

A competency-based program that will:

- Enhance the skill for testing and commissioning of various protective relays
- Provide the learners to apply the techniques in the testing, commissioning, and maintenance of relays
- Enable the Learner to analyze any SLD (Single Line Diagram) being used in the industry (Utility, Commercial, Industrial, Establishments) including electrical power system interpretation thru the use of various device function numbers.
- Enhance the proper usage of relay secondary injector test apparatus and prepare corresponding test data sheet including the testing protocols and procedures as required by magnitude relays (i.e. pick up and drop out current)

At the end of the session, the participants will be able to:

- Interpret and learn the fundamentals and principles of relaying as applied to power systems
- Utilize the basic relaying setting coordination calculations
- Perform how a fault in power system are calculated and its relevance to the Time Characteristic Curves and relaying coordination
- Apply the basic relaying application to the industry and utility infrastructure
- Discuss the basic testing methodology applications

At the end of the session, the participants will receive:

- Certificate of Completion, TESDA Accredited
- Continuing Professional Education points (as required by PRC and IIEE)
- Recommendation of Competency (upon completion of Supervisor evaluation)

PAMAV PAMAV TRAINING INSTITUTE & TECHNOLOGY CENTER



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POWER SYSTEM PROTECTIVE RELAYING

- **Protective Relaying theoretical basics**
- **Various Device function numbers**
- **Calculation of fault current setting of relays and coordination, TCC**
- **Insulating Oil, Transformer Loading, Protection**
- **Maintenance of relays**
- **Relaying applications**
- **Hands On Testing**
- **Assessment By Examinations**

July 28, 29, 30, 2010

POWER SYSTEM PROTECTIVE RELAYING

COURSE BACKGROUND:

The EPIRA law mandates reliability, efficiency and practically zero downtime in substation apparatus operation. Technical services group, power system maintenance team and facilities maintenance engineers are the front liners in ensuring the asset longevity operation and recovery of investments.

The unpredictability of operation lies in the way substation assets are maintained and this technical training will guide experienced power protection engineer improve his knowledge based on international standards.

COURSE HIGHLIGHTS:

- Identifies performance requirements in substation relaying apparatus testing
- Presents relaying applications, manufacturing, maintenance and hands on testing of protective relaying
- Emphasize methods in insulation power factor testing
- Interpretation of various SLD (Single Line Diagram) with the use of various device function numbers

WHO SHOULD ATTEND?

- Maintenance Engineers from the utility and industrial segments
- Power system / relay engineer from utility, IPP and Electrics Cooperative

COURSE FEE:

PhP 12,800.00 inclusive of snacks, lunch, Certificate of Completion
An additional of PhP 500.00 will be charged CPE points

POWER SYSTEM PROTECTIVE RELAYING

COURSE OUTLINE

DAY 1

- Course Introduction
- Welcome Remarks

1. Relaying Methodology

- Device function numbers
- Primary protection
- Back-up protection
- Single line diagram
- Various relaying Schemes
- Hierarchy of relaying
- DC Schematics diagrams
- What is relay?
- Purpose of relaying
- Block diagram of power system protection
- Types and Categories of relays
- Logical design and various criteria of relaying

DAY 2

2. Refresher course on fault current calculation

- Per-unit value
- Portescue Theorems
- BIL, withstand capability
- (Pos, Neg, Zero Sequence)
- Sample calculation of maximum and minimum fault current manual calculation.

DAY 3

- Advance Relaying
- Hierarchy of Relaying
- SCADA peripherals
- Relay equipment and technology

YOUR INSTRUCTORS:

Engr. Rodolfo R. Peñalosa, PEE, PECE, Apec Engr.

Engr. Penalosa is the Chairman and President of . He is also the President of WESTCO is a sister company of PAMAV specializing in providing electrical testing services and equipment. Engr. Penalosa is a visionary and leader of testing equipment and tools for the development and advancement of the Electrical Engineering Profession. He is a keynote speaker on Electrical Engineering Law, Substation testing and key areas in the Electrical Engineering field and has addressed various audiences both locally and the international scene. He led the Continuing Professional Education Council of the Professional Regulation Commission (PRC) as a Chairman for nine years. Currently, Engr. Penalosa is the Chairman of the Technical Panel for Engineering, Technology (TPET) of the Commission on Higher Education Higher Education (CHED) and a member of the Construction Arbitration by The CIAC. His expertise contributed to being a Philippine Representative of CHED in Japan, Brunei and Pennsylvania covering the aspects of Electrical Professional Practice and Standards and APEC Competency Standards Development for Engineer Registry.

Engr. Penalosa also holds Past President of Society of Philippine Electrical Contractors & Suppliers (SPECS, 1992), the Institute of Integrated Electrical Engineers of the Phils (IIEE, 1995), Past Chairman of Construction Manpower-Development Foundation, National Construction Productivity Development Plan, Department of Trade and Industry (DTI/JICA, 1994 to 1996), the President of Society of Philippine Accredited Consultants (SPAC, 2007-08) and a Past President of the Philippine Association of Board Examiners (PABE, 2001 & 2002). Engr. Penalosa has attended extensive trainings in Power System Maintenance by DOBLE in Finland, Boston and Singapore and holds a degree in Bachelor of Science in Electrical Engineering from FEATI Universtiy.

Engr. Ulysses B. Paguio, PEE

Engr. Paguio is a Training Consultant of PAMAVTech. Engr. Paguio's expertise comes from years of experience as a Power Systems and Testing Engineer in the Middle East and the Philippines servicing companies such as: Siemens, ABB Industry, Inc., and Manila Electric Company to name a few. He is also a Professor of the Electrical Engineering department at the Mapua Institute of Technology in the Philippines teaching. Engr. Paguio's expertise is on the aspects of Power System Engineering and Testing. He graduated Bachelor of Science in Electrical Engineering and is currently continuing his Master of Science in Technological University of the Philippines.

REGISTRATION

POWER SYSTEM PROTECTIVE RELAYING

Please check the date:

Date: July 28 to 30, 2010

Venue: PAMAVTECH, 7F Integrated Professional Office Building
14 Quezon Avenue Quezon City

Time: 8:00 a.m. to 5:00 p.m. on each day

Please fill up and return to fax 740-7602 or admin@pamavtech.com. Provide one form for each participant.

NAME (as you want to appear on certificate. Title, first name, middle initial, last name, suffix)	
DESIGNATION	
COMPANY NAME	
TELEPHONE	LOCAL NUMBER
CELLPHONE	
EMAIL ADDRESS	

Payment:

Reservations without payment do not confirm your slot. To confirm your reservation, please pay the course fee of Php 12,800.00 per person thru China Bank (Quezon Avenue branch) Account name PAMAV Training Institute & Technology Center, C/A#: 107-119555-8. Please attach the deposit slip with this form.