



**POWER AND ENERGY SOCIETY
INDUSTRY APPLICATIONS SOCIETY
NEW YORK CHAPTER
2015**



Grounding and Bonding 101

Name of Course: Grounding and Bonding 101.

Dates: **Thursdays, May 21, 2015 to June 11, 2015**

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

Time: 6:00 PM to 8:00 PM

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

<u>Cost:</u> Including all printed material:	1.	IEEE Member: \$199.00;	Two or more: \$150.00
	2.	Non-Member: \$299.00,	Two or more: \$250.00
	3.	IEEE Student Member: \$25.00	

Course Duration: 4 weeks Lecture Hours: 2.00 hours / week; 2 PDH / 0.2 CEUs; Total 8 PDH / 0.8 CEU

Instructor: Geradino A. Pete, PE
President Vector Engineering Services, PC

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 grounding and bonding principles for electrical power systems. The participants will get an overview of:

- Electrical engineering fundamentals related to grounding and bonding applications.
- Application of IEEE 80-2013 Safety in AC Substation Grounding including safety in grounding, range of tolerable current, tolerable body current limit, accidental ground circuit, criteria of tolerable voltage, principal design considerations, recommendations for gas insulated substations, selection of conductors and connections, soil characteristics, soil structure and selection of soil model, evaluation of ground resistance, determination of maximum grid current, design of grounding systems, special areas of concern, construction of a grounding system, field measurements of a constructed grounding system, and physical scale models.
- Application of IEEE C2-2012 National Electrical Safety Code including introduction, scope, application, general rules, definitions, grounding methods for electric supply and communications facilities, rules for the installation and maintenance of electric supply stations and equipment, and safety and work rules for the installation and maintenance of overhead and underground electric supply and communications lines.
- Application of NFPA 70-National Electrical Code, Article 250 Grounding and Bonding including scope, definition, application of other articles, general requirements for grounding and bonding, objectionable current, connection of grounding and bonding equipment, system grounding, grounding electrode system and grounding electrode conductor, enclosure, raceway and service cable connections, bonding, equipment grounding and equipment grounding conductors, methods of equipment grounding, grounding of direct current systems, instruments, meters and relays, and grounding of systems and circuits over 1000 volts.

- Application of IEEE 1100-2005 Recommended Practice for Powering and Grounding Electronic Equipment, (The IEEE Emerald Book) including overview, definitions, general needs guidelines, fundamentals, general needs guidelines, site survey and power analysis, specification and selection of equipment and materials, recommended design and installation practices, telecommunications and distributed computing, industrial systems and case histories.
- Application of NFPA 780-2014 Standard for the Installation of Lightning Protection Systems including scope, purpose, listed, labeled or approved components, definitions, general requirements, principles of lightning protection systems, inspection and maintenance of lightning protection systems, lightning risk assessment, and guide for personal safety from lightning.

Who should attend?

- Students who study electrical engineering.
- Engineers new to the application of grounding and bonding principles or with limited experience.
- Experienced engineers seeking an overview of the contemporary grounding and bonding practices.
- Managers and supervisors without previous experience in grounding and bonding.
- Electricians, technicians, installers and field personnel seeking overview of grounding and bonding systems.
- Engineers seeking to obtain continuing education credits to satisfy New York State's 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 from the same company can attend.

Required Reference Book (to be purchased by STUDENT not included in the course material):

<i>IEEE 80-2013</i>	Safety in AC Substation Grounding
<i>IEEE C2-2012</i>	National Electrical Safety Code
<i>NFPA 70</i>	National Electrical Codes, Article 250 Grounding and Bonding
<i>IEEE 1100-2005</i>	Recommended Practice for Powering and Grounding Electronic Equipment
<i>NFPA 780-2014</i>	Standard for the Installation of Lightning Protection Systems

Suggested Reference:

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

COURSE OUTLINE SCHEDULE

<u>Lesson</u>	<u>Subject</u>
1.	Electrical engineering fundamentals related to grounding and bonding applications – IEEE 80
2.	National Electrical Code Requirements – NFPA 70
3.	National Electrical Safety Code Requirements -IEEE C2 & lightning protection requirements – NFPA 780
4.	Electrical engineering issues related to grounding and bonding

