

COURSE OUTLINE

INDUSTRIAL POWER SYSTEM PROTECTION

- 1 OVERVIEW OF OVER-CURRENT PROTECTION & COORDINATION
- 2 INTRODUCTION & GENERAL PRINCIPLES OF PROTECTIVE RELAYING
 - 2.1 Introduction.
 - 2.2 Classification of Relays.
 - 2.3 Protective Relaying Systems and their Design.
 - 2.4 Applying Protective Relays.
 - 2.5 Relays and Application Data.
 - 2.6 Circuit Breaker Control.
- 3 BASIC RELAYING UNITS
 - 3.1 Introduction.
 - 3.2 Electro-mechanical Units.
 - 3.3 Sequence Networks.
 - 3.4 Solid-State Units.
 - 3.5 Basic Logic Circuits.
- 4 INSTRUMENT TRANSFORMERS FOR RELAYING
 - 4.1 Introduction.
 - 4.2 Current Transformers.
 - 4.3 Voltage Transformers & Coupling Capacitance Voltage Transformers.

5 MOTOR PROTECTION

- 5.1 Introduction.
- 5.2 Phase-Fault Protection.
- 5.3 Ground-Fault Protection.
- 5.4 Locked-Rotor Protection.
- 5.5 Overload Protection.
- 5.6 Thermal Relays - CT & DT Relays and Thermal Replica Relays.
- 5.7 COM relays for Overload Protection.
- 5.8 Low Voltage Protection.
- 5.9 Phase-Rotation Protection.
- 5.10 Negative Sequence Voltage Relay.
- 5.11 Phase-Unbalance Protection.
- 5.12 Negative Sequence Current Relays.
- 5.13 Out-of-Step Protection.
- 5.14 Loss of Excitation.
- 5.15 Typical Application Combinations.

6 TRANSFORMER & REACTOR PROTECTION

- 6.1 Introduction
- 6.2 Magnetizing Inrush.
- 6.3 Differential Relays for Transformer Protection.
- 6.4 General Guidelines for Transformer Differential Relaying.
- 6.5 Sample Checks for Applying Transformer Differential Relays.

- 6.6 Typical Applications of Transformer Differential Protection.
 - 6.7 Typical Protective Schemes for Industrial & Commercial Power Transformers.
- 7 STATION-BUS PROTECTION
- 7.1 Introduction.
 - 7.2 The Linear Coupler Differential System.
 - 7.3 Multi-Restraint Differential System.
 - 7.4 Multi-Impedance Differential System.
 - 7.5 Setting Example for KAB Bus Protection.
 - 7.6 Protecting a Bus that Includes a Transformer Bank.
 - 7.7 Other Bus-Protective Schemes.
- 8 LINE AND CIRCUIT PROTECTION
- 8.1 Introduction.
 - 8.2 Distribution Circuit Protection.
 - 8.3 Sub-transmission Circuit Protection.
 - 8.4 Transmission Circuit Protection.
 - 8.5 Ground-Fault Protection.
 - 8.6 Series-Compensated Transmission Line Protection.
 - 8.7 Protecting Direct-Current Systems.
- 9 TESTING & MAINTENANCE OF PROTECTIVE RELAYS
- 9.1 Overview and Practical Sessions.