



**POWER & ENERGY SOCIETY
INDUSTRY APPLICATIONS SOCIETY
NEW YORK CHAPTER**



Electrical Power Systems 101

Name of Course: Electrical Power Systems 101.

Dates: **Thursdays, May 15, 2014 to June 26, 2014**

Place: Parsons Brinckerhoff, Room 209, One Penn Plaza, New York NY 10119

Time: 6:00 PM to 8:00 PM

Contact: Arnold Wong: Chairman: Program Committee: WONGAR@ConEd.com (212) 460-4189
Thomas Li, PE: Chairman: Education Committee: Thomas.Li@Jacobs.com (212) 946-2333
Chris Kwong, PE: Secretary: PES & IAS NY Chapter: Chris.Kwong@Jacobs.com (212) 946-2334

Cost: Including all printed material:

1. IEEE Member:	\$299.00;	Two or more:	\$250.00
2. Non-Member:	\$399.00,	Two or more:	\$350.00
3. IEEE Student Member:	\$25.00		

Course Duration: 7 weeks Lecture Hours: 2.00 hours / week; 2 PDH / 0.2 CEUs; Total 14 PDH / 1.4 CEU

Instructor: Geradino A. Pete, PE, NJIT Adjunct Professor

Reserve Now: **Class size limited. Please make checks payable to: IEEE PES/IAS NY Chapter.**

Mail check for registration to: Consolidated Edison of NY,
ATTN: Arnold Wong, Room 6NE
4 Irving Place
New York, NY 10003

Course Description:

This course will be a broad introduction to the components, concepts and design/code applications of electrical power systems. The participants will get an overview of:

- Power system configuration including generation, transformation, transmission, subtransmission, primary and secondary distribution subsystems and customer loads.
- Power circuit impedance, voltage, current, frequency, and apparent, real and reactive power relationships under normal, overload and fault conditions.
- Power circuit configuration including single-phase and three-phase and wye and delta connections.
- Overvoltage and insulation coordination.
- Undervoltage and power transfer capacity.
- Voltage and reactive power control including generator excitation, synchronous condensers, shunt reactor and capacitor banks, transformer tap changers and line charging.
- Transformer theory including wye and delta transformations, three-winding transformers, power, voltage-regulating and phase angle-regulating applications, neutral grounding transformers, voltage, current and auxiliary transformers and saturation considerations.
- Symmetrical versus asymmetrical current.
- Fundamentals of system protection.
- Symmetrical components.
- Transmission line protection including non-directional and directional overcurrent and distance protection, phase and ground protection, and zero sequence mutual compensation.
- Generator theory including prime movers, real and reactive power mechanisms of electric generators, synchronous and induction generators and motors, generator capability curves, steady-state, transient and subtransient current.
- Generator protection including phase and ground fault protection, loss of excitation, loss of synchronism, directional and non-directional overcurrent protection, reverse power, negative sequence protection, overload, overspeed and overvoltage protection.

- Grounding theory and design including touch-and-step criteria, ground resistance and ground resistivity measurements, ground grid design, ground protective relay coordination, effect of surface material, criteria for tolerable voltage, transferred potentials, ground electrodes, ground mat and ground grid design.

Who should attend?

- Students study electrical engineering.
- Engineers new to the field or with limited experience.
- Experienced engineers seeking an overview of the contemporary electrical power systems.
- Managers and supervisors without previous experience in electrical power systems.
- Electricians, Technicians, Installers and Field Personnel seeking overview of electrical power systems.
- Engineers seeking to obtain continuing education credits to satisfy New York State’s re- registration requirements for professional engineers.

Requirements:

Quizzes/Tests and home work will be given at the discretion of the instructor. A certificate of completion will be given to all participants who successfully complete the course. For partial attendance, a certificate for the attended day-course/s with its PDH/CEU’s will be issued.

NOTE: If an attendee cannot attend a particular session, another person can attend from the same company.

Required Reference Book:

Electric Power Systems for Engineers and Technicians,
Geradino A, Pete, PE, included in the course material.

Suggested Text:

Westinghouse Electrical Transmission and Distribution Reference Book, Westinghouse Central Station Engineers, 1965.

COURSE OUTLINE SCHEDULE

<u>Lesson</u>	<u>Subject</u>
1.	Introduction to Electric Power Systems
2.	Transformers
3.	Introduction to System Protection
4.	Transmission Line Protection
5.	Generating Systems
6.	Generator Protection
7.	Grounding

