.