



**GCC Electrical
Testing Laboratory**
المفتبر الفليبي لفصص المصمص الكهريبالية

Basic Protection Course

This -3day course is intended for engineers who are starting a career or in the area of relay protection or have been working in the field for 3-2 years. This course is designed build a strong foundation of knowledge enabling participants to get ready with future tasks and challenges. This course is designed in a way to ensure easy comprehension. Extensive math is simplified to help convey the concepts and the details associated with such protection. Participants should bring their scientific calculator to solve problems.



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Education
Course Code: **EXX1**

Basic Protection Course

SEPTEMBER
9 - 13
2018



The Course program contains the following training outline:

Objectives

Upon completion of this course, the Participant will be able to:

Gain confidence in the work they perform and at the same time be ready for more complicated applications and troubleshooting.

Addressed to:

Electrical engineers who are starting a career or in the area of relay protection or have been working in the field for 3-2 years.

Maximum recommended class size is 25 students (ideal class size is 15 students).

Duration:

3 Full Days

Location/Venue:

GCCIA HQ, Dammam

Course Fees:

DAY 1:

Introduction to Protection (Abnormal Conditions, main components of microprocessor relays, etc.); Fault Analysis (typical impedance data, symmetrical and asymmetrical components, etc.); Instrument Transformers (different types of CTs and PTs and their functions).

DAY 2:

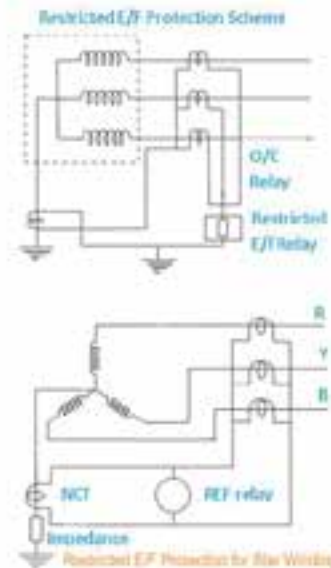
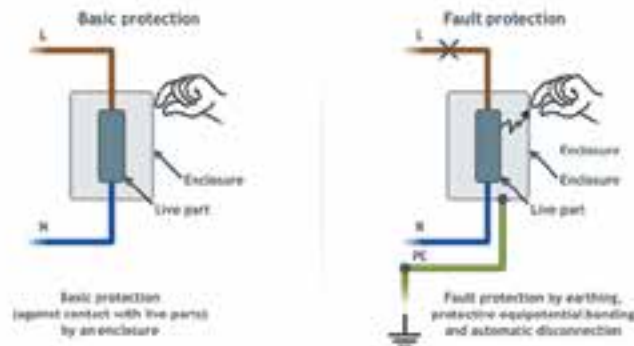
Basic Concepts (Overcurrent Protection, fuses, differential protection, Line current differentials, High impedance and low impedance differential, Bus differential, Types of Bus configuration, Distance protection & Communication Assisted Protection)

DAY 3:

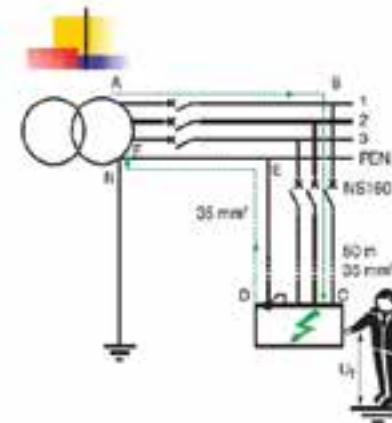
Basics of Overcurrent Relay Coordination.

A software that is used by the company will be used to demonstrate the principles of relay coordination study. A sample system will be used to illustrate all facets of a coordination study. This will include proper timing for various relays, equipment withstand capabilities, etc. .

Basic protection and fault protection



Automatic disconnection for TN systems



The automatic disconnection for TN system is achieved by overcurrent protective devices or RCD's

$$I_d \cdot \frac{U_0}{Z_s} \text{ or } 0.8 \frac{U_0}{Z_c} \geq I_a$$

I_d = the fault current

I_a = current equal to the value required to operate the protective device in the time specified

U_0 = nominal phase to neutral voltage

Z_s = earth-fault current loop impedance

Z_c = the faulty-circuit loop impedance