



SIEMENS

Ingenuity for life



PDEC 591

Substation Engineering and Design

Siemens Power Academy TD - NA • usa.siemens.com/pti-education

At a glance

Electrical substations are an integral piece of any distribution network between generation and consumers. Substations are complex projects involving many aspects of engineering; from conceptual layout to detailed design, procurement, and maintenance, there are many factors involved.

The objective of the **Substation Engineering and Design** course is to provide participants with a basic understanding of the electrical engineering design fundamentals for new substations or for expansions of existing stations.

PDEC 591 course participants will:

- Investigate general substation design considerations, including major substation components, system and space requirements, and switching arrangements
- Explore considerations in the design process, including security of supply, operational flexibility, environmental considerations, etc.

- Understand the types of substations, their general layouts, configurations, and applications
- Discuss reactive power fundamentals and their relation to substation design
- Explore grounding methodology, considerations, grid design, studies required, and preliminary engineering
- Discuss bus design, including electrical clearances and bracing
- Review FACTS devices and explore their implementation in the overall power system design
- Understand the effect of lightning on utility systems
- Discuss surge arrester selection in the insulation coordination process
- Understand the general principles of protection schemes, i.e., how protective systems are designed to minimize equipment damage and service disruption resulting from system disturbances
- Recognize inspection and testing requirements for substation equipment and develop appropriate procedures
- Compare the features of gas insulated to air insulated substation installations
- Discuss HVDC substations, equipment, components, and operation.

Upon completion of this course, participants will have a fundamental understanding of substation design, which is a must for engineers and technicians working in the power system.

Prerequisites

This course is intended for engineers in the first few years of substation engineering and design, and for managers or seasoned designers who want an overview of the complete substation engineering and design process.

Course structure

This is a three-day course. Material is presented in both morning and afternoon sessions for a total of six hours of daily instruction. Standard course hours are 9:00 a.m. to 4:00 p.m. each day.

To view the PDEC 591 Course Schedule on the web:

https://siemens.coursewebs.com/cart/pageCourseInfo.aspx?Course_ID=PDEC_591

Instructors

All courses offered through Siemens Power Academy are developed and taught by leading industry engineers. In addition to their proven instructional ability, our engineers have advanced degrees complemented by first-hand knowledge and experience solving power system problems throughout the world.

Continuing Education Units (CEUs), Professional Development Hours (PDHs):

Licensed engineers, on a voluntary or mandated basis, attend continuing professional education for licensure renewal to ensure competency. All courses offered through Siemens

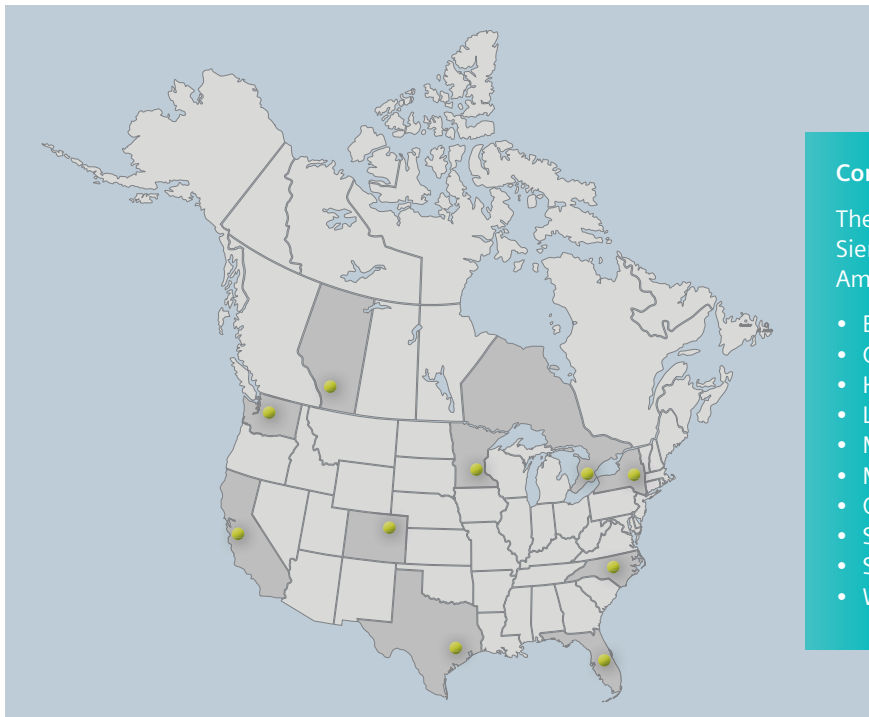
Power Academy meet the requirements for CEUs and PDHs.

- Continuing Education Units (CEUs) are the nationally recognized units for recording participation in professional development and noncredit educational programs. Participants completing this course will be awarded CEUs based on the instructional hours of the course: one CEU is awarded for 10 classroom hours of instruction.
- Professional Development Hours (PDHs) – Continuing education training for the Professional Engineer (PE) – that needs to earn annual Professional Development Hours

(PDHs). Through our instructor-led training, participants earn one PDH for each one hour of instruction. The participant is responsible for maintaining records of courses taken in support of licensure.

Client site and custom training

All courses are available for presentation at any client's location by special arrangement. At client sites, it is recommended that sufficient computer terminals be available to enable a fully interactive and productive class, if applicable. Client site courses can also be tailored to address specific topics of local importance.



Convenient training locations

The course is scheduled on a regular basis at Siemens offices located throughout North America, including:

- Burlington, Ontario, Canada
- Calgary, Alberta, Canada
- Houston, Texas, USA
- Littleton, Colorado, USA
- Minnetonka, Minnesota, USA
- Mountain View, California, USA
- Orlando, Florida, USA
- Schenectady, New York, USA
- Seattle, Washington, USA
- Wendell, North Carolina, USA

Contact us

Siemens Power Academy TD - NA

Phone: (518) 395-5005

Fax: (518) 346-2777

Email: power-academy.us@siemens.com

Web: usa.siemens.com/pti-education

Export Control

AL-Number:

ECCN: EAR99

Siemens Industry, Inc.

Siemens Power Technologies International

400 State Street

P.O. Box 1058

Schenectady, NY 12301-1058 USA

© 2016 Siemens Industry, Inc.

usa.siemens.com/digitalgrid